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資料 1. 要請書

APPLICATION FOR THE TECHNICAL COOPERATION (DEVELOPMENT STUDY)

1. PROJECT DIGEST

1-1. Project Title : Feasibility Study on the Lower Munyati River
Basin Agricultural Development Project

1-2. Location : Kadoma District, Mashonaland West Province, and
North and South Gokwe Districts and Kwekwe District,
Midlands Province
(Refer to Location Map as attached)

1-3. Requesting Agency : Ministry of Agriculture (MOA)

1-4. Executing Agency : Department of Agricultural, Technical and Extension
Services (AGRITEX) under Ministry of Agriculture

1-5. Justification of the Project

(1) Present Condition of the Sector

In response to the poor performance of the previous plans, the Second Five-Year National Development Plan (1991-1995) was formulated under the framework of the Structural Adjustment Programme (SAP). Out of 12 main objectives of the Second Five-Year Plan, the most critical objectives are
⑦ improvement in living conditions, reduction of poverty and economic growth with the increase in investment and employment opportunities. In order to achieve these objectives, the following strategies are set up: (a) increasing the rate of savings and channeling these into productive investment; (b) achieving expansion of trade; and (c) encouraging the operation of market forces.

Specifically, in the agricultural sector, the main objective of the sector is the production of enough food for the population. The plan identified the major constraints for the agricultural production as water shortage and drought.

In order to remove these constraints and attain this objective, the investment program including the acceleration of the construction of dams as well as drilling of boreholes, especially in communal and resettlement areas, was proposed. The average percentages of investment on agriculture and water sectors during 1991-1995 are the second and the third largest, respectively. In addition to the economic aspect of the agricultural sector, the social aspect was emphasised in the rural development sector, committing itself to enhance the basic needs of communal and resettlement farmers.

The sector contributes around 12 percent of GDP and over 50 percent of the raw materials required by the manufacturing sector. Its contributions to exports, allowing for the influence of climate, have usually been about 40 percent since 1981. The sector provides employment for approximately 70 percent of the population and 80 percent of population is depending on the sector for securing their livelihood.

1.2) Master Plan Study for the Lower Munyati River Basin Agriculture Development Project

Under the governmental policy to develop the limited water resource in the country, the construction of the Kudu Dam for agricultural development purposes, in Munyati river which flows at the middle part of the country, has been planned since 1960's. Feasibility study and detailed design for the dam itself were carried out by Zimbabwean budget and resources. However, the required study on irrigation planning has not been undertaken. The Zimbabwean government then made a request to the Japanese government, which includes plan formulation and feasibility study for irrigated agricultural development including the construction of the Kudu Dam.

In Zimbabwe, water resource development are usually executed, mainly for large scale commercial farms. Generally, they have enough know-how and technology for irrigated agriculture, and hence, the government only concentrate its efforts on the construction of storage dam and main irrigation facilities. However, for the planned Kudu Dam project, small scale farmers are given more priority as a beneficiary. These farmers might not have enough financial and organizational background as well as a know how

and technology related to water utilization, and operation and maintenance of facilities. In addition, there would arise a problem on land holding system with the implementation of the project.

Under such circumstances, JICA has recognized and concluded that the proposed Study should not only focus on a feasibility study for the Kudu Dam project as requested by the Zimbabwean government, but firstly, from viewpoint of development of Munyati river basin, development needs in the basin should be grasped, and development potential and constraints should be reviewed and analysed in considering natural, social and administrative condition in the basin. Secondly, on the basis of results from the above analysis, it is desirable to carefully study the necessity, priority and possibility in management, operation and maintenance of the proposed Kudu Dam Irrigation Study, through the formulation of a master plan as a basic agricultural development plan for the basin. Eventually, JICA recommended said considerations to the Zimbabwean government, and both sides have agreed.

The Master Plan Study was carried out from November 1994 to August 1995, taking into three development scenarios, namely, with and without Kudu Dam case and the without case is further divided into with and without any water resource development option. Eventually, the Study has concluded to promote the agricultural development in the Lower Munyati River Basin by the scenario with Kudu Dam case.

(3) General Condition of Project Area

Location

The Project Area is located between the South Latitude 17°30' and 18°30' and the East Longitude 28°35' and 29°47' at north-west of Kadoma town. The area covers 5,052 sq.km., administratively extending from Kadoma District of Mashonaland West Province to South and North Gokwe Districts as well as the northern portion of Kwekwe District of Midlands Province.

Area and Population

The project area has the following general features:

<u>Province</u>	<u>District</u>	<u>Land Holding</u>	<u>Area (ha)</u>	<u>No. of H.H.</u>	<u>Population</u>
Mashonaland West	Kadoma	Communal	45.100	3.791	22.753
		Resettlement	127.600	2.252	14.444
		S.S.C.F.	24.000	370	2.512
		L.S.C.F.	41.000	1.510	6.091
	Total		237.700	7.923	45.800
Midland	Gokwe North	Communal	30.900	2.458	15.307
		Resettlement	13.000	172	1.039
		S.S.C.F.	81.300	867	6.516
	Sub-total		125.200	3.497	22.862
	Gokwe South	Communal	111.100	4.143	25.535
	Kwekwe	Communal	31.200	2.050	11.071
	Total		267.500	9.690	59.468
Grand Total			505.200	17.613	105.268

Climate and Hydrological Condition

The project area belongs to tropical continental climate zone with the wet season (November to March) and the dry season (April to October), and presents the following climatic condition:

Temperature Mean Max. 26.6 Mean Mix. 14.2 A^oC
Humidity Mean 57.3%
Evaporation Daily Mean 6.0 mm
Rainfall Annual average 647.9 mm
Rivers flowing into the Project Area are mainly Umsweswe, Munyati and Sebakwe rivers of which annual discharges are summarized below:

<u>River</u>	<u>1964/64-93/94(MCM)</u>		<u>Mean (MCM)</u>	
	<u>Minimum</u>	<u>Maximum</u>	<u>1964/65-93/94</u>	<u>1984/85-93/94</u>
Umsweswe	0.8	539.1	99.1	34.4
Munyadi	3.5	1,260.7	278.9	244.4
Sebakwe	6.8	1,467.3	225.6	57.1
Total	-	-	603.6	335.9

(4) Prospective Beneficiaries

(a) Direct beneficiaries of about 19,000 farm families by the irrigated agriculture development and about 9,000 farm families by improvement of rainfed farming technology in year 2010.

(b) Indirect beneficiaries of a considerable number of Zimbabwean outside the project area

(5) Outline of the Project

The proposed project contains the following components:

1) Land Use Planning

In the Project Area, the existing cultivated land is amounting to 101,140 ha, 20 percent of total area of 505,200 ha. It is expected that irrigated land will increase to about 25,000 ha by constructing Kudu and medium-size dams. In case of converting existing grazing land to cultivated land, it is inevitable to carry out soil erosion control measures. Furthermore, considerable acreage remains under rainfed. It is necessary to promote livestock production through introduction of sylvo-pastoral system.

2) Cropping Pattern and Farming Plan

By Kudu Dam, about 25,000 ha under 10 percent risk level will be irrigable. The area will be distributed to 14,700 ha for the communal and resettlement land, 5,900 ha for S.S.C.F. and 4,400 ha for L.S.C.F. in accordance with AGRITEX guideline.

In the communal and resettlement land, a cropping pattern based on maize and cotton in rainy season and wheat and vegetables in dry season, will be introduced. On the other hand, sprinkler irrigation will be practised on the basis of cropping pattern of cotton in rainy season and vegetables in dry season, in both commercial lands.

Apart from these irrigated farmers, about 22.000 ha of existing farms and 20.000 ha of new farms remain under rainfed, for which the present cropping pattern will be continuously practised. On the other hand, it is expected that crop yield of maize and cotton as major crop will be improved (20 - 65%) due to efforts on research, experiment and extension on rainfed farming technology applicable to Natural Region III

3) Water Resource Development and Utilization Plan

Based on water balance study for Kudu Dam, available water resources at 10 percent risk level is estimated at 380 MCM, which will be distributed irrigation, urban water supply and industrial purposes. On the other hand, Mtanke and Sanyati-2 dams having higher economical and technical feasibility, will be utilized for RFTC's activities. Medium-size dams of Sanyati-2 and one planned in Mdzongwe river will be functioning as a regulating reservoir within the Kudu irrigation system.

The outline of proposed Kudu dam is as follows:

Kudu Dam

Design of dam

- Dam type	Rockfill
- Dam Height	72.7 m
- Dam Length	860 m
- Saddle Dam Length	875 m
- Designed flood	12.122 cu.m/s
- Embankment Volume	8.005 MCM

Design of Reservoir

- Catchment Area	17.520 sq.km
- Surface Area at FSL	7,800 ha
- Total Storage	1,551.4 MCM
- Full Capacity	1,491.4 MCM
- Live capacity	1,426.9 MCM
- 10 % yield	380.0 MCM
- FSL	947.0 m
- Outlet EL	approx. 905.0 m

4) Irrigation and Drainage

a) Design Discharge

- Design discharge for irrigation planning is estimated at 5.4 mm/day.
- This discharge is maximum throughout a year in the fourth 5-days interval of February, and calculated as 24 hours continuous flow.

b) Irrigation Method

Basically, gravity and furrow irrigation will be introduced. Main facilities are as follows:

- Water Source: Kudu Dam
- Water Conveyance: Open (Main and Secondary Canal)
- Regulation: Regulating Reservoir and Farmpond
- On-Farm: Farm Ditch and Drain and Road

5) Rural Infrastructure Development

Rehabilitation and construction for Road Network. Boreholes for drinking water and Community Center should be considered.

6) Farmers Supporting Services

Research and Extension on Regional Farming Technology, Reinforcement of Agricultural Extension, Activation of Farmers Organization, Strengthening of Agricultural Credit and Strengthening of Agriculture Credit should be taken into consideration in future.

7) Marketing Plan

Road Network Development and Collection Point for the purpose to strengthen the existing marketing channel for maize and cotton, one depot in Gokwe and six collection points of COTTCO, as well as five collection points of GMB shall be established.

8) Regional Farming Technology Center (RFTC)

In order to research and experiment on improved rainfed farming technology as well as irrigated farming technology applicable to smallholder farmers, and to extend the results to farmers, it is proposed to establish "Regional Farming Technology Center" in each side of Munyati river. The center also collect and analyse such information on marketing farm products including internal and external demand. Furthermore, results obtained in the center shall be transmitted to farmers in the area through guidance and training for AGRITEX extension staff.

2. TERMS OF REFERENCE OF THE PROPOSED STUDY

2-1. Necessity/Justification of the Project

The Zimbabwean government is aiming to bottom up a quality of life in smallholder farmers especially in the communal and resettlement areas through implementation of socio-economic development plan which focuses on eradication of poverty and attainment of fair and equitable society.

2-2. Necessity/Justification of Japanese Technical Cooperation

Advanced technology to achieve higher productivity of agricultural production and to create new job opportunity for a number of farmers under the limited land and water resources, shall be necessary in the project. Furthermore, the feasibility study should provide not only economic feasibility but also technical soundness for engineering aspects and sustainable project formulation taking into consideration socio-economic and environmental impact. For this reason, technical assistance to formulate the feasibility for the project will be requested from the Government of Japan through the Japan International Cooperation Agency (JICA).

2-3. Objective of the Study

It aims as major objective of the regional development to bottom up smallholder farmers especially in the communal and resettlement lands in the Project Area, and further to develop and promote the regional economy through self-support of them. Zimbabwean government put its priority to the communal and resettlement lands, the small scale commercial farms and then the large scale commercial farms in order for allocation of Kudu Dam water.

2-4. Study Area

The Project Area is located at north-west of Kadoma town. The area covers 5,052 sq.km., administratively extending from Kadoma District of Mashonaland West Province to South and North Gokwe District as well as the

northern portion of Kwekwe District of Midlands Province.

2-5. Scope of the Study

2-5-1. General

The agricultural development of Lower Munyati River Basin has a very good potential to boost not only the rural economy but also the entire regional economy. In this connection, a feasibility study should be carried out firstly to review the results of the master plan study and to select priority sub-project(s), secondly to formulate a required plan for the selected priority sub-project(s), and thirdly to formulate the Kudu Dam irrigation scheme and other sub-project(s). The following subjects should be undertaken in the Feasibility Study.

2-5-2. Preparation of Topo-Maps

On the basis of the existing aerial photograph taken in 1986, various topographical maps shall be prepared to cope with specification to be required by each sub-project(s).

2-5-3. Field Investigation and Data Collection

In order to review the existing condition of the project area, the following items relevant to the Study shall be collected.

Natural Conditions

- (a) Topographical Map and Aerophotograph
- (b) Meteorological Data
- (c) Hydrological Data especially, water level and discharge of the rivers and streams
- (d) Soil Map
- (e) Land Use/Land Classification Map

Agro-Socio-Economic Condition

- (a) Demography including population, number of household, age structure, employment, dividing into farmer and non-farmer
- (b) Present land use and classification
- (c) Present cropping pattern, production and yield
- (d) Land holding and tenure system
- (e) Regional economy and farm economic condition
- (f) Post-harvest and marketing system

Environmental Condition

- (a) Physical Resources
- (b) Biological Resources
- (c) Socio-Economic Resources
- (d) Ecological System

In order to obtain necessary data and information to be required for preparation of sound plan formulation by sub-project(s), the following survey works shall be carried out.

Hydrological Survey

- (a) Typical cross section and bed slope for streams/rivers.
- (b) Water quality of streams/rivers, especially sediment load
- (e) Other necessary survey related with the agricultural/rural development

Soil Survey

- (a) Test pits excavation and soil profile survey.
- (b) Soil sampling from test pits.
- (c) Chemical and physical analysis of above soil samples in the Laboratory.

Geological Survey

- (a) Road bearing capacity (CBR).
- (b) General geological condition in the project area.
- (c) Physical analysis on sampled materials.

Review of Detail Design Reports of Dams

- (a) Kudu Dam
- (b) Medium Size Dam of Sanyati-2 and Mutanke etc..

Irrigation and Drainage Survey

- (a) Present irrigation and drainage condition
- (b) Existing conditions of irrigation and drainage facilities
- (c) Present irrigation method and water requirement for crop plantation

Agro-Socio-Economic Survey

- (a) Existing cropping pattern and varieties
- (b) Farming practice of upland crop, and fruit tree
- (c) Farm input, especially, green manure, production, planted and harvested area and yield by crop
- (d) Present farm mechanization condition
- (e) Animal husbandry
- (f) Extension services and credit service supported by the Government
- (g) Marketing system for farm outputs
- (h) Farmer's organization
- (i) Farmer's income and poverty situation
- (j) Agricultural processing
- (k) Prices of farm input and output
- (l) Farmer's living standard
- (m) Land ownerships

Environmental Assessment

On the basis of existing available data and information, an environmental assessment shall be carried out on the following items.

- (a) Physical resources
- (b) Biological resources
- (c) Socio-economic resources
- (d) Ecological system

2-5-4. Project Formulation

On the basis of reviewing data and information collected during the feasibility study, detailed development proposal shall be formulated consisting of so-called "hardware" and "software". While the hardware consists of those structural facilities and machinery/equipment, the software is composed of various plans such as land use, cropping pattern, farming practise, post-harvest/marketing activity, institutional set-up, etc. Especially, preliminary design shall be prepared for the structural facilities.

2-5-5. Project Management and O & M Planning

In order to secure the project sustainability, management, operation and maintenance, the proposed sub-project(s) shall be carefully studied.

2-5-6. Environmental Management Planning

The present environmental concerns in the Project Area are: (a) Population and resettlement, including displacement and relocation, compensation and cultural and historical sites; (b) Environmental health issues including water-borne and water-related diseases, use of agrochemicals, domestic water supplies and health, and sexually transmitted diseases; (d) Woody vegetation clearance; and (e) Monitoring of mining activities. (f) displacement of cultural and historical sites.

2-5-7. Project Cost Estimate and Implementing Programme

In accordance with the said project formulation, the project cost shall be estimated, which includes an initial investment cost and an operation and maintenance cost and a replacement cost.

On the basis of various input to be possibly mobilized to implement the proposed sub-project(s) including human, financial resources, the implementing programme shall be designed.

2-5-8. Project Evaluation

In order to justify the proposed project(s), they shall be comprehensively evaluated from economic, financial, social, managerial, technical and environmental viewpoints.

2-6. Study Schedule

The feasibility study, consisting of three stages, namely, Work-I, II and III, shall be carried out over 24 months period as tentatively set forth in Figure 2-1. Request Expert to be proposed for the study is shown below.

Required Experts for the Study

	<u>Work 1</u>	<u>Work 2</u>	<u>Work 3</u>	<u>Total</u>
1. Team Leader	1.5	3.0	3.0	7.5
2. Hydrologist	-	4.5	2.0	6.5
3. Soil and Land Use Expert	-	4.0	-	4.0
4. Geologist	-	3.0	2.0	5.0
5. Agronomist/ Farm Management Planner	1.5	4.5	2.0	8.0
6. Livestock Expert	-	2.5	1.0	3.5
7. Dam Engineer	-	3.5	3.0	6.5
8. Irrigation / Drainage Engineer	-	5.0	4.0	9.0
9. -do-	-	5.0	3.0	8.0
10. Road Engineer	-	3.5	-	3.5
11. Rural Sociologist/ Institutional Expert	-	4.0	5.0	9.0
12. Design Engineer of Dam Structure	-	3.5	-	3.5
13. Environmental Management Planner-	-	5.0	3.0	8.0
14. Cost Estimator	-	3.0	3.0	6.0
15. Agro Economist	1.5	3.5	3.0	8.0
Total	<u>4.5</u>	<u>57.5</u>	<u>34.0</u>	<u>96.0</u>

5. UNDERTAKINGS OF THE GOVERNMENT OF THE REPUBLIC OF ZIMBABWE

- (1) The Government of Republic of Zimbabwe (GOZ) shall be responsible for dealing with claims which may be brought by third parties against the members of the Japanese study team and shall hold them harmless in receipt of claims and liabilities arising in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims or liabilities arise from gross negligence or willful misconduct of the above mentioned members.
- (2) In order to facilitate a smooth and efficient conduct of the Study, GOZ shall take necessary measures:
 - (a) to secure the safety of the Japanese study team;
 - (b) to permit the members of the Japanese study team to enter, leave and sojourn in Zimbabwe for the duration of their assignment therein;
 - (c) to exempt the members of the Japanese study team from taxes, duties, fees and charges of any kind imposed on equipment, machinery and other materials brought into Zimbabwe for the conduct of the Study; and
 - (d) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study.
- (3) The Ministry of Agriculture (MOA) shall act as a leading agency in the Inter-Ministerial Committee for the Study, and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study. MOA shall appoint Dept. of Agricultural, Technical and Extension Services (AGRITEX) as a chief counterpart agency to the Japanese study team

(4) AGRITEX shall, at its own expense, provide the Japanese study team with the following, if necessary, in cooperation with other agencies concerned:

(a) available data and information related to the Study;

(b) counterpart personnel;

(c) suitable office space and

(d) credentials or identification cards to the members of the Japanese study team.

(5) AGRITEX shall also make necessary arrangements with other governmental and non-governmental organizations concerned for the following:

(a) to secure permission for entry into private properties or residential areas for the conduct of the Study;

(b) to provide necessary facilities to the Japanese study team for the remittance as well as utilization of the funds introduced into the Zimbabwe from Japan in connection with the implementation of the Study;

(c) to secure permission to take all data and documents related to the Study out of the Zimbabwe to Japan by the Japanese study team; and

(d) to provide medical services as needed and its expenses will be chargeable on the members of the Japanese study team.

On behalf of the Government of the Republic of Zimbabwe, the Ministry of Agriculture assured that the matters referred in this form will be ensured for a smooth conduct of the Development Study by the Japanese study team.

Signed:

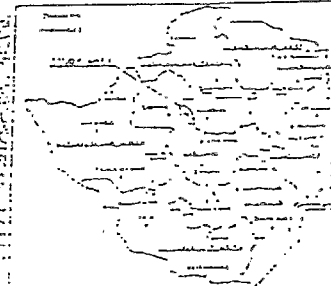
Titled:

On behalf of the Government of the Republic of Zimbabwe

Date:

LOCATION MAP

COUNTRIES OF SOUTHERN AFRICA



LEGEND

- State Area Boundary
- District Boundary
- Water Number
- Communal Area
- ▨ Residential Area
- ▧ Small Scale Commercial Area
- ▩ Large Scale Commercial Area

022-4

1.3 - (1) Feasibility Study on the Lower Yamvoti Basin Agricultural Development Project.

Working Schedule (tentative)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. Work I (Basic Study)																								
1-1 Review of Master Plan Study																								
1-2 Selection of Priority Sub-project(s)																								
2. Work II (Priority Sub-project(s))																								
2-1 Preparation of Topo Map																								
2-2 Field Investigation and Data Collection																								
2-3 Project Formulation																								
2-4 Project Management and O & M Planning																								
2-5 Environmental Management Planning																								
2-6 Project Cost Estimate and Implementing Programme																								
3. Work III (Endu-bas Scheme & Other Sub-project(s))																								
3-1 Preparation of Topo Map																								
3-2 Field Investigation and Data Collection																								
3-3 Project Formulation																								
- Endu-bas Scheme																								
- Main Irrigation System																								
- On-farm Irrigation System																								
- Other Sub-project(s)																								
3-4 Project Management and O & M Planning																								
3-5 Environmental Management Planning																								
3-6 Project Cost Estimate and Implementing Programme																								
3-7 Project Evaluation																								
Report																								

Report: Inc/R: Inception Report

PR: Progress Report

I/R: Interim Report

DFR: Draft Final Report

Table 1: Feasibility Study on the Lower Banggai Basin Agricultural Development Project

Consultants Requirement (tentative)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	OTH	
1. Team leader																										7.5
2. Hydrologist																										6.5
3. Soil and Land Use Expert																										4.0
4. Geologist																										5.0
5. Agronomist/Farm Management Planner																										6.0
6. Livestock Expert																										3.5
7. Dam Engineer																										6.5
8. Irrigation/Drainage Engineer																										9.0
9. Road Engineer																										3.5
10. Rural Sociologist/Institutional Expert																										9.0
11. Water Supply Engineer																										3.5
12. Environmental Management Planner																										8.0
13. Cost Estimator																										6.0
14. Agro-Economist																										8.0
Total																										87.0
Report Preparation	△						△						△					△						△		
	Ine/R						PR(1)						1/R						PR(2)						DFR	

Report: Ine/R: Inception Report

PR: Progress Report

1/R: Interim Report

DFR: Draft Final Report