

## **(2) Guidelines and Criteria for Preparation of Medium and Small Dams Package Programs**

For more clear understanding on the scope of work to prepare a series of the medium and small dams package programs, the general guidelines and criteria have been presented being apart from the procedures for the EIA as proposed.

### **Pre-Feasibility Study:**

- Installation of hydrological gaging stations and their reliable observation over the basin.
- Study for potential surface water over the basin dividing into those for tributary basins with the area of 1,000 to 2,000 sq.km.
- Identification of potential sub-projects to be developed by proposed dams on the 1:50,000 maps and site reconnaissance survey.
- Preparation of approximate outline of identified sub-projects including potential surface water, dimension of dam and reservoir, irrigable area size, water demand, socio-economic condition, related development cost, etc.
- Water balance and allocation for each sub-project and tributary basins as a whole based on potential surface water and water demand.
- Screening of most likely feasible sub-projects for subsequent feasibility study.

### **Feasibility Study:**

- Preparation of topographical maps for tributary basin, dams site and service area.
- Geological investigation at dams site, soil survey over service area, socio-economic survey, EIA for the proposed sub-project areas, and etc.
- Feasibility study at international level including plan formulation, preliminary design for project facility, project cost estimate and evaluation, etc.

### Preparation of Package Program for Implementation:

- Package program including two to four sub-projects under the proposed medium dams which will be implemented by domestic contractor.
- Package program including five to ten sub-projects to be developed by the proposed small dams which will be implemented on the RBDA force account basis.

In order to conduct the above-mentioned study smoothly and rationally, the FMWRRD will be directed to prepare the guidelines to be applied for the following items:

- Hydrological analysis.
- Reservoir planning.
- Geological and soil survey.
- Dam standard section and appurtenant structures.
- Irrigation water demand and per capita demand for water supply.
- Irrigation canal system.
- Cost estimate including the cost allocation procedures for multipurpose joint facilities.
- Environmental impact assessment.

In addition, particular attention will be paid to the following in the feasibility study of service components under the proposed multipurpose medium and small water storages:

- Socio-economic and land tenure conditions in service area, especially problem and constraint to be solved for achievement of successful irrigated agriculture.
- Local people participation for project planning and implementation.
- Definitive area for irrigation based on available irrigation water in water storage and irrigation water demand in service area.
- Irrigation facilities to be managed easily and effectively by WUA.
- Multipurpose use of water for irrigated agriculture, domestic water supply, fish culture, mini-hydro, reforestation, etc.

- Adequate project implementation program including proper project cost estimate and implementation schedule.
- Project evaluation including economic evaluation and financial analysis.
- Institutional building of RBDA, State agencies, and beneficiaries to implement the project and manage irrigated agriculture and other activities.

#### **4.3.3 Master Action Plan Implementation Schedule**

This paragraph compiles the implementation schedule and relevant costs for the projects and programs so far recommended to be carried out during the National Water Master Action Program towards 2000.

	Costs	1996	1997	1998	1999	2000
	(10 <sup>5</sup> Naira)					
<b>1. Water Resources Monitoring Programs</b>						
1.1 Climate and Surface Water Gages/equipment Monitoring	208.2					
	157.4					
	50.8					
1.2 Groundwater Monitoring systems Monitoring	63.1					
	60.1					
	3.0					
Sub-total: (1.1 + 1.2)	271.3					
<b>2. Water Source Works</b>						
2.1 Existing Dams	600.0					
Water management program	100.0					
BMR works	500.0					
2.2 Study for Proposed Dams	200.0					
Sub-total: (2.1 + 2.2)	800.0					
<b>3. Irrigation and Drainage</b>						
3.1 Existing Public Schemes	7,680.0					
BMR works	420.0					
Additional development	7,260.0					
3.2 Study for Proposed Schemes	100.0					
Sub-total: (3.1 + 3.2)	7,760					
<b>Total: (1 + 2 + 3) for the FMWRRD</b>	<b>8,851.3</b>					
<b>4. Water Supply</b>						
4.1 BMR Works	3,400					
Urban	2,960					
Rural	440					
4.2 On-going and Proposed	37,380					
Urban	18,020					
Rural	19,360					
Sub-total: (4.1 + 4.2)	40,780					
<b>Total: (1 + 2 + 3 + 4)</b>	<b>49,631.3</b>					
<b>5. Others as Examined under the NWRMP</b>						
5.1 Private Irrigation Schemes under the FMANR-State ADPs	1,300					
5.2 Dadin Kowa Hydro Development under the NEPA	600					
5.3 Gully Restoration Works under the Federal Ecological Fund and State Government Budgets	7,160					

#### **4.3.4 Priority Technical Assistance Program for Urgent Consideration by External Agencies**

##### **(1) General**

The needs and categories of projects and programs to be assisted by external agencies during the period of the National Water Master Action Plan towards the year 2000 where the study and preparation should be appropriately carried out upon setting clear guidelines in line with the internationally recognized standard, have been examined extensively during the final course of the NWRMP Study, some of which are compiled in the relevant Chapters of Vol. Two "Sector Report".

It is highly recommended that the top priority has been given, among others, for proper implementation of the feasibility study on a proposed "Comprehensive River Basin Management Program" for a particular basin with existing water resources development facilities inclusive of water storage(s) as a pilot model for future demonstration and application to other basins. And, this should be considered for prompt realization as a technical cooperation program with the assistance of external agency(ies) during the early period of the National Water Master Action Plan for subsequent effective implementation of the recommended NWRMP. It may be noted that a working paper for the Comprehensive River Basin Management Program was presented by the JICA Advisory Committee at the Final Steering Committee Meeting held in Abuja for discussion.

##### **(2) Feasibility Study of A Comprehensive River Basin Management Program**

Provisional Terms of Reference on the subject technical cooperation program are given below:

###### **(a) Introduction**

In line with a series of the findings incorporated in the Final Report, the most fundamental step to be promptly taken for proper implementation of the JICA-assisted National Water Resources Master Plan is to carry out a feasibility study of the Comprehensive River Basin Management Program for a particular basin in a size of around 500 to 1,000 sq.km with existing water

resources development facilities inclusive of water storage(s) as a pilot model for future demonstration and application to other basins.

**(b) General Concept Involved**

The planning objective to be set for the proposed Comprehensive River Basin Management Program is to work out a feasible scenario on income generation and its sustainable development for the rural people's benefits through the establishment of a solid foundation for water resources development and management. In particular, the planning target is (1) to stabilize the rural people's income at a certain level under which population keeps in equilibrium, and (2) to improve the financial accountability and relevant public services of autonomous utilities concerned through establishing the proper water resources management system. In other words, this target on the improvement and stabilization of living level for the people in the basin under the Program may be converted into an issue on the enlargement and sustainability of commodity production and related shipment in the basin which should be achieved through the establishment of appropriate water and land resources management program to be closely combined with the strengthening of its downstream ancillary extension services for people with the assurance of possible production and viable product marketing in terms of incentive prices and values added for the producers.

In Nigeria, the Government activities are generally organized so that each type of water use and related services are managed by a separate Ministry / Department. There is the need of appropriate institutional setting for sound implementation of the Program including inter-Ministerial / Departmental coordination, decentralization, privatization and users participation. In particular, the participation of beneficiaries is essential for the design and implementation of the proposed Program to be effective. Participation cannot be limited to the direct beneficiaries and those adversely affected, and the persons and groups concerned about environmental consequences and economic effects especially for members of disadvantaged groups need to be part of the decision making process. In this occasion, NGOs as stemmed from local initiatives and operated as independently funded and self-managed groups have an important role to play in ensuring the participation of rural people and local community with a particular emphasis upon the concept of WID (women in development) in the implementation of this type of the Program. The NGOs

who bring fresh views, new ideas and participatory working methods to the areas of development policy and practice may undertake a wide range of water-related functions from developing water use schemes to foster water users groups and also encourage the rural people to experiment appropriate technologies suited to local conditions through their setting of farmers cooperatives, rural workers organizations, informal groups, community associations, etc. The important role of private sector in promoting appropriate technologies, facilitating marketing and input supplies, and direct participation in the development itself is encouraged with more incentives.

The proposed Program Study may be divided into five Components as introduced below which should be mutually inter-linked and individually backed up by strengthening the education and training program for the Government officials and rural people and also be properly connected with the regular monitoring framework as a whole.

**Component 1:**

Water Resources Development and Management with the target to supply water on demand in terms of place, period, quantity and quality, as well as the provision of disaster prevention measures and watershed management.

**Component 2:**

Extension Services for Income Generation to Rural People which include the development of crop farming (suitable crops, farming practices and on-farm water management), livestock breeding, fisheries, forestry and other rural activities, in line with the land capability and use strategy, together with an appropriate arrangement of the rural credit operations.

**Component 3:**

Extension Services for the Water-Related Infrastructure including the construction and OM of systems and facilities related to irrigation, water supply and sanitation, reservoir and pond fisheries and hydropower.

**Component 4:**

Strengthening of the Services for Downstream Development of Rural Activities which include the procurement processing, marketing, input supply, transportation and others to be performed by the private sector and/or rural cooperatives.

**Component 5:**

Development of the Program Management System which covers the administrative functions, information and data management, land use management, health and environmental resources, and project monitoring on the basis of appropriate legal and regulatory framework.

**(c) Scope of Each of Five Components**

**c. 1 Component 1: Water Resources Development and Management**

This Component is to be organized with the following six consecutive procedures:

**i) Basic Analysis**

- Present situations of the water resources facilities including the operations and surveillance, as well as relevant management system; to this end, identifying the problem areas.
- Understanding of (1) the land resources and use, (2) extent of the damage-free flood discharges, (3) the resources potential for both surface and groundwater, and (4) the current pattern of water use for irrigation, water supply, hydropower and other activities.

**ii) Analysis of the Water Demand and Its Pattern**

- For the increased production of crops, fishes and livestock which may be derived from the socio-economic study including the projection of population.



- For the increased output of hydropower generation in terms of the water release from existing dam(s)
- For the stabilization and expansion of water supply in accordance with the growth of population served and income generated, taking into account the conjunctive use of surface and groundwater.

iii) **Hydrological Analysis**

Rainfall-runoff relation, low flow availability at a return period of ten years, computation of the natural river discharges and required reservoir capacity in connection with the water demand pattern and sediment load.

iv) **Preparation of an Integrated Water Release Operations Program**

This may be developed through several trial computations for optimum water release by employing the outcomes of the above analyses ii) and iii).

v) **Preparation of a Reservoir Operations Rule**

The reservoir operations rule is discussed for several alternatives, and more favorable rule is for test operations in the field for a period of one year; to this end, the optimum rule is finally formulated.

vi) **Preparation of an Integrated Water Resources Operations Program**

Operations program including the water releases and reservoir operations as formulated above in combination with proper plans of organizational structure, installation of monitoring and surveillance equipment and OM for relevant facilities; to this end, computation of the benefits to be derived from the integrated operations.

**c. 2 Component 2: Extension Services for Income Generation to Rural People through Water-Related Rural Development Activities**

The area development schemes for sectors of crop production, livestock breeding, fisheries, forestry and other rural activities in response to the water resources development potential benefiting a large number of rural people inclusive of small farmers, tenants, landless workers and their families should be examined in view of the current situations, resources potential and possible process towards full development level. With well-designed development schemes offering proper incentives to rural poors in connection with the strengthening of public and/or private technical extension services, the development scenario should be prepared at the pace that is more rapid than was usually believed and with the impact on levels of living following the expansion of cash incomes from the subsistence baseline.

This Component may include the following study items:

**i) Provision of the Physical Resources Inventory and Socio-Economic Profiles**

Confirmation of the physical resources inventory of the Program area including climate, topography and geology, water availability, soils, land capability and existing use, aquaculture, vegetation, and environmental conditions as well as of its economic profile including economic trend, income distribution, employment structure, and the sectors of production, physical infrastructure and related services; to this end, providing the inventory maps of physical resources and socio-economic profiles.

**ii) Estimate of the "Without Project" Situation**

On the basis of its social environment including demographic trends with emphasis upon the motivation and process of outmigration and the age structure of economically active population, estimates of the "without project" situation on the

expectation for income distribution, the level of farm income, the labor requirements, and employment opportunities with special reference to the agriculture sector and after an assessment of the expected changes in economic production during the coming decades, together with the identification of its constraints or problems against the exploitation of its natural and human resources potentials.

iii) **Development of the Land Use Plan**

Preparation of a detailed land use plan for the Program area in order to avoid future conflicts between agriculture, rural activities and watershed conservation / erosion protection, and identification of the size and location for the areas for specific objectives.

iv) **Provision of a Credit Program**

In association with the selected priority schemes in production sector and the availability of investment and operational credit facilities, the provision of detailed scope of a credit program including credit delivery system, required investment estimate for associated schemes, implementing arrangement inclusive of terms and conditions of loans, and annual lending program.

v) **Formulation of an Area Development Plan**

In the light of the above items i) to iv), the formulation of specific objectives including the selection of target groups and the constraints for development, and the identification of comparative advantages for production potentials which leads to that of the priority areas and sectors with emphasis upon such sectors as irrigation, upland crop production, livestock, fisheries, forestry, road development and rural credit. Additionally, in line with the assessment on the role of women in farm and household activities in the Program area, the identification of their needs, interests and constraints, and the formulation of strategies and approaches for integrating women

into the Program development plans including the training which might integrate matters of concern to women into the Program.

**vi) Preparation of Possible Development Schemes**

Preparation of the possible schemes with their location, scale and timing including proposal of high impact ones with their tentative features and costs to be implemented up to the year 2000, with special attention to (1) sectoral and spatial linkages / integration, (2) integration between productive schemes and institutional / managerial programs, (3) vertical integration of productive sectors, and (4) financial and implementing capability for the proposed strategy.

**vii) Preparation of the Benchmark Information**

Preparation of the benchmark information about beneficiaries for future monitoring covering (1) their demographic and socio-economic conditions, (2) descriptive profiles of the community groups indicating their interests in and capacity for participating in the implementation and OM of the schemes, and (3) the role of women.

**c. 3 Component 3: Extension Services for the Water-Related Infrastructure**

Based upon the above examination and review, the preparation of priority schemes for such water-related infrastructure as needed for the area development program including irrigation, water supply and sanitation, reservoir and pond fisheries, and major or mini hydropower will be made at a full feasibility level.

The Component 3 will include the following aspects:

**i) Needs for Infrastructure Development**

Assessment of the needs for rehabilitation and improvement of existing schemes and new construction for the proposed water-related infrastructure on the minimum basis necessary as required for the future development of an influence area and determined by such relevant factors as development of agriculture and other rural enterprises through the Program activities.

**ii) Preliminary Layout for Infrastructure Development Schemes**

Investigation of various alternative solutions including alternative alignments, staging and design standards, and the preparation of a preliminary construction layout and cost estimate for each alternative solution, while this assessment may include the application of appropriate technology suited to local situations so that the maximum local labor force could be used.

**iii) Recommendation for Schemes OM**

Assessment of the water-related infrastructure OM arrangements in the Program area, and formulation of the recommendations for improvement of maintenance standards and operations to ensure adequate maintenance for completed schemes.

**iv) Environmental Impact Analysis**

Preparation of an environmental impact assessment of the proposed Program as a whole with particular attention to loss or degradation of natural resources due to land use change, effects of agrochemicals, and effects on socio-cultural and other quality of life values including water supply, sanitation and public health; to this end, evaluating the significance of projected impacts and proposing the measures to minimize / mitigate adverse impacts.

v) **Economic and Financial Analysis**

Consolidated economic and financial analyses including cash flow and repayment schedules by users with the computation of ERR and FRR over the economic life of the project inclusive of sensitivity testing, and evaluation of the financial and operational data inclusive of income statements, balance sheets, and source and use of fund statements of the executing agencies.

c. 4 **Component 4: Strengthening of the Services for Downstream Development of Rural Activities**

In any event, various schemes likely to be incorporated into the proposed Program should contain the blend of inputs and services necessary to ensure a sustained increase in productivity for the beneficiaries. Attention should be given to the appropriate balance between the directly and indirectly productive elements in the scheme, and the balance should reflect the level of services proposed for the sector on a national basis, the most economic means of providing such services and restrictions on the resources that can be used for this purpose. In particular, the viability and soundness of each scheme may require an operational sequence of three basic component activities, such as procurement, processing and marketing from the standpoint of external environment and demand, where the marketing factor is the logical starting point for the proposed Program.

The Component 4 may cover the following studies:

i) **Analysis of the Support Services**

Assessment of the adequacy of existing support services and facilities for various schemes within the Program area, including identification of the constraints in the quality and capacity of such services, and recommendation of the required improvement in adaptive research, extension, training, credit, input supply, procurement, processing and marketing, and transportation and

distribution together with the provision of details of staff deployment levels and budgetary allocations needed to strengthen an overall support facility.

**ii) Marketing Analysis of the Basin's Products**

Examination of the external environment's response to the basin's products by analyzing consumer characteristics and the competition taking into account the technical capacity to grow the raw materials in order to eliminate the problem that the lack of marketing opportunities acts as a powerful discentive to rural people, and identification of the product design, pricing, promotion and distribution as the elements of marketing plan to be made by the private sector and/or rural cooperatives with emphasis upon the value added from production; to this end, indicating the prospects and comparative advantage in the Program area.

**iii) Preparation of a Development Plan for Production and Processing**

In the light of the above items i) and ii), preparation of the plan on multisectoral basis to intensify and diversify the production sectors along with adequate provision of supporting socio-economic infrastructure including institutional and managerial aspects, and assessment of the scope for promotion and development of small-scale cottage and rural industries for primary processing of agricultural, fishery and forestry products.

**iv) Analysis of the Road Network**

Identification of the priority sectors of road network including farm-to-market one for improvement and construction, and preparation of a phased development program to ensure that it is fully linked with proposed marketing and other development activities with respect to location and timing.

**c.5 Component 5: Development of the Program Management System**

Since water is critical for human survival, the public agencies have assumed the central responsibility for its overall management; however, their activities have often caused serious misallocations and waste of the water resources when not properly formulated or managed. Three problems are of a particular concern; (1) fragmented public sector management that has neglected interdependencies among agencies; (2) reliance on overextended Government agencies that have neglected financial accountability, users participation, and pricing while not delivering the services effectively to users and the poor in particular; and (3) public investments and regulations that have neglected water quality, health, land use and environmental consequences. In addition, the unsatisfactory situation of the management information system may lead towards proper employment of the Program monitoring system as a simplified and more feasible technique for managing three aspects of the Program; (1) physical progress; (2) project cost; and (3) project benefit.

The Component 5 may include, but not necessarily be limited to the following aspects:

**i) Role and Function of the Public Agencies**

Assessment of the role and function of the public agencies to implement the proposed schemes which include the organization and staffing to cope with assigned planning, coordination and monitoring functions, and preparation of the proposals on required change and improvement of these agencies with the purpose of strengthening their envisaged functions.

**ii) Participation of the NGOs**

Preparation of the proposals on possible participation of the local NGOs who have participatory working conditions to other areas



of the Government development policy and practices, in order to provide supplemental roles from initiating the potential water-related schemes in promoting the interests of poor and disadvantaged through articulate and forceful advocacy and service provision to foster the water users associations for water management purposes.

iii) **Strengthening of the Institutional Capability of the Public Agencies**

Review of the institutional capability of the public agencies at various levels for environmental impact assessment, monitoring and management, and recommendation on a program to strengthen their capabilities including delineation of requirements and costs for manpower, training, facilities, equipment and other operations, with an attention to the need for providing an independent body for monitoring the progress of implementation and the benefit during and after implementation.

(d) **Scope of Work for the Technical Assistance**

d.1 **Objective**

- i) To prepare the Comprehensive River Basin Management Program with a feasibility report inclusive of immediate implementing program and guidelines and criteria for planning in similar-natured projects.
- ii) To transfer the planning skills and technology to the Nigerian personnel in Nigeria and in the donor country(s).

d.2 **Study Area**

The condition to select a basin for development survey would be a size of the basin at 500 to 1,000 sq.km with existing water resources development facilities that would be manageable for an intensive study by the external agency within the limited period.

### **d.3 Agencies**

The executing agencies would be the Federal Ministry of Water Resources and Rural Development in cooperation with the State Government, other Federal Ministries concerned, River Basin and Rural Development Authority, and the National Water Resources Institute.

### **d.4 External Inputs**

The external agency will dispatch a Survey and Study Team of required experts with the provision of equipment and materials to support proper implementation of the technical assistance program. A Team may be composed of the experts in the field of leadership, water resources planning, hydrology and hydrogeology, dam and reservoir engineering, irrigation and drainage, water supply and sanitation, hydropower, agriculture, fisheries, rural development, socio-economy, rural sociology and institution, and environment.

### **d.5 Scope of Work**

The development study which may take 30 months may be divided into the Phase 1 for understanding of the present situation and identification of the problem areas, and the Phase 2 for the preparation of a Comprehensive River Basin Management Program in an integrated manner through thorough discussions of the five Components and related manpower training program and project monitoring system.

In view of the foreseeable problems on availability and reliability of the needed data, the Federal Ministry of Water Resources and Rural Development should collect those data and carry out a supplementary data collection scheme before the arrival of External Study Team to facilitate smooth implementation of the Study, and in particular, the hydrological observation work should be commenced as early as possible with full mobilization of the equipment and materials including those taken over from

**the JICA-assisted Study on the National Water Resources  
Master Plan.**

## **APPENDIX A**

### **JICA NWRMP STUDY RELATED**

- 1. Experts in the JICA Study Team**
- 2. Members of the JICA Advisory Committee**
- 3. Composition of the Steering Committee**
- 4. Members of the FMWRRD Technical Committee**
- 5. List of Vehicles and Equipment (brought into Nigeria by JICA for the Study)**



### 1. Experts in the JICA Study Team

Expertise	Name	Firm & Nationality	Phase I (Review and Preparation)				Phase (Main Work for NWRMP)											
			Home Work (Mar. to Apr. '92)		Field (I) (Apr. to May. '92)		Home (I) (May to Jun. '92)		Field (II) (Aug. '92 to Mar. '93)		Home (II) (Jun. to Aug. '94)		Field (III) (Nov. '93 to Feb. '94)		Home (III) (Mar. to Aug. '94)		Field (IV) (Jan. to Feb. '95)	
(1) Team Leader	Shigeru ITO	SCI, JP	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(2) Water Resources Planner (A)	Yasushi MIYAZAKI	SCI, JP	○	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(3) Water Resources Planner (B)	Shoichiro HIGUCHI	SCI, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(4) River Planner	Isao DOI	SCC, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(5) Irrigation Planner	Toyotaka NIWA	SCI, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(6) Water Supply Planner	Munetoshi MORIO	SCI, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(7) Hydropower Planner	S. A. ADEBARI	SCI, NG		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(8) Erosion Control Expert	Junzo YOSHIWAKA	SCC, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(9) Hydrologist	(April to October 1993) Masahiro YAMADA (From November 1993) Kunio OHTA	SCI, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(10) Hydro-Geologist	Koichi SHINODA	SCC, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(11) Databank Expert	Kenji MIYAZAKI	SCI, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(12) Environmental Expert	David W. CONNALLY	SCI, USA		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○
(13) Regional/Project Economist	Yoshitomo MIYANISHI	SCI, JP		●	○	○	○	○	○	○	○	○	○	○	○	○	○	○

Notes: SCI : Sanyu Consultants Inc. ● : Assignment in the Field Work  
 SCC : Sumiko Consultants Co., Ltd. ○ : Assignment in the Home Work  
 JP : Japanese  
 NG : Nigerian

## 2. Members of the JICA Advisory Committee

<u>Expertise</u>	<u>Name</u>
(1) Chairman	Mr. Masayuki WATANABE Development Specialist, Institute for International Cooperation, JICA, Tokyo
(2) Member (Water Resources Development)	(April 1992 to March 1993) Mr. Etsuo OZAKU Ministry of Construction (From April 1993) Mr. Ryohei KITAZUME Ministry of Construction
(3) Member (River Planning)	Mr. Kenzo HIROKI Ministry of Construction
(4) Member (Irrigation and Drainage)	Mr. Shin TAMURA Ministry of Agriculture, Forestry and Fisheries
(5) Member (Agricultural Development)	(April 1992 to March 1993) Mr. Kazuhiko MARUYAMA Ministry of Agriculture, Forestry and Fisheries  (From April 1993) Mr. Toshimasa KOHNO Ministry of Agriculture, Forestry and Fisheries

## 3. Composition of the Steering Committee

Chairman	National Coordinator and Director of Planning, Research and Statistics Department, the Water Resources Sector, the Federal Ministry of Water Resources and Rural Development (FMWRRD) (Engr. Dr. F. I. Soribe)
Members	(1) All Directors of Departments, the Water Resources Sector, FMWRRD (8)  (2) Director of National Water Resources Institute, FMWRRD

- (3) Director of National Electric Power Plc.
- (4) Director of Inland Waterways Department
- (5) Director of Meteorological Services
- (6) Director of Federal Environmental Protection Agency
- (7) Representative of National Planning Commission
- (8) Representative of Federal Ministry of Agriculture and Natural Resources
- (9) Representative of Federal Ministry of Health and Human Services
- (10) Representative of Federal Ministry of Industries and Technology

Secretary

Project Coordinator  
(Mr. N. C. Nwosu)



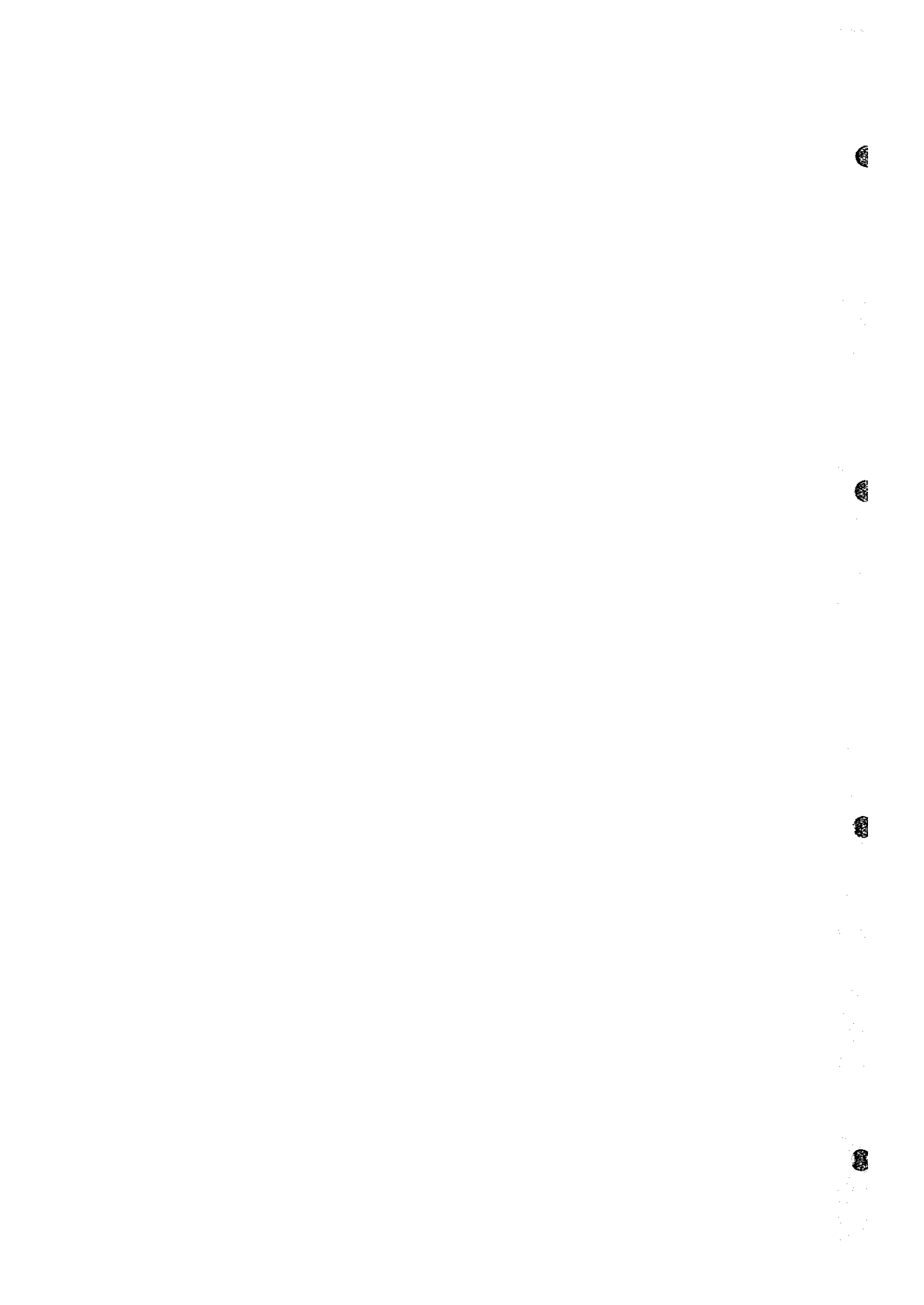
4. Members of the FMWRRD Technical Committee

No.	Department, FMWRRD	Name
1.	National Coordinator	Dr. F. I. Soribe
2.	Deputy National Coordinator	Mr. J. A. Eanidu
3.	Water Resources Planning (A)	Engr. M. N. Gundiri
4.	Water Resources Planning (B)	Engr. J. A. Akinola
5.	Dams & Reservoir Operations Planning	Engr. S. Mohmood Engr. I. E. Ekpo
6.	River Planning	Mr. R. A. Habu
7.	Irrigation Planning	Engr. H. Yusuf Engr. O. M. Olatinwo
8.	Hydropower Planning	Dr. J. A. Oguntola
9.	Hydrology	Mr. J. A. Shamonda Ms O. A. C. Ofji Mr. O. S. Bejide
10.	Water Supply Planning	Engr. E. O. Okeke Mr. A. Aletan
11.	Erosion Control Planning	Dr. D. T. Gowon Mr. C. O. Obidike
12.	Hydro-Geology	Mr. J. O. Adesuyi Mr. C. M. Maduabuchi
13.	Databank	Mr. S. O. Ome Mr. M. D. Bila
14.	Environmental Preservation	Engr. R. D. Abudakar Mr. P. E. Ibeka
15.	Regional / Project Economics	Mr. O. Oluwasanmi Mr. R. Oyetunmbi
16.	Coordination	Mr. N. C. Nwosu Project Coordinator

## 5. List of the Vehicles and Equipment

These were brought into Nigeria by the JICA for smooth undertaking of the NWRMP Study and are scheduled to be transferred to the FMWRRD for subsequent effective use.

Item	Model/Specification	Unit	Qty	Remarks
1. Vehicles	Nissan Patrol (4WD)	no.	4	
2. Computer System				
- Personal Computer	IBM PS/2 Model 95XP (8595 OKF)	set	1	
- Diskette Drive	6451066	set	1	
- PS/2 Key Board	1393990	set	1	
- Video Memory Option	75X5889	set	1	
- Color Display	8514001	set	1	
- Personal Computer	IBM PS/2 Model 70 386 (8570161)	set	1	
- PROCPM	5.25" (PXF1200)	set	1	
- XGA Display Adapter	75X5887	set	1	
- Video Memory Option	75X5889	set	1	
- PS/2 Keyboard	90X9254	set	1	
- Color Display	8514001	set	1	
- Personal Printer	2391001	set	1	
- Cut Sheet Feeder	79F4841	set	1	
- Changeover Switch for Printer	JYP - 1000	set	1	
- Printer Cable		set	1	
- Mouse	6450350	set	2	
- YHP Plotter Cable	12755F	set	1	
- AVR Transformer				
- UPS		set	2	
- IBM DOS 5.0	Model 1010PC	set	2	
- Lotus 1 - 2 - 3	84F9775	set	2	Software
- dBASE IV		set	2	Software
- MS QUICK BASIC		set	2	Software
- Ink Ribbon		set	2	Software
3. Survey Equipment			12	Consumable
- Water Sampler				
- Current Meter	8052-0501	set	4	
- GPS	Model CM-IBM with weight	set	4	
- Hand Level	Ensign	set	3	
- Lensatic Compass		set	1	
- Curvimeter		set	2	
- Measure	Double Sided	set	2	
- Ribbon Rod	50 m (Esrton)	set	2	
- Ribbon Rod	120-E, 5 m	roll	20	Consumable
- Bonding Agent	120-E, 10 m	roll	10	Consumable
4. Office Equipment	E-250 (2 kg)	pc	2	Consumable
- Copy Machine	XEROX	set	1	





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