BASIC DESIGN STUDY
ON
THE ESTABLISHMENT PROJECT
OF
THE CENTRAL AGRICULTURE DEVELOPMENT
TRAINING CENTRE
IN
THE SOCIALIST REPUBLIC
OF
THE UNION OF BURMA

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JAPAN INTERNATIONAL COOPERATION AGENCY

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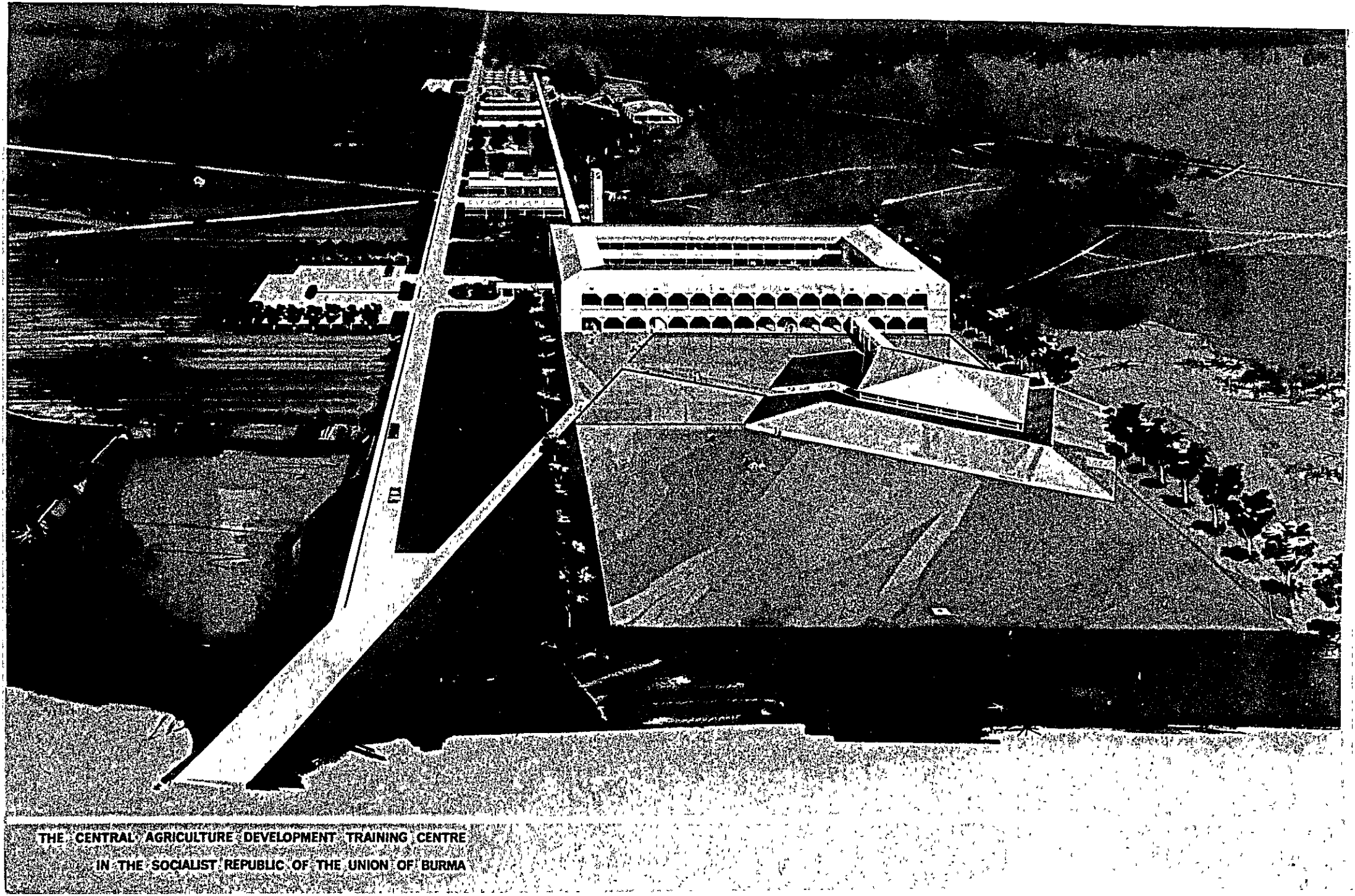

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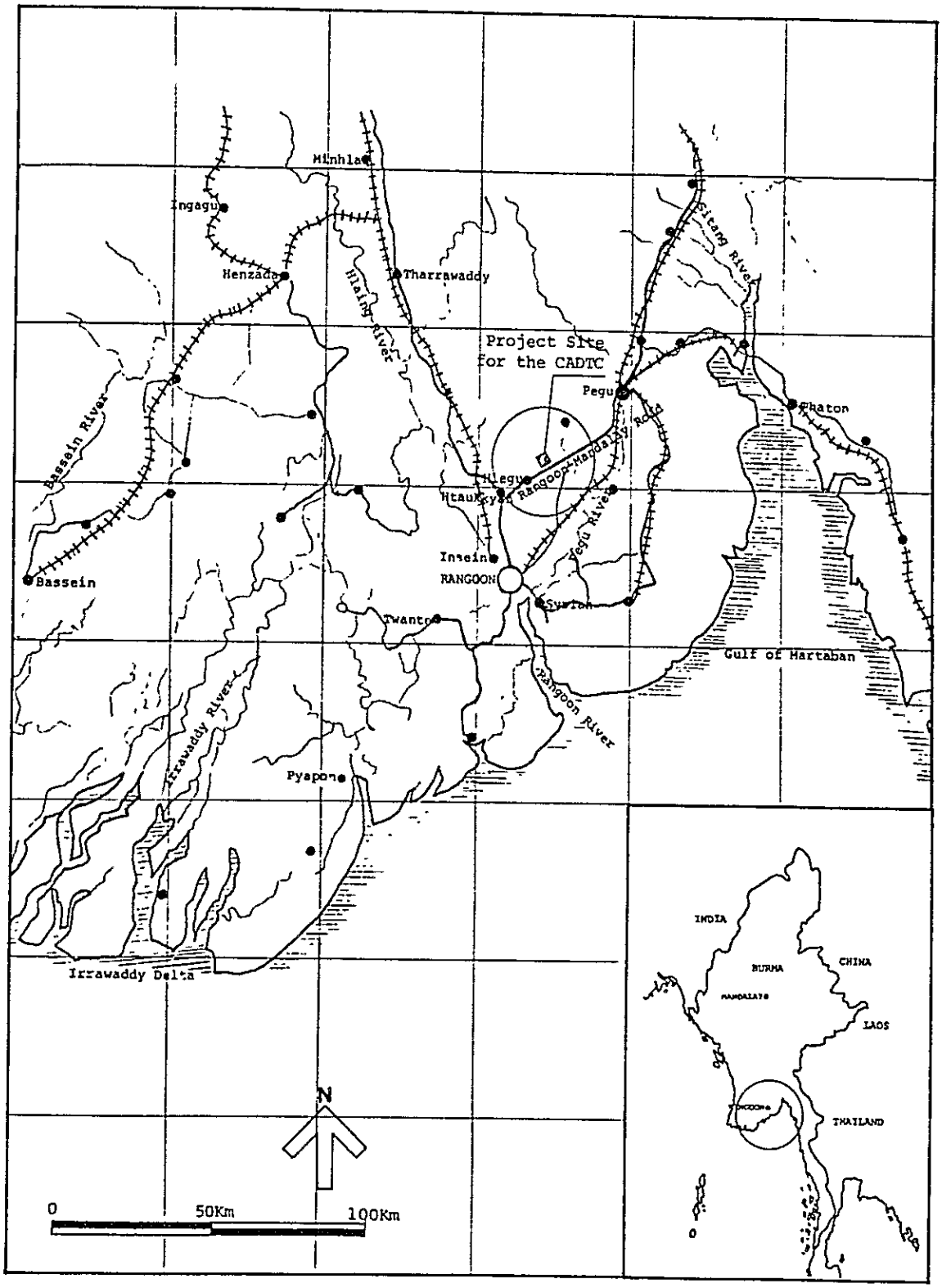
Site Location Map



PREFACE

In response to the request of the Government of the Socialist Republic of the Union of Burma, the Government of Japan decided to conduct a Basic Design Study for the establishment Project of the Central Agriculture Development Training Centre and entrusted the survey to the Japan International Cooperation Agency.
The JICA sent to Burma a survey team headed by Mr. Kazuhisa Matsuoka, Deputy Chief, Basic Design Division, Grant Aid Department, JICA, from March 7th to 28nd, 1982.

The team had discussions with the officials concerned of the Government of Burma and conducted a field survey in Rangoon area. After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the Socialist Republic of the Union of Burma for their close cooperation extended to the team.

July, 1982

Keisuke Arita

Keisuke Arita
President
Japan International Cooperation Agency

SUMMARY

The Third Four-year Plan (TFYP) as a part of the New 20-year Plan has come to end in March 1982, achieving an average GDP's growth rate of 5.9 percent in the real term and a rate of 8.6 percent in the agricultural sector. In the fourth 4-year programme it aims at 6.2 percent GDP growth rate in the real term with a continuing higher target rate in the agricultural sector as well.

Burma as a agricultural country , agricultural development serves as a propulsive power of the nation's economic growth. The priority target for development is to make continuing effort for improvement of farm productivity and expansion of crop production for export abroad.

In order to enhance farm productivity both innovative and renovate technologies on agriculture, along with superior breeds, must be propagated to farmers over a wide area. In fact, however, despite the country's high potential over its expansive farm land, the agricultural sector is still at the developing stage for lack of the extension manpowers responsible for propagation of such new or improved technologies. Although the training program for extension workers is being carried out under the administration of Agriculture Corporation, the present status is that both training system and programme are not as yet well systemized in addition to insufficient number of training facilities.

Hence, promotional activities for extension activities are rather slow and sluggish in progress, being hampered by such difficulties as vast land expansion assigned to each extension workers, deficiency of traffic facilities, farmers' less digestibility of new knowledges and improperly prepared method of propagation. As a result, each instructor is taking heavier workload increasingly with years.

With the foregoing background taken into consideration, the Burmese Government formed its plan to establish the Central Agriculture Development Training Centre (CADTC) with functional roles to train extension workers on the well-planned systematic basis, to supervise the nationwide training systems for extension workers, to provide

publication services on agriculture and thus to act as the central core of training for extension workers. In this view of the circumstances, the Burmese Government has requested the Government of Japan to cooperate in the establishment of the CADTC in the manner of Grant and Technical Cooperation.

The CADTC will be able to fulfil its nationwide training programme and schedule for the annual total of 1,335 trainees; 500 trainees in pre-service training, 595 trainees at divisional, township and village levels over medium class for on-the-job training and 240 trainees for in-service training. It is expected that the national training system, which now exists in diversity, will be unified as the systematic training establishment at central, regional and township levels distinctly. It is further expected that the information service to be provided by the CADTC will help extension of new farm technologies and contribute sufficiently toward further development of agriculture through wide-spreading channels from each extension personnels to many farmers.

The proposed project site of the CADTC is a rubber plantation owned and operated by Agriculture Corporation, which is situated at Zayat Kwin of about 50 km northeast from the center of Rangoon and surrounded with paddy fields. A land area of 8 ha and 10 ha is available respectively for the Centre site and for the demonstration farm. With regard to infrastructural facilities, aside from the easy approach to the power supply line, necessary preparatory works must be carried out to drill wells for water supply, to clear a part of the site area by felling and to draw the incoming telephone line from Hlegu township 10 km apart from the construction site.

The Centre facilities will consist of main training building, training hall, workshop, dormitories for trainees, staff quarters, guest house, sports facilities and demonstration farm. The main training building will include the project manager's office constituting rooms for office service, project manager, leaders and conference, the training section containing training office, classrooms, laboratories and audio-visual

rooms and the publication section comprised of rooms for teaching-materials production, library and exhibition. The training hall will serve as a large classroom and concurrently as an assembly hall with accommodating capacity of 300 trainees. The workshop will include storage for farm machineries and tools, repair shop and field classroom.

The demonstration farm will be halved to 5 ha respectively by paddy and dry fields for exhibition of maize, beans, peanut, sesame, jute, fruit trees and vegetables. Training equipment and materials consist of farm machinery, training and laboratory equipment, production materials for teaching and audio-video equipment.

The facility volume of the CADTC is as follows:

Training Main Bldg.	4,170 m^2	Canteen	382 m^2
Training Hall	576 m^2	Trainee Dormitory	2,295 m^2
Workshop	420 m^2	Guest House	312 m^2
Storage & Halling	288 m^2	Staff Quarter	1,989 m^2
Pump, Electricity, Covered Way	498 m^2	Sporting Facilities	864 m^2
		Guardman's House	36 m^2
		Labourer's Quarter	500 m^2
		Covered Way	780 m^2
Sub-Total	5,952 m^2	Sub-Total	7,158 m^2
	Grand Total	13,110 m^2	

The total investment cost of the Project is estimated at including a Japanese portion of Japanese yen 1,910,000,000.-, Burmese contribution of 14,459,000.- Kyats.

The Agriculture Corporation will be the Executing Agency for the implementation of the Project.

It will take about 3 months for detail design, 2 months for tendering and 17 months for construction of the CADTC following the conclusion of the Exchange of Notes by the Burmese Government and Japanese Government for the Grant aid of the Project.

The establishment of the CADTC is what is strongly hoped for its earliest implementation, in that the plan is to establish to nation's sole training institution as being indispensable to organisational establishment of training for extension personnels and propagation of new technologies as well as implementation of the agricultural development policy as formulated by the Burmese Government.
Indeed, the establishment of the CADTC is not only expected to promote the agricultural development programme as the core of the nation's economic growth in Burma but also evaluated as the educational project to cultivate agricultural extension personnel, who can promise the improved level of daily living for farmers accounting for nearly 70 percent of the nation's total population. Furthermore, the implementation of the Project by Japan's grant aid cooperation has a great meaning in itself, and considerable effects will be expected.

Toward the prompt realisation of the Centre construction and for the smooth management of the Centre, the close cooperation in the construction on the part of the Japanese side and the establishment of the administration and maintenance system toward the centre opening are essential factors. In other words, highest consideration should be taken for currency budget allocation for the maintaining facilities, equipment and securing of personnel of CADTC.
With a proper planning of Technical cooperation in the form of "Project System" for the CADTC, if realized, by dispatch of Japanese experts, supply of follow-up equipment and training of counterpart, it is expected that the CADTC will achieve their purposes more effectively.

ABBREVIATIONS

BURMA	:	Socialist Republic of the Union of Burma
MAF	:	Ministry of Agriculture and Forests
AC	:	Agriculture Corporation
JICA	:	Japan International Cooperation Agency
GSKUB	:	Government of the Socialist Republic of the Union of Burma
GOJ	:	Government of Japan
AFPTC	:	Agricultural and Farm Produce Trade Corporation
FRG	:	Federal Republic of Germany
ADB	:	Asian Development Bank
ARD	:	The Applied Research Division of Agriculture Corporation
ARI	:	Agricultural Research Institute
EXD	:	Extension Division
PPD	:	Planning and Projects Division of Agriculture Corporation
PDD	:	Procurement and Distribution Division
UNDP	:	United Nations Development Program
IBRD	:	International Bank for Reconstruction and Development
EEC	:	European Economic Community
IRRI	:	International Rice Seed Research Institute
UK	:	United Kingdom
USAID	:	United States Agency for International Development
CLD	:	Central Law Office
CC	:	Construction Corporation
ECC	:	Equipment Control Committee
EPC	:	Electric Power Corporation
TIC	:	Training Implementation Committee
AMD	:	Agricultural Mechanization Department
PIC	:	Project Implementation Committee
FERD	:	Foreign Economic Relation Department of the Ministry of Planning and Finance
NPAC	:	New Project Appraisal Committee
MFTB	:	Myanma Foreign Trade Bank
TC	:	Timber Corporation
CIC	:	Ceramic Industries Corporation
PPFC	:	People's Pearl and Fisherie's Corporation

SC	:	Salt Corporation
LDMC	:	Livestock Development and Marketing Corporation
VAHD	:	Veterinary and Animal Husbandry Department
FD	:	Fisheries Department
FRD	:	Forestry Department
GDP	:	Gross Domestic Product
CPI	:	Consumer Price Index
TFYP	:	Third Four-Year Plan
FFYP	:	Fourth Four-Year Plan
SEES	:	State Economic Enterprises
WTPPDP	:	Whole Township Paddy Production Development Programme
HYVS	:	High Yielding Varieties
CADTC	:	Central Agriculture Development Training Centre
VTM	:	Village Tract Manager
VEM	:	Village Extension Manager
SMS	:	Subject Matter Specialist
TM	:	Township Manager
PC	:	Production Camp
BAG	:	Bachelor of Agriculture
BE (AGRI)	:	Bachelor of Ergy. (Agriculture)
Dip	:	Diploma of Agriculture
THS	:	Technical High School
BEHS	:	Basic Education High School
NR	:	New Recruit
PG Training	:	Post Graduate Training
AGTI	:	Associate of Government Technical Institute
OJT	:	On-the-Job Training
IST	:	In-Service Training
MDF	:	Main Distribution Feeder
JIS	:	Japan Industrial Standards
BS	:	British Standards
PSI	:	Pounds per Square Inch

CONTENTS

CHAPTER 1. INTRODUCTION

At the request of the Government of the Socialist Republic of the Union of Burma (GSRUB) for the financial and technical cooperation in grant in order to contribute to the establishment of the Central Agriculture Development Training Centre (CADTC), the Government of Japan (GOJ) through Japan International Cooperation Agency (JICA) had sent a contact mission for 8 days from 7th to 14th December, 1981.

In accordance with the recommendations of the contact mission, the Government of Japan decided to carry out a Basic Design Study through JICA to confirm the feasibility of the Project for 22 days from 7th to 28th March, 1982.

Basic Design Study Team (the Team) had discussions with various government authorities, and executed following investigations.

1) Discussions and confirmation on background of the CADTC project.

2) Discussions and confirmation on objectives of the CADTC.
   - CADTC function
   - CADTC activities (training programme/facility contents/equipment)

3) Field survey of the project site and related infrastructure.

4) Confirmation of executing agency for the CADTC.

5) Confirmation of implementation schedule for the construction of CADTC facilities.

6) Collection of necessary informations for estimation of the total project costs.

7) Collection of necessary informations for evaluating the Project.

After the completion of the field study in Burma, the Team carried out analysis of data collected and prepared the Draft Final Report of the Basic Design Study in June, 1982.

This report includes, basing on the findings and analysis of collected informations, background of the Project, CADTC objectives, most appropriate preliminary design, project costs, execution system and project evaluations with recommendations for the CADTC Project.

CHAPTER 2. BACKGROUND OF THE PROJECT

2-1. Economic Development Plan

The Socialist Republic of the Union of Burma (Burma) is well endowed with natural resources; she has substantial forestry resources (in particular, teak) and mineral resources including coal, copper, lead, tin, tungsten, and zinc. She has adequate oil and gas to be essentially self-sufficient. She also has good agricultural land which gives it the potential to export large quantities of rice and other agricultural products. But in spite of her resource situation, Burma's economic performance during the 1960s and early 1970s was poor. One major reason for this appears to have been emphasis which the GSRUB placed on achieving self-sufficiency, which required development of the industry sector. This development was done at the expense of the rural sector -- particularly agriculture; scarce resources were used to develop manufacturing industries and as a result, the agriculture sector -- which had previously been the most successful sector -- stagnated.

The GSRUB changed its policies in the mid-1970s. It relaxed price controls on agricultural commodities; introduced managerial and financial reforms in State Economic Enterprises (SEEs); promulgated a "Rights of the Private Enterprises" law to encourage private investment; changed the tax system; and increased interest rates.

1) GDP

These changes in policies had a major impact on the economy. Between 1976/77 and 1979/80 real GDP grew by an average of about 6.0 per cent a year (compared with an average of 2.5 per cent a year over the previous six years) and in 1980/81, real GDP grew by about 8.3 per cent. All sectors of the economy, with the exception of the fisheries and livestock sector, have had higher rates of real growth. The improvement in the mining and construction sectors has been particularly impressive. Between 1976/77 and 1980/81 the average annual growth in these sectors was 10.4 per cent and 17.9 per cent respectively (compared with about 2 per cent a year for both sectors

over the previous ten years). Furthermore, the most important development has been occurred in the agriculture sector, which during the period from 1976/77 to 1980/81 grew at an average annual rate of 7.7 per cent (compared with 1.3 per cent a year over the previous ten years). Growth in the industry sector during this period averaged 6.5 per cent a year, as against about 2 per cent per annum in the previous ten years. Burma's per capita GNP increased from $140 in 1978 to $180 in 1980.

Although the GSRUB has taken steps to encourage private investment, it remains committed to expanding the size of the public sector. Much of the growth in manufacturing, for example, has been in the public sector and between 1976/77 and 1980/81 there was a decline in the relative size of the private sector.

2) Public Investment

The effect of the policy reforms on the public sector, particularly SEEs, has been impressive. In 1974/75 there was a substantial deficit in the public sector's current account and this, together with a fairly modest investment programme, produced an overall public sector deficit of over K1,600 million. Following the reforms there was a rapid improvement and in every year since 1976/77 there has been a surplus on the public sector's current account. The GSRUB has, however, substantially enlarged the public sector investment programme. In 1980/81 the total volume of public investment was K555 million above expenditure in 1979/80). The SEEs accounted for about 80 per cent of public sector investment with expenditures of K5,062 million in 1980/81 and K4,506 million in 1979/80.

The manufacturing sector has been absorbing an increasing proportion of capital expenditure (32.4 per cent of the total in 1980/81) but much of this has been in industries involved in the processing of primary products. Another important sector in 1980/81 was mining, which accounted for 13.8 per cent of total capital expenditure, followed by agriculture (11.0 per cent), transport and communications (10.2 per cent), livestock and fisheries (7.8 per cent) and power (7.5 per cent).

The size of the investment programme has been such that in spite of very high current account surpluses in some years, the overall public

sector budget has almost consistently been in deficit. This deficit has increased rapidly in recent years -- from K862 million in 1977/78 to K5,173 million (or 14 per cent of GDP) in 1980/81.
Much of the GSRUB's investment programme has been financed by foreign loans and grants, and in at least two years (1976/77 and 1977/78), the amount of foreign borrowings exceeded the public sector deficit and the GSRUB was able to reduce its domestic debt. However, in subsequent years foreign borrowings could not match the rapid pace at which the public sector deficit expanded, and the GSRUB had to increase its domestic borrowings.

3) Money Supply and Prices

The money supply and the consumer price index (CPI) have been affected by the public sector's budgetary position. Between 1978/79 and 1980/81, the money supply rose by 18.2, 15.4 and 11.8 per cent a year respectively. However, the CPI only increased by 5.7 per cent in 1979 and less than 1 per cent in 1980, and decreased by about 1 per cent in mid-1981 due largely to the BSRUB's administered prices and the rapid increase in food production.

4) Employment

The unemployment rate has increased in recent years from 2.3 per cent in 1976/77 to 3.8 per cent in 1979/80, but it is still low relative to many other countries. However, official statistics on this subject might not be very accurate and the actual incidence of unemployment could be somewhat higher. There also seems to be high levels of under employment in both urban and rural areas.

5) Balance of Payments

Since the mid-1970s Burma's balance of payments situation has shown some underlying improvement. After about a decade of virtual stag-nation of foreign trade in nominal terms and a decline in real terms, exports rose by an average of about 27 per cent a year

between 1976/77 and 1980/81. In 1980/81, rice and rice products (the country's most important export) accounted for over 40 per cent of exports by value followed by teak and hardwoods which accounted for about 25 per cent. Despite this, the quantum index remains below the levels of the mid-1960s.

The prospects for increased rice exports appear to be favorable with paddy production having increased from about 10 million mt in 1979/80 to 13 million mt in 1980/81. The wider use of high yielding varieties (HYV) should further increase rice production, making more rice available for exports. But the continued success of this programme will largely depend on periodic review and adjustment of the BSRUB's paddy procurement prices; in 1977 and 1980 there were modest increases in the price of some higher quality varieties.

There also appears to be some scope for increasing exports of wood and wood products. The major constraints on forestry exports are transportation difficulties and poor marketing procedures, and action to overcome these is expected to result in a considerable improvement in exports. In 1978/79, when rice exports were low, a special effort was made to export forest products and the value of teak exports more than doubled from $54.2 million in 1977/78 to $117.8 million in 1978/79, and similarly hardwood exports increased from $1.1 million to $15.8 million. With sufficient investment, production of minerals could also increase with the possibility of increased exports by the mid-1980s.

Although exports have increased rapidly, imports have increased even faster and the trade deficit has widened. The value of imports increased from about $241 million in 1976/77 to about $731 million in 1980/81 -- and average annual increase of about 34 per cent. Burma's trade deficit increased from $48 million in 1976/77 to about $260 million in 1980/81. A large proportion of imports is for projects associated with the public sector's investment programme. In 1980/81 about two-thirds of imports (by value) were capital goods.

Most imports associated with the public sector's investment programme have been covered by foreign loans. These loans increased from about $66 million in 1976/77 to about $316 million in 1980/81 -- an average annual increase of about 60 per cent. Consequently, although the balance of trade has been in deficit since the mid-1970s the overall balance of payments account was in surplus between 1977/78 and 1980/81.

6) International Reserves

International reserves have been increasing and in mid-1981 stood at $274.1 million, equivalent to about 4-1/2 months of imports. This represented a slight increase of $2.3 million over the previous year's level.

7) Development Prospects and Constraints

The response of the economy to the policy changes of the mid-1970s has been encouraging. Under the Third Four-Year Plan (TFYP) (1978/79-1981/82), the target set for real GDP growth in 1981/82, reset by the Annual Plan, is 5.7 per cent. Agricultural output is projected to grow by 4.9 per cent, livestock and fisheries by 7.1 per cent, forestry by 7.7 per cent, mining by 31.4 per cent, manufacturing by 8.7 per cent, power by 20.5 per cent, construction by 5.8 per cent and transport by 3.6 per cent. In the external sector efforts will be directed towards increasing exports by 21.1 per cent while imports are to be increased by 9.8 per cent.

To achieve this target the GSRUB estimates that a total investment of K8,462 million in current prices would be needed: K6,721 million (79.4 per cent) in the public sector; K1,618 million (19.1 per cent) in the private sector; and K123 million (1.5 per cent) in the cooperative sector.

However, these and future targets may prove difficult to achieve unless appropriate action is taken to resolve the problems facing the economy and in particular to control the public sector deficit. Although the GSRUB has been promoting private investment, growth has been and will continue to be heavily dependent upon public sector investment. In the near future, it is probably unrealistic to expect any major reduction in public sector expenditure. Reduction of the deficit will therefore by dependent upon the BSRUB's ability to mobilize resources.

8) External Resource Mobilization

In recent years external resource mobilization has played an important part in the public sector's investment programme. Over the period 1975/76 to 1979/80 foreign debt commitments were about $1.6 billion and disbursements about $1.1 billion, most of which was provided by members of the Burma Aid Group.

At the Fourth Burma Aid Group Meeting (held in Paris on 11 December 1980) Burma's external assistance needs on a commitment basis during 1980/81 were estimated at $660 million. The total amount of aid that was committed of indicated at the Meeting amounted to about $520 million, most of which would be on highly concessional terms. The balance was expected to be provided by non-Aid Group sources. The World Bank Group's assistance was projected at $100 million, the Bank's at $56 million, and UNDP's at $30 million. Japan continues to be the largest bilateral donor ($176 million) followed by France ($56 million), the Federal Republic of Germany ($40 million) and United Kingdom ($21 million). The rest, viz. $41 million, is expected to be provided by Australia, the European Economic Community (EEC), Finland, Norway and Switzerland. Annual disbursements from external loans and grants are projected at $400 million.

However, Burma's success in external resource mobilization has not been without its problems. Its external public debt disbursed and outstanding in 1979/80 was about $1.2 billion. Debt service payments have risen from $34 million in 1976/77 and is projected to be over $125 million in 1980/81, and there has been a rapid rise in the debt service ratio from 15.4 per cent in 1976/77 to an estimated 21 per cent in 1979/80; in 1980/81 the debt service radio is estimated to reach about 24 per cent. Most of this increase is due to commercial loans which accounted for about 64 per cent of projected debt service payments in 1980/81 compared with over 50 per cent in 1976/77.

There is some cause for concern as to the extent to which Burma can sustain further increases in non-concessional loans and the Aid Group cautioned the GSRUB on the serious consequences of additional commercial borrowings. The representative of the GSRUB indicated that Burma was aware of the danger of relying too heavily on such borrowings and said that over the next two years the relative importance of these borrowings should decline. There is an urgent need for the GSRUB to intensify domestic resource mobilization efforts.

In recent years, foreign borrowings were insufficient to cover the public sector's deficit and the GSRUB had to resort to domestic borrowings mainly in the form of bank credit to finance the deficit. Continued recourse to this method of financing could have serious consequences for the GSRUB's development strategies and for controlling inflationary trends.

9) Domestic Resource Mobilization

The GSRUB has two main ways of increasing domestic resource mobilization: the first is to increase tax revenue by intensifying collection efforts, widening the tax base, and increasing the level of taxes; the second is to rationalize the price structure so that prices reflect real economic costs more accurately. Prices of many inputs (especially imported ones) for SEEs have risen considerably but these increases have not been fully reflected in output prices. Many good are therefore sold at official prices below what they cost in the open market. Consequently, many private traders purchase goods through official channels and resell them at higher prices in the open market. Thus some of the SEEs have not been operating according to the commercial principles laid down by the GSRUB and their surpluses have been declining. Increases in controlled prices would enable SEEs to capture some of the surpluses which are currently accruing to private traders and, more importantly, could improve the efficiency in using scarce resources.

2-2. The Agricultural Sector

From 1976/77 to 1979/80, agricultural output including livestock, fisheries and forestry grew at an average annual rate of 7.7 per cent as against 1.3 per cent per annum in the previous ten years. From 1979/80 to 1980/81, the rate of increase was 11.3 per cent and accounted for two-thirds of the growth of GDP. It also accounted for about 67 per cent of total employment and 80 per cent of total exports.

The net area sown to crops in 1980/81 was 8.34 million ha, i.e., about 12 per cent of Burma's total land area. Paddy accounts for 52 per cent of the total cropped area, followed by sesamum (13 per cent), pulses (8 per cent), groundnuts (6 per cent) and cotton (2 per cent). Jute, rubber, wheat, maize and other crops account for the remaining 20 per cent. About 12.7 per cent of the net area sown in 1980/81 was irrigated. Overall, the cropping intensity in Burma is about 120 per cent.

All agricultural land is owned by the GSRUB and farmers have lifetime cultivation rights. The average land rights of the 4.3 million farm families in Burma is 2.2 ha; varying from 61 per cent of farmers with less than 2 ha to 3 per cent with over 8 ha.

Beginning in 1970 the GSRUB has given a high priority to investments to obtain a more intensive cultivation of existing land under rain-fed conditions, particularly in lower and Central Burma. Relatively lower priority has been given to investments to extend irrigation, for drainage and flood control, or for the extension of the cultivated area. Consequently, the net cultivated area increased by only 0.44 million ha in 1971/72 - 1980/81; the irrigated area increased from 0.85 to 1.05 million ha during the same period.

The GSRUB's policy in the late 1970s was to introduce intensive measures to promote increased production of paddy in order to meet domestic demand and to provide an increasing surplus for export. It therefore introduced a selective and concentrated strategy which involved the adoption of proven technology, the leadership of local level political bodies, selective and concentrated use of land and technicians and promotion of mass participation.

Following an intensive pilot program in 1975-1977, the Whole Township Paddy Production Development Programme (WTPPDP) was introduced in two townships in southern Burma in the 1977/78 crop season. The main features of WTPPDP include the more intensive use of exotic and locally bred HYVs, the introduction of improved cultivation practices, and the application of recommended rates of fertilizer. WTPPDP was extended to cover 78 townships in 1981/82, involving 2.5 million ha or about 48 per cent of the area sown to paddy.

The Agricultural and Farm Produce Trade Corporation (AFPTC) procures paddy and other crops from farmers, distributes rice from surplus areas to deficient areas, and exports the surplus. AFPTC procures about 35 per cent of the total paddy crop and the amount procured increased from 2.9 million mt. in 1977 to 3.9 million mt in 1981. AFPTC maintains over 800 procurement centers, each serving 20 -30 villages. The procurement quota for each farm is based on total production less amounts for domestic consumption, for payments to labor in kind, and tor sale on the free market. Incentives are offered to farmers who sell all their produce to AFPTC, as well as for rice varieties popular on international markets.

Prices for all varieties of paddy were increased by 51 per cent between 1971 and 1974 and by 1981 the price of high quality paddy was increased by a further 15 per cent. Paddy is graded by AFPTC at procurement centers, each variety being classified into three main grades by quality namely, ordinary, quality seed and first grade quality seed. Procurement prices range from $57 to $82 per mt depending on the variety and quality. Price differentials have recently been increased in favor of internationally preferred premium grades; farmers' responses to these price incentives have been very favorable. While the current export price for rice of approximately $360 per mt would appear to provide the GSRUB with a substantial margin, it is not out of line with other countries in the region given the subsidized cost of inputs, and paddy storage costs and storage losses which the farmers do not have to incur on the paddy procured by the GSRUB. After adjustment is made to convert the purchase price in terms of rice equivalent, and allowing for processing, storage, transport and marketing costs the effective procurement price would

correspond to about 40 per cent of the current export price, fob Rangoon.

The GSRUB also regulates the procurement and prices of cotton, jute, maize, pulses, rubber and sugarcane, whereas the prices of groundnuts, sesamum, tobacco and other subsidiary crops are set by free market forces.

Changes in the government policies over the past decade have enabled it to introduce new technological and agronomic techniques with the active participation of farmers. These efforts have resulted in substantial increases in production and yields, which have been of considerable benefit both to the farmers and the country. Paddy production increased from 9.2 million mt in 1976/77 to 13.1 million mt. in 1980/81 with a significant increase in rice exports. Production of other crops has also markedly increased. The budget for the TFYP Plan provided a record $750 million for the development of the agriculture sector and this represented 25 per cent of the total development budget.

The introduction of WTPPDP has led to some dramatic changes in farming practices, including the introduction of HYVs and the relatively high application rates of chemical fertilizer to realize HYV's yield potential in a shorter growing period. From 1970/71 to 1977/78 the use of fertilizers increased from 34,000 to 141,000 mt and during the next three years, with the increase in townships involved in WTPPDP, fertilizer use increased to 220,000 mt. A further increase in fertilizer use to 450,000 mt by 1983/84 is projected.

The three types of fertilizer used are ures, triple superphosphate and muriate of potash. From a proportionate use of 86:13:1 in 1977/78, it is projected to be 61:28:11 by 1983/84.

Domestic production of urea started in 1971 when a 65,000 mt per annum (tpa) factory in Central Burma began operating. Another plant of similar capacity came on stream in the following year and from 1972 to 1976, Burma exported urea fertilizer. An extension to the first factory, due to be completed in 1982, will increase local production of a further 65,000 tpa. Construction has started on a 200,000 tpa

factory in the same area. This is due to come on stream in 1985 and will increase production capacity to 395,000 typa by 1988. Even with this additional capacity, considerable quantities of urea will still have to be imported as the projected demand for urea in 1988 is 709,000 mt. The country's total requirements of triple superphosphate and muriate of potash will continue to be imported.

The three divisions of Pegu, Rangoon, and Irrawaddy encompassing the 12 townships for the proposed Programme, accounted for 53 per cent of the 220,000 mt of fertilizer used in Burma in 1980/81.

Paddy occupies only 52 per cent of the cultivated area but accounts for 84 per cent of the fertilizer used. Under WTPPDP, there will be no significant increase in the cultivated area, but fertilizer application per hectare is expected to increase substantially. The growing of jute, which currently coincides with the paddy season, uses only 4 per cent of fertilizer consumed. Groundnuts, cotton and sugarcane are the other users of fertilizer. A number of secondary crop intensification projects and several major irrigation projects are expected to further increase fertilizer consumption.

Total external assistance to Burma for the agriculture sector since 1974 has amounted to about $800 million. The Federal Republic of Germany has been the largest source of bilateral assistance (over $150 million) followed by Japan ($49 million), the United Kingdom ($20 million) and Australia ($17 million). ADB has provided loans totalling $243 million -- about 46 per cent of total multilateral assistance to that sector. International Bank for Reconstruction and Development (IBRD) has provided loans totalling about $291 million. Details of external assistance to the agriculture sector are shown in Fig. 2.3.2. per hectare is expected to increase substantially. The growing of jute, which currently coincides with the paddy season, uses only 4 per cent of fertilizer consumed. Groundnuts, cotton and sugarcane are the other users of fertilizer. A number of secondary crop intensification projects and several major irrigation projects are expected to further increase fertilizer consumption.

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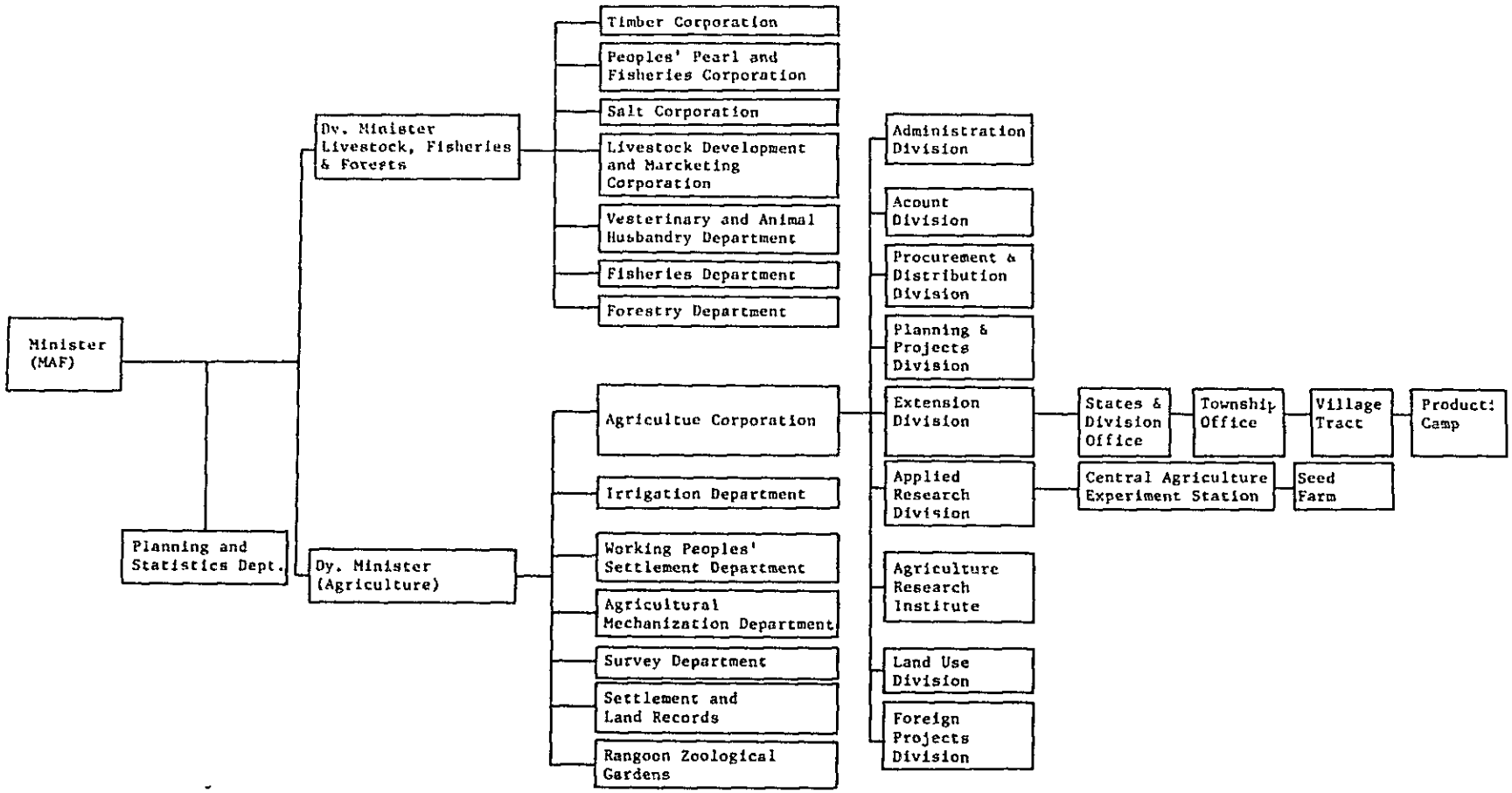
The Fourth Four-Year Plan (FFYP) which covers the period from 1982/83 through 1985/86 have been started implementing and in the agricultural sector is mainly responsible for meeting the food requirements of the people, supplying raw materials to the local processing and manufacturing sector and accounting for the major share of foreign exchange earnings capital investment. In the fulfilment of the targets for the agricultural sector of the current economic plan, the six point objectives spelled out for the sector must be taken as guiding principles. They are: (1) to expand cultivation and raise production of basic agricultural crops to meet home consumption needs; (2) to produce enough raw materials for meeting the requirements of the local industries; (3) to increase the export of agricultural produce every year, to concentrate mainly on expansion of cultivation of main export crops and to search for and cultivate new export crops; (4) to reclaim arable land in areas with uncultivated land and to expand irrigation networks to keep the agricultural sector growing steadily for a long time; (5) to effectively expand co-operative farming with the aim of realizing the ownership ratio envisaged in the 20-Year Long-Term Plan; (6) to ensure an annual 5.4 percent growth of the agricultural sector.

These objectives evolved out of the experiences of the previous economic plan and on the basis of manpower, machinery, materials, and scientific methods of cultivation available during the current Fourth Four-Year Plan period. For instance, the special high-yield strains and scientific methods of cultivation helped to boost paddy output from 36.8 baskets per acre in 1976-77 to 57.06 baskets per acre in 1981-82 under the TFYP. At the same time the acreage under cultivation increased vastly.

Fig. 2.3 Agriculture Corporation



Source: Agriculture Corporation (March, 1982)

2-3. Agriculture Corporation

The Agriculture Corporation (AC) is one of four state corporations under the Ministry of Agriculture and Forests (MAF). It was established in 1972 by the amalgamation of the former Department of Agriculture, the Agriculture and Rural Development Corporation and the Land Use Bureau. The AC is responsible for agricultural research, extension, and procurement and distribution of seeds, fertilizers, agricultural chemicals and application equipment. Its headquarters area in Rangoon and it is headed by a Managing director who reports directly to the Deputy Minister of Agriculture and Forests. It is organized into nine (9) divisions each headed by a general manager with the exception of the Land Use Division which is headed by a deputy general manager. (Refer to Fig. 2.3)

The total staff strength of AC in 1980/81 was over 15,000. Two of the divisions of AC have substantial field operations. The Extension Division (EXD) has field staff at the State/Divisional, Township, Village Tract, Production Camp and Village level with the basic level extension worker being the Village Extension Manager (VEM). There were over 6,000 village managers in 1980/81 providing extension services to farmers with each village manager being responsible for average super vised cultivated area of 1,300 ha (3,256 acre).

The Applied Research Division (ARD) carries out its functions through 17 Central Farms located in six states and five divisions of Burma. In 1980/81 there were about 1,500 employees in this Division. Eight of the 17 central farms specialize in paddy research, seven focus on dryland crops and two on fruit crops. This Division conducts field testing of the materials emerging from the core research programmes of the Agriculture Research Institute which is located at Yezin, some 400 km north of Rangoon.

The Agricultural Research Institute (ARI) is responsible for undertaking crop related research. It is located near Yezin, approximately 400 km north of Rangoon, where 567 ha are available for the development of experimental plots. The work undertaken by a staff of about 50 professionals and 400 support personnel is designed to increase crop production and is focused on developing improved

quality seeds, better crop husbandry and protection techniques, more efficient application methods of plant nutrients and better cropping systems suited to each agro-ecological condition. In-service training to township level extension workers is also provided by ARI.

The Planning and Projects Division (PPD) is responsible for the identificatin, preparation and analysis of projects and programmes to be undertaken by AC. PPD is also responsible for project monitoring and for the collection of baseline data and other information required for project formulation and evaluation. With the cooperation of the Extension Division statistics are compiled on crop performance and the interpretation and dissemination of these data are carried out by PPD's professional staff in AC headquarters in Rangoon.

The Procurement and Distribution Division (PDD) is responsible for the procurement and distribution of all farm inputs including fertilizer and pesticides. International tenders for these items are drawn up and evaluated by this Division which is also responsible for assuring the timely distribution of fertilizers within the country. In this regard PDD works with the close cooperation with the Central Movement Coordinating Committee which is responsible for allocating and contracting the required domestic transportation. PDD is also responsible for the procurement and export of rubber and some secondary crops produced within the country. The activity of the division has increased significantly over the last several years as the demand for fertilizer and pesticides have grown with the expansion of HYV acreage.

AC is currently involved in the executing of 17 externally assisted projects, either as an executing agency or as a cooperating agency. These projects cover a wide range of activities including a World Bank funded seed development project whose principal objective is to develop six seed production farms for the production of rice, cotton, groundnuts and jute seed. The Federal Republic of Germany has recently concluded three project agreements with AC involving two fertilizer seeding programmes and a fertilizer marketing and distribution programme. The latter project is funded under a technical cooperation agreement and provides for the preparation of long-term plans to assess domestic demand and recommendations on fertilizer

import requirements as well as providing training and recommendations on fertilizer distribution measures. AC has also been executing agency for a UNDP financed Crop Development Project aimed at accelerating the improvement and development of wheat, maize, sugar cane and other secondary crops. The Asian Development Bank projects which AC has been involved include the Sedawgyi Multipurpose Dam, where AC will support the Irrigation Department in carrying out a component of the Project. Furthermore, AC was recently involved in Palm Oil Project, which was prepared by the Bank for Swiss and EEC financing. (Refer to Fig.2.3.2 & Fig.2.3.3)

In general, AC has performed well as an executing agency, although the majority of the projects that are being executed are still in a fairly early stage of implementation. Consultants have been successfully fielded in AC implemented projects, including the Federal Republic of Germany financed fertilizer distribution and marketing project, the Canadian International Development Agency - IRRI Research Project and several UNDP technical assistance projects. Although there were some delays associated with the selection and fielding of a consultant under the Palm Oil Project, this has been largely the result of delays in the provision of draft invitation documents from the financing agency concerned. AC's performance on the agriculture development component of this project was completed on schedule during 1980 and consisted of the preparation of about 2,350 ha. of land.

AC has an extensive and well organized field operation which is totally integrated into the political and administrative framework of the country. Distribution of fertilizers in the Programme area by AC has increased from about 13,000 mt. in 1977/78 to 37,000 mt. in 1980/81 whereas country wide fertilizer distribution has increased from about 157,000 to 216,000 mt. over the same period. AC has considerable professional depth, with over 400 staff having agriculture degrees, many with postgraduate diplomas and overseas training and experience.

AC has been the principal agency responsible for the implementation of WTPPDP. The success of this Programme can largely be attributed to the contribution made by AC in providing the initial extension service required to explain the programme to farmers and the follow-up delivery of inputs.

Fig. 2.3.2 External Assistance to the Agriculture Sector (1974–1981)

Sr. No	Name of Project	Source	Amount ('000)	Approval Year	Terms	
					Interest %	Amortization (Grace)
1	Irrigation	IDA	US$ 17,000	1974	0.75	50(10)
2	Fisheries Development	ADB	US$ 9,800	1974	1 00	40(10)
3.	Forestry I	IDA	US$ 24,000	1974	0.75	50(10)
4.	Livestock	IDA	US$ 7,500	1975	0.75	50(10)
5.	Paddyland Development I	IDA	US$ 30,000	1976	0.75	50(10)
6	Sedawgyi Project	ADB	US$ 45,900	1976	1.00	40(10)
7.	Seed Development	IDA	US$ 5,500	1977	0.75	50(10)
8.	Sedawgyi Dam (Local Cost Financing)	OPEC	US$ 2,250	1977	0.50	20 (5)
9.	Forestry Project	ADB	US$ 25,100	1977	1.00	40(10)
10.	Paddyland Development II	IDA	US$ 34,500	1978	0.75	50(10)
11.	Pyinmana Sugar Integrated	ADB	US$ 10,100	1978	1.00	40(10)
12	Arakan Fishery Development	Norway	NKR 135,500	1978	5.80	15 (3)
13	Kyaukpyu Fishery Development (DANIDA I)	Denmark	DKR 30,000	1978	0	35(10)
14	Second Fishery Development	ADB	US$ 24,880	1978	1.00	40(10)
15	Rubber Rehabilitation	IDA	US$ 4,500	1979	0.75	50(10)
16	Kyaukpyu Fishery Development IDANIDA II)	Denmark	DKR 90,000	1979	0	35(10)
17	Marine Prawn Development (Sandoway)	UK	US$ 17,315	1979	7 50	8 (0)
18.	Forestry Project II	IDA	US$ 35,000	1979	0.75	50(10)
19	Forestry Project II	EEC	US$ 8,000	1979	0.75	50(10)
20.	Community Loan VII (Supply of NTK Fertilizer)	FRG	DM 3,000	1980	0.75	50(10)
21.	Nyaunggyat Dam Multipurpose	IDA	US$ 90,000	1980	0.75	50(10)
22.	Purchase of Fishery Inspection Vessels (DANIDA I.I)	Denmark	DKR 35,000	1980	0	35(10)
23.	Inland Fisheries Development	ADB	US$ 20,000	1980	1.00	40(10)
24.	Furniture Industries	Japan	Y. 393,000	1980	7.75	2 (0)
25	Kinda (Nyaunggyat) Dam Multipurpose	Japan	Y.3,600,000	1981	2.25	30(10)
26.	Engineering Services for South Nawin	Japan	Y. 250,000	1981	2.25	30(10)
27.	Procurement of Fishery Inspection Vessels (DANIDA IV)	Denmark	DFR 40,000	1981	0	35(10)
28	Wood Industries I	IDA	US$ 32,000	1981	0.75	50(10)
29.	Pump Irrigation and Area Development	ADB	US$ 20,000	1981	1 00	40(10)

Source Foreign Economic Relations Department, Ministry of Planning and Finance.

Fig. 2.3.3 New Projects to be Implemented in the Fourth Four Year Plan Period (1982 – 83 to 1985 – 86)

AGRICULTURE CORPORATION

Sr No	Project Title	Total Investment Cost (Kyats)	
		Total (000)	F E (000)
1	Development of Maize & Oil Seed Project (Ground nut Sesamum, Safflower, Sunflower)	73,600	43,300
2	Fertilizer Pipeline Project (Crop Intensification Programme Phase I)	84,779	62,988
3.	Plant Protection & Quarantine Research Project	9,600	4,200
4	Food Crop Development Project	37,080	30,080
5.	Industrial Crop Development Project	29,040	14,000
6.	Central Agricultural Development Training Center Project	51,100	37,400
7	IRRI-Burma Co-operative Research Project (Multiple Cropping System & Small Farm Machinery Project Phase II)	13,333	4,053
8.	Plantation Crop Development Project	31,596	20,665
9.	Development of Bio Fertilizer Project	8,000	800
10.	Radiation & Mutation Breeding Project	1,100	910
11	Certified & Quality Seed Production Project-III	28,648	15,695
12	Strengthening of Soil Survey & Sand Use Evaluation Studies	1,742	1,377
13.	Pump Irrigation & Area Development Project	8,500	5,492
	Total	378,118	240,960

Source: Agriculture Corporation (March, 1982)

WTPPDP has been enthusiastically received and coverage is expected to 78 townships in 1981/82. The total area under the WTPPDP has increased from approximately 96,000 ha. in 1977/78 to an expected 2.7 million ha. in 1981/82.

AC is now expanding this programme to cover other crops. The first major externally assisted project supporting this programme for other crops will be the Maize and Oilseeds Production Project. This undertaking will involve a $30 million contribution from USAID which will finance over 200 manmonths of technical assistance, 2,300 manmonths of training, 70,000 mt. of fertilizer, and equipment and machinery for seed farms and processing facilities. The project is expected to be implemented over a three-year period in 28 townships in Upper and Lower Burma. An agreement covering the scope and description of this project has recently being concluded between USAID and AC and implementation is expected to commence in 1982.

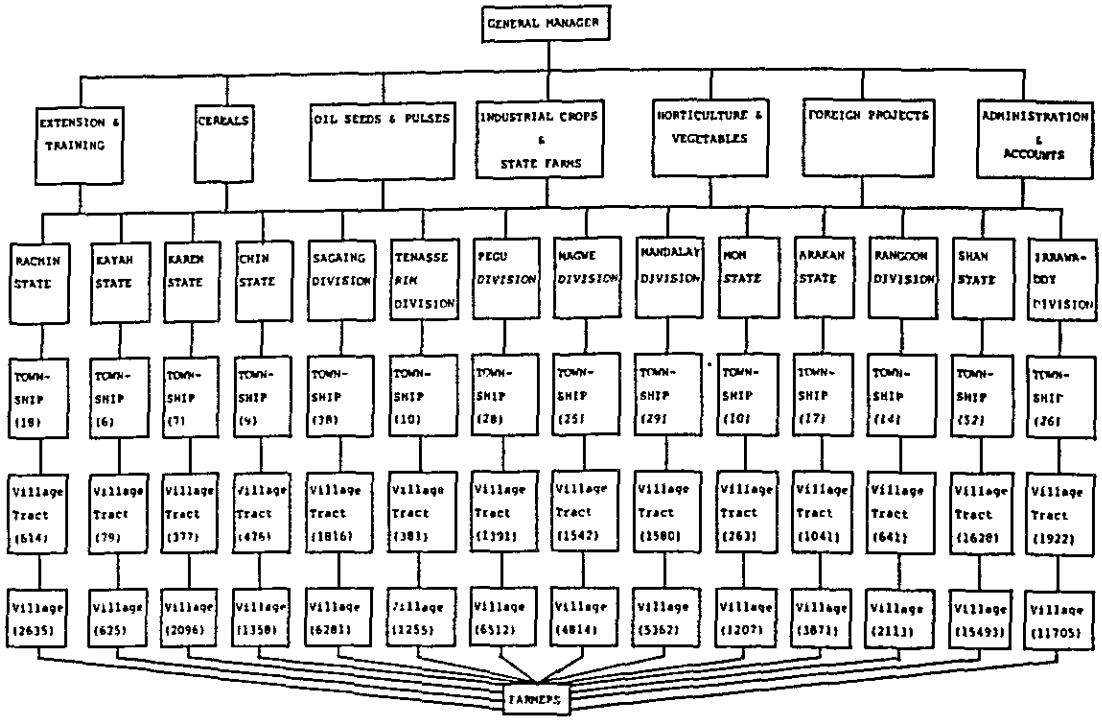
2-4. Extension Activities

To materialize the agricultural development, AC has been promoting the High Yield Rice Programmes with remarkable achievement. To expand this programmes to wider area, and also to increase the coverage of crops other than rice and to promote the production are urgently needed. To expand these plans correct and advanced technologies should be transfered effectively to farmers. As the principal executing division of AC, the EXD is headed by General Manager (Extension), who is assisted by Deputy General Managers at the State and Division level; 299 Township managers at the Township level, 902 VTM and 6,803VEM at the village level.

The responsibilities of the Extension Division are to:

(1) disseminate agricultural research findings;
(2) implement the annual agricultural plan;
(3) distribute essential supplies to the farmers and assist in procurement of these inputs;
(4) distribute pure seed;
(5) help coordinate the agricultural adivities with the people's councils at village level;

Fig. 2.4 *Extension Division*



Source Agriculture Corporation (March, 1982)

Fig. 2.4.2 Extension Staff Allocation

Different Level	Office	No. of extension office	No. of extension personnel	No. of extension personnel/ per office
State and Division	State and Division Manager Office	14	125	10
Township	Twonship Manager Office	299	608	2
Village-Tract	Village tract Manager	-	902	-
Village	Village Manager	-	6803	-
	Total		8438	12

Source. Agriculture Corporation (March, 1982)

There are over 6,803 VEMs in 1980/81 providing extension services to farmers with each village managers being reponsible for average supervising cultivated area.
Average supervised area for each village managers were 1,307 ha. in 1975/76 and were 1,300 ha. in 1980/81. Fig. 2.4.2 & Fig.2.4.3 is showing that 8.9 extension personnels per each State/Division office, 2.0 extension personnels per each township office, 1 village tract manager for 14.5 village tracts and 1 village extension manager for 10.4 villages.

AC has give a higher priority for investments to expand extension service systems to increase extension staffs following the success of WTPPDP project that include the intensive investment of extension managers with average supervised area of 400 ha.
For this purpose it needs to increase more than three times of existing extension personnels equal to 20,000 village managers.

Duties of village extension managers cover, the following items.

(1) Extension and introduction of improved technologies and cultivation practices.
(2) Extension of exotic and locally bred HYVs.
(3) Production increase of alternative to imported crops and export oriented crops (such as cotton, jute, sugar-cane and beans)
(4) Plant protection method.

The major constraints which reduce the effectiveness of the extension Division are;

(1) lack of systematic formal training programmes and facilities for VEM and the absense of higher level specialist training;
(2) lack of adequate vehicles for mobility (transportation);
(3) involvement of VEMs in non-extension activities such as procurement and distribution of agricultural inputs, collection of data, thereby reducing the effectiveness of its essential purpose.

Because of this heavy load upon village managers, they tend inevitably to neglect their primary duties to extend new technologies and

Fig. 2.4.4 Training Example of Agriculture Corporation at central level

(1979 - 80 to 1981 - 82)

Sr. No.	Description	Number of Trainies	Training Period	Remark
1	3	3	4	5
1 (C)	Advance Course for Agricultural development	60	2 Weeks	State/Division and Township manager
2 (A)	Preservice training	458	2 Months	above Agriculture High School level
3 (B)	Transplanting equipment training	300	10 Days	VTM & VEM
4 (B)	Transplanting instrument training	285	5 Days	Dy. Township manager, VTM, VEM
5 (B)	Reaper Binder training	62	4 Days	-do-
6 (C)	Subject matter specialist training	157	3 - 8 Months	Dy. Township manager and above
7 (B)	Mushroom culture training	20	5 Days	-do-
8 (B)	Plant protection training	445	1 Weeks	VTM & above
	Total	2177		

Note. (A) Induction training
(B) On the job training
(C) In service training

Fig. 2.4.5 Regional Level (State/Division) Training Programme

Training Course	Purpose	No. of Participants	Duration	Frequency	No. of Location	Caricculum
1	2	3	4	5	6	7
On Job Training		Township & village levels 50	1-2 Weeks	3	14	Impact points of CADTC: subject
Inservice Training		Township level & village levels 50	1-2 Weeks	3	14	Impact points of CADTC: subject
Mini-Mechanization Training		Township & village level 50	2-5 Days	3	14	"
Others (Meeting & Discussion)		Township & village level 100 Local authorities	2-3 Days	4	14	Demonstration Discussion Film shows

Fig. 2.4.6 Local Level (Township/Production Camp) Training Programme

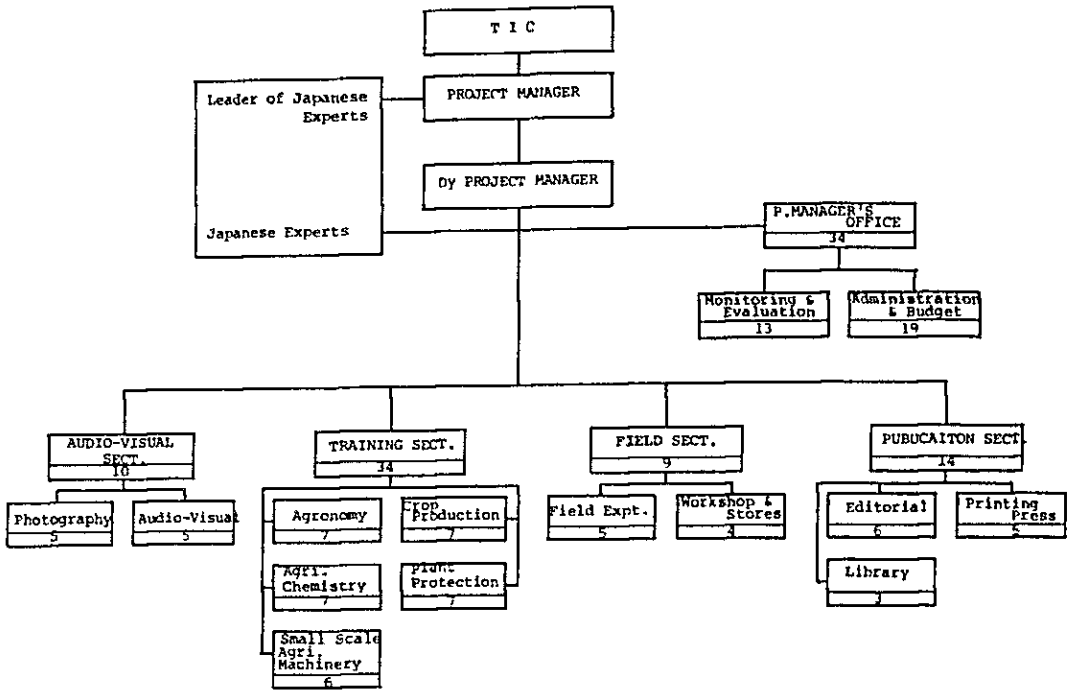
Training Course	Purpose	No. of Participants	Duration	Frequency	No. of Location	Caricculum
1	2	3	4	5	6	7
On Job Training		Village Level: 50	1-2 Days	6	20	Impact points of CADTC/ Regional subject
Mini-mechanization Training		Village level: 50	1-2 Days	6	300	"
Others		Local authorities peasants other class & organization VTM/VEM 100	1-2 Days	4	300	- Demonstration Discussion Field days Film shows

Source: Agriculture Corporation (March, 1982)

informations to local farmers. It should be noted that there remain big obstacles hampering their extension activities, for instance, such as lack of adequate transport means, insufficient ablity to digest new knowledge by farmers and feeble publication system of farmers.
Training for extension officers and extension personnels is provided by AC for graduates from Institute of Agriculture, Agriculture Institutes, Agricultural High schools, etc. As the In-Service Training, extension managers at different level of state, division, township, village tract and village are trained by use of facilities and fields of ARD in Gyogon, ARI in Yezin and Central Farms. The local training by use of State farm, Demonstrate farm at township and village level are executed. However, the overall programme of such training and the basic programme for the extension plan are still remain at an preliminary stage.

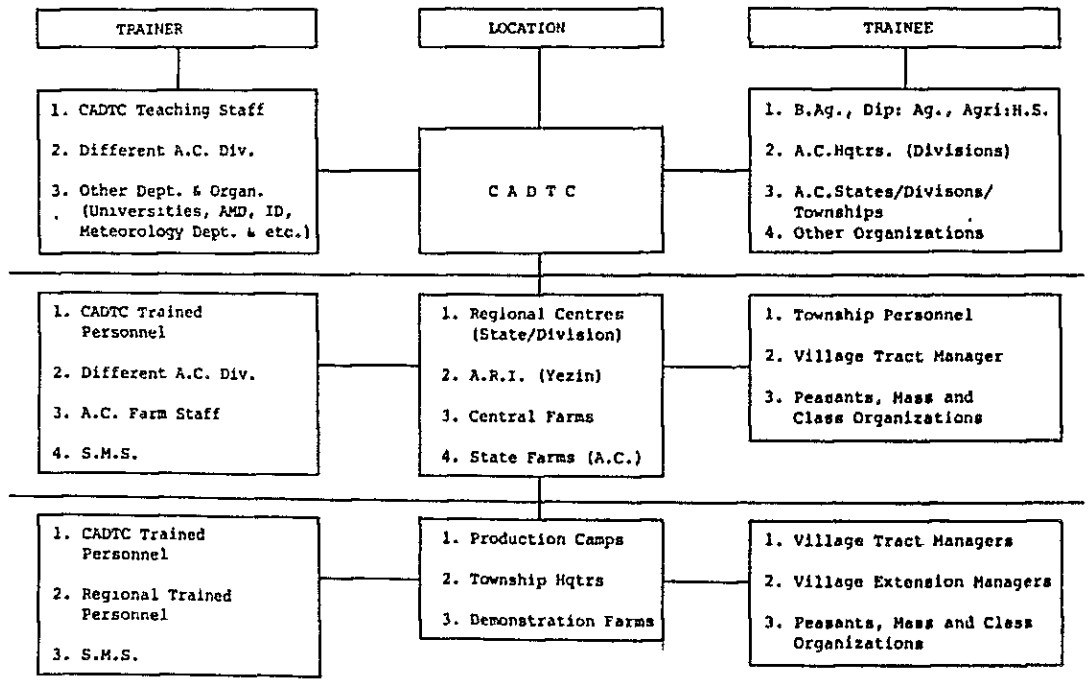
Therefore, comprehensive training system of the extension personnels should be urgently initiated. (Refer to Fig.2.4.4 & Fig.2.4.5 and also refer to Appendix-4.(5))

Fig. 3.1.1.1 CADTC Organization



Source: Agriculture Corporation (March, 1982)

Fig. 3.1.1.2 CADTC Function Chart



Source: Agriculture Corporation (March, 1982)

CHAPTER 3. OUTLINE OF THE PROJECT

3-1. Objectives & Contents

The objectives of the Project is to establish the Central Agriculture Development Training Centre (CADTC), to facilitate improvement of agriculture extension personnels by close tieing-up with the existing training facilities and extension systems and to develop agricultural productivity by spreading widely of new technologies among peasants on a nation wide scale throughout the country of Burma, thereby contributing much toward to nation's economic development plan as is fully expected. Furthermore, it is expected by and after the establishment of the CADTC that all existing training systems will be unified with distinct in organization of Central Training, Regional Training and Local Training, each being to serve its own function more effectively and efficiently.

3-1-1. Function of the CADTC

The CADTC holds its position as one of the executing divisions within AC, having its advisory board with the Training Implementation Committee (TIC) consisting of the Managing Director as a chairman, by the Project Manager of the CADTC as a secretary and by the Division Managers of the AC as committee.

The CADTC constitutes the Training Section responsible for execution of training and improvement of teaching materials, the Field Section for control and operation of the demonstration farm, the Publication Section for Compilation and printing of training materials, the Audio-Visual Section for operation and maintenance of training aids and the Project Manager's Office for training planning, administration and management of the CADTC.
According to the objectives, the function of the CADTC are classified as follows:

1) Central Function

The CADTC will provide the Pre-service training for new-recruits On-the-Job training and In-service training courses for extension personnels as well as the managing staff and subject matter specialists at the levels of States, Divisions Township and Villages.
Concurrently, the CADTC will be responsible division for all the matters concerning training activities of the regional and local training at each office level of States and Division being operated by the EXD of AC, thus performing its centre function, on the other hand, for monitoring, coordinating and evaluating of the training programmes in a systematic way throughout the whole country of Burma.

2) Training Function

The CADTC will provide the practical training using the achieved results of research development, tests and new technology developed at each research organs of AC such as Agriculture Research Institute in Yezin, Applied Research Division in Gyogon and Central Experiment Farm.

3) Publication Function

The CADTC will provide publication, information services and exhibition of major products and cultivation methods as a backing-up systems to agricultural extension personnels to improve their Knowledges and technical informations and on the other hand, to offer the ways and means of extension services.

As aforestated, the functional roles of the CADTC will help the trainees enhance their interest, through the training programme in agricultural production, living style of farmers or guidance and promotional activity of agriculture extension. Furthermore, the CADTC will serve for overall coordination between staff individuals by repleting the training programme and expansion of the scope of services.

3-1-2. Training Programme

The yearly training programme will be planned by the Project Manager's Office of the CADTC and will be decided for execution by the Training Implementation Committee.
The CADTC will provide the following trainings as the supreme training organs for the extension staffs.

1) Training Courses

Pre-Service Training

Training will be provided for new graduates from Institute of Agriculture, Agricultural Institutes and Agricultural High Schools, for a period of two (2) months, to cultivate of responsibility as the extension staff, the ideology of agricultural extension activities. Total annual number of trainees may be 500 or so, as broken down by 250 from university graduate level, 150 from Agricultural Institutes level and 100 from High School level. The curriculum is based mainly upon theoretical education.

On-the-Job Training

The type of this training will be provided to improve technical skill for extension staff of offices at different levels of states, divisions, townships, village tracts and villages. The training period will cover 1 to 2 weeks. The curriculum will apply to any varied level of trainees. Total number of trainees a year will amount to 595 or so. The curriculum constitutes mainly theoretical and laboratory exercise training.

In-Service Training

This training programme consists of four courses, for extension staff and for specialists in every specific field, such as Subject Matter Specialist Course (S.M.S), Specialist Comprehensive Course, General Agriculture & Extension Course and Planning and Analysis Course.

Fig. 3.1.2.1 Training Outline

Training Courses	Purpose	Participant	Duration	Substance of training
(1) Pre-Service training	orientation of new recruits for the extension services	new recruits with the following qualification (1) University (B.Ag.) Graduate (2) Diploma of Agric. Institute (Dip.Ag.) (3) Agric. High school Graduate (H.S)	2 months	-organizational set up, function and activity of AC -strategy of agric, development and plan executed by AC -role and activities of extension workers -management of extension services -requirement of the knowledge about the advanced techniques, equipments and facilities -other information necessary after joining extension services
(2) On the Job training (refresher course)	reorientation of managing staff for extension services	(1) extension personnels up to divisional level, mainly township level	(1) 1/4-1/2 months (divisonal level) (2) 1/2-1 months (township level) (3) 1-1 1/2 months village level)	-management of extension services -guide line of current agric. policy -requirement of the new technology -problem identification and their remedies
(3) In-Service training	requirement of the special knowledge necessary for the extension services			
(i) Subject Matter Specialist course	training of subject matter speciallst	Subject matter Specialist	(1) 3 months (central and divisional (2) 6 months (township level) (3) 3 months (others)	-agronomy -soil science and land use -water management -plant protection -agri. economics -fertilizer -post harvest technologies
(ii) Specialist comprihensive courses	requirement of specific knowledge necessary for the extension services	extension personnel mainly township managers and deputy township managers	(1) 3 months (central level) (3) 6 months (township level)	-multiple cropping -organic recycling -seed quality and purity maintenance -economics planning and analysis -extension method
(iii) Extension and general agric. course	training for leading extension workers	extension personnels	(1) 2 months (central and divisional level) (2) 3 months (township level) (3) 2 months (others)	
(iv) Planning and analysis course	requirement of the knowledge about economic planning and analysis necessary for the extension service	mainly township manager and deputy township manager	(1) 1 month (central and divisional level) (2) 1 month (Central and divisional level township level)	-agricultural economics -economic planning and analysis

Source: Agriculture Corporation (March, 1982)

The training period will be three to six months. Training will be provided in a class organized by a small number of trainees.

2) Target Trainees

The CADTC will assign the following trainees to three (3) different levels of training:

Pre-Service Training:

Graduates from Institute of Agriculture
Graduates from Agricultural Institutes
Graduates from Agricultural High School

On-the-Job Training:

Extension staff at levels of State and Division, township, village tract and village managers.

In-Service Training

Extension staff at levels of State and Division, township, village tract and village.
Specialists at each specific fields.

3) Lecturers and Instructors

Lecturers and instructors presently assigned to training institutes are mostly regular personnel of AC. If and when the training curriculum may need, the experts are invited as lecturers from other departments and organizations. When the CADTC will be established, total teaching staff will be 34 persons on a permanent service basis and 42 persons as part-time or visiting lectures from AC and other related organizations (Refer-Appendix-(4)). It is also planned that those qualified instructors will be dispatched abroad as well as at CADTC. In the training programme for lecturers and instructors, the technical cooperation from the Japanese Government is highly expected.

4) Training Programme

The annual training schedule is shown in the Fig.3.1.2.2 Normally, the training programme must be planned with due consideration to classification, grade, course, recipient, method and teaching material of training. In particular, special consideration must be paid to the following points for formulation of the training curriculum in details.

(1) The curriculum must aim at improved quality of individual extension staff as the settler of any problem to arise in the local community, developing their necessary ability to achieve the objective of agricultural extension activities; in other words, to develop the ability to foresee and shape up the problem, both organizationally and individually, by full demonstration and utilization of independent, positive and creative characters peculiar to the extension staff, in full recognition, that the extension work is the indispensable system to solve the problem arising out of and in connection with the agricultural living in the local community.

Fig. 3.1.2.2 Annual Training Schedule

Sr. No.	Type of Training	Total No. of Trainees	No. of Trainees per Course	Duration (m) X Frequency	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
I	PRE-SERVICE TRAINING	500	500													
(1)	B. Ag.		250	2x1			200	200							200	200
(2)	Dip. Ag.		150	2x1												
(3)	H.S.		100	2x1	100	100										
II	ON THE JOB TRAINING	595	115													
(1)	Division, Level	45	15	1/4- 1/2x3						15		15				15
(2)	Township Level	250	50	1/2- 1x5	50	50			50	50				50		
(3)	Village Level	300	50	1- 3/2x6	50	50			50	50	50	50	50	50		
III	IN-SERVICE TRAINING	240	110						20	20	20	20	20	20		
(1)	S.M.S.	80	20	3- 6x4								20	20	20		
											20	20	20			
(2)	Specialist Comprehen-sive								20	20	20	20	20	20		
	a)Central/Div,Township	20	10	3x2					10	10	10	10	10	10		
	b)Village	60	30	6x2	30	30	30	30	30	30	30	30	30	30	30	30
(3)	Extension + General Agri (Township)	60	30	3x2					30	30	30	30	30	30		
(4)	Planning/Project (Analysis)	20	20	3x1						20	20	20				
		1335	725	-	230	230	230	230	210	245	200	235	200	230	230	245

Source: Agriculture Corporation

(2) Since "research" is based on a different concept from "development", it may be natural that the staff engaged in research activities should be of different qualification from those engaged in development activities. However, it can be said in this regard that the extension staff is a technical expert holding both of such qualifications as may be required for development as well as research activities. With this taken into consideration, therefore, particular importance will be attached to the following matters in formulating the curriculums for on-the-job training and in-service training so as to combine both training programme and extension activity into close coordination.

To carry out the training programme systematically and continuously alongside the guideline toward the target of formation of basic ability (inclusive of knowledge, skill and attitude) to be required for research staff improvement of specialized technical ability expansion of specialized knowledge.

To strengthen ability of technical development systematically (by extension offices), from the viewpoint that technology of independency fully reflecting local peculiarities should be established as essential to building of the local community.

To provide the condition for and comply with the requirement for a wide scope of technical knowledges so as to enable individual extension staff to perform its duties without any difficulty in his qualification as the research staff.

3-2. Technical Cooperation

At the request of BSRUB for the Project-type Technical Cooperation for the CADTC, the Technical Cooperation Preliminary Survey Team has been dispatched from 1st to 15th March, 1982 by JICA.

1) Purpose of the cooperation

Technical Cooperation is to be conducted in order to assist and strengthen the overall training activities of CADTC, through provision of advice and guidance, inter alia, preparation and implementation of training programmes, setting up of curriculum and production of training materials for the On-Job and In-service Training courses, mainly.

2) Duration of the cooperation

Total term of cooperation will be decided between GSRUB and GOJ before the completion of all the buildings and facilities of CADTC.

3) Contents of the cooperation

(1) Dispatch of experts

Some of experts (including Team Leader) will be possibly dispatched on the long term basis. In addition, Burmese side requested dispatch of experts in such fields as water management, agricultural machinery, agricultural economy and agricultural meteorology. Those fields will be mainly covered on the short-term basis.
Detailed schedule will be decided through discussions between GSRUB and GOJ.

Note: As to the agricultural meteorology, availability of expert is to be explored by Japanese side.

(2) Supply of machinery and equipment

Machinery and equipments indispensable for training activities of CADTC will be donated through the discussions between GSRUB and GOJ.

(3) Acceptance of Burmese counterpart personnel to Japan for training

Necessary number of Counterpart personnel will be trained in Japan. Details will be decided through the discussions between GSRUB and GOJ.

Tentative time schedule for implementation of the Technical cooperation is shown in 6-4 Implementation Schedule.

This schedule will be in the future finalized through the discussions between GSRUB and GOJ.

CHAPTER 4. PROJECT SITE

4-1. Site Location

The proposed site for the CADTC is located at Zayat Kwin, Hlegu township, Rangoon division approximately 50 km northeast of Rangoon center.

The Rangoon-Mandalay road being faced by the site is the trunk road inter-connecting Rangoon, Pegu and Mandalay. New Rangoon-Mandalay road has been constructed near the site. Existing site and its surroundings are used as the rubber plantation estate owned and operated by AC. A strip of land of about 18 ha. extension from south to north is made available for the project, and approximate 8 ha for the centre site and 10 ha. for the demonstration farm.

In the future town planning, Hlegu township is connected with Rangoon city by new Rangoon-Mandalay highway and Hlegu township is the centre of the education and training zone.

New Rangoon-Mandalay road is now undertaking and in the 4th Four-year Plan, remaining highway between Hlegu and Rangoon will be undertaken.

4-2. Climate & Geographical Conditions

Rangoon and Hlegu are situated in the monsoon zone which is featured by high temperature and humidity; 26 to 28°C at annual average temperature 68% at average annual humidity. In architectural planning, space allocation insulating the strong solar radiation, provide good air ventilation and drainage arrangement of storm water will be necessary.

Rangoon and Hlegu are situated in the typical alluvial soil on the great delta zone which is formed up with three rivers as Irrawaddy river, Sitang river and Salwin river.

Soil is of heavy clay soil type. Surrounding area of the site forms a part of rain fed paddy field being neighboured to the brown soil zone

in Hlegu township and provides suitable site conditions for the demonstration farm.

4-3. Existing Infrastructure

With regard to the infrastructures surrounding the project site, electricity is by branch of Electrical Power Corporation's (EPC's) 11KV high voltage line and water supply is also available to the CADTC building and demonstration farm from a few deep wells drilled within the site. However, the telephone lines should be installed over 30 km from Pegu.

4-4. Construction Conditions

In Burma, all construction work are undertaken solely the Construction Corporation (CC) under direct control of the Minister of Construction. It is one of the executing agencies under the jurisdiction of Construction Council, corresponding to Ministry of Construction, which is responsible for decision-making of important policies concerning construction projects.

High-rise buildings are scarcely built in the city of Rangoon. Many buildings are of reinforced concrete construction with walls of brick block structure, apparently influenced by the British architectural style and fashion.

Because of the ceiling limit to the quantity of construction material supplies, the time for completion of a construction work tends to be prolonged. Major materials such as cement and reinforcing bar in particular, together with skilled labour, seem to be suffered from chronic shortage.

CHAPTER 5. BASIC PLANNING

5-1. Basic Principles - to harmonize with Burmese natural conditions

Architectures under the Japanese Grant are mostly influenced by the construction period and the building technical level of the recipient countries, so that architectures does not some time harmonize with local natural conditions and also cause problems in the view of practicality, durability, economical and cultural side. Burma is located in the south east asia, however Burma is in the different conditions from ASEAN countries in the point of climatic, social and economical situations.
In the architectural planning of the CADTC, the basic principles are finalized with due consideration on the Burmese climatic conditions, traditional conditions and social conditions to create facilities real functional, durable and economical in the long-span of life cycle of the building.

1) To harmonize with natural conditions

Burma has distinct three seasons in the year, such as rainy season from May to October, cool season from November to February and hot season from March to April. In the rainy season, it rains every day and in the dry season it seldom rains. In the hot season, the temperature is very high.
To harmonize such hard changes of the climate, the building should be planned to create more comfortable architectural environment on careful consideration of the strong solar radiation and rainfalls, high temperature and humidity not merely depending the mechanical solutions.

2) To be functional, economical and durable

The CADTC facilities should be planned in adequate consideration of effective utilization of the facilities by close interrelationship mutually established for all the functions of the CADTC.

adopting local construction method and materials at maximum possible use the CADTC facilities should be planned to acquire durability, easy-maintenance and economical rationality.

3) To develop the power latent within local capability

It is considered to be also necessary in the architectural field some tranfering of technology in the case that the much local materials would be adopted in the building.
The necessary transfering of technology should not be different from the difference between the imported materials and construction method from Japan, and the local conditions.
It should be necessary to transfer technologies such as extracts the local power latent by aiming to create new technologies by utilizing local materials.

5-2. Orientation for Planning

5-2-1. Function and Facility Planning

The CADTC will provide its four different functions of centre, training, publicity and welfare. Facilities and material supplies including equipment must be planned so as to ensure multiplied effect of such functions by close interrelationship mutually established for all those different functions.

1) Function as Centre for Training Facilities

The CADTC will hold its position as the supreme institute for agricultural extension staff training, in the expectation that it will serve as the sole institute assuming its role of centrality responsible for planning and implementation of the training programme for guidance of the training for the local extension system. Since it will be established as the model institute in Burma as the propulsive base for agricultural extension activities over a wide expansion of land area, the Centre facilities should be accordingly planned.

2) Function as Training Centre

The training system in this CADTC is of a completed pattern with regard to classification, and teaching method and materials of training. Therefore, the facility planning, scale and arrangement of facilities must meet the need for each different pattern of training. Especially, the effective utilization of facilities should be fully considered on the facility planning. In the equipment planning to be used for training, the content and quantity of such equipment and materials should be specified with due consideration to the level and effectiveness of the training and the common utilisability by each different division. The development plan of the demonstration farm for practical exercise should fully consider the workability of the small-size tractor by utilization of the paddy field around the proposed construction site of the CADTC. The effective plan should be to establish the dry farm land using the distributed layer of brown soil.

3) Function as Publication Service

The agricultural extension activities are now being impeded by the existing poor vehicle traffic network in the rural part, the farmers' insufficient ability of absorbing new knowledge and the feeble structure of rural communities.

Under the present circumstances, therefore, it is important to establish the backing-up system mainly at the CADTC which can provide the agricultural extension staff with the ways and means of extension activities, together with the function to enhance both knowledge and technical skill of each extension staff. The plan must be established to construct the promotional facilities, including supplies of equipment and materials, for various extension activities such as release of publicity leaflet, supply of teaching aids for extension, display of demonstration farm and technical information service.

4) Function as Welfare Services

In addition to the foregoing three functions as the agricultural training center, the following welfare facilities will be required so as to ensure maximum training effect within the short period in the CADTC, especially in consideration of the need to compensate the local surrounding conditions around the proposed construction site.

Staff quarters and guest house:

These facilities are indispensable as the accommodation for regular full-time teaching staff and other administrative staff of the CADTC. The guest house may be used to accommodate those experts to be dispatched from Japan for technical cooperation.

Dormitory house:

Dormitory house for trainees will be used for concentrated and partial training for a short training period.

Canteen:

Sports and recreational facilities:

Recreational facilities for staff and trainees, such as gymnasium and tennis court, etc will be necessary.

Labourers' Quarter:

The Labourers' quarter will accommodate workers for the demonstration farm.

5-2-2. Effective Utilization of Facility

The scale and constitution of the CADTC facilities shall be planned in adequate consideration of effective utilization of training facilities.

In setting up the constitution and scale of training rooms, it is important to reduce the unoccupancy rate as much as possible and to ensure effective use of the rooms when they are not used for training.

Judging from the contents of training in the CADTC, it is necessary to provide a Large lecture room for collective training for Pre-Service training course. The period of Pre-Service training is limited to November - December, January - February and March - April by the scheduled period of graduation.
The number of trainees is 250 for university graduates, 150 for Institute graduates and 100 for high school graduates (expected numbers at of 1981/1982). Taking into account future increase, it may be safely said that at least one room with 300 seats is necessary. It is desirable that the large lecture room shall be provided with hall function so as to serve as a hall for lecture meeting or symposium by invited outside lecturers, lecture meeting for training instructors and graduation ceremony of the CADTC (required capacity: 300 persons) when it is not used for training.

According to analysis of room utilization at the peak period (June) from training programme, the following rooms will be required:

50-seat room x 2	30-seat room x 2
20-seat room x 3	15-seat room x 1
10-seat room x 1	

Assuming that lecture (theory) and practice (practical training and experiment) shall be in the ratio 70 : 30 and that the average effective utilization rate shall be 70% (higher than 50 - 60% in ordinary Japanese school), the minimum number of required rooms is calculated as follows:

9 rooms x 70/100 ÷ 0.70 = 9.0 rooms

according to the above estimate, the following constitution of facilities will be optimized.

300-seat room x 1 : To be used for Pre-service training course. When not used, it shall be utilized as a hall for lecture meeting, symposium, graduation ceremony, etc.

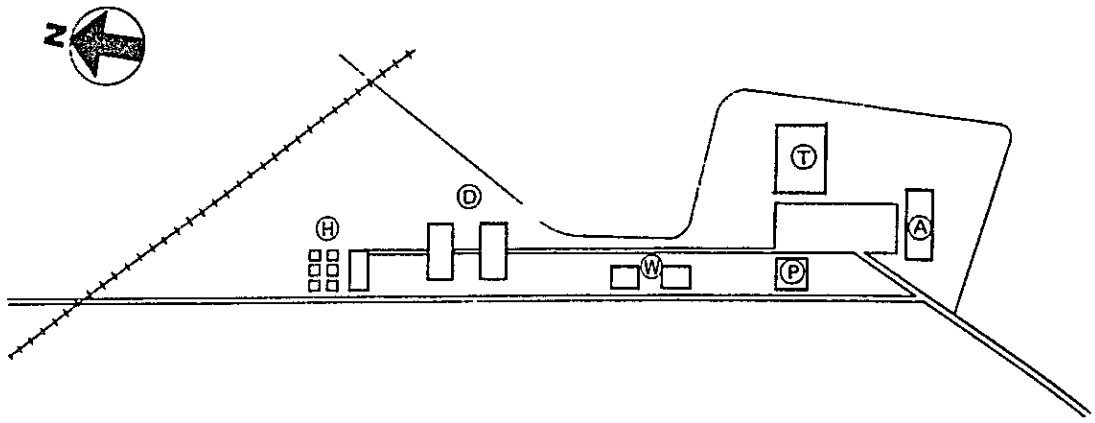
120-seat room x 1 : To be fully equipped with audio-visual facilities. It can be used for training of Pre-Service training course as well as for audio-visual training in On-the-Job training and In-Service training courses. It enables collective training of 2 - 3 classes.

Training room x 9 : Total 9 rooms shall be planned as training room. Judging from the contents of training, more 50-seat rooms and 30-seat rooms will be effective. 30-seat room enables collective training of two 10-person classes.

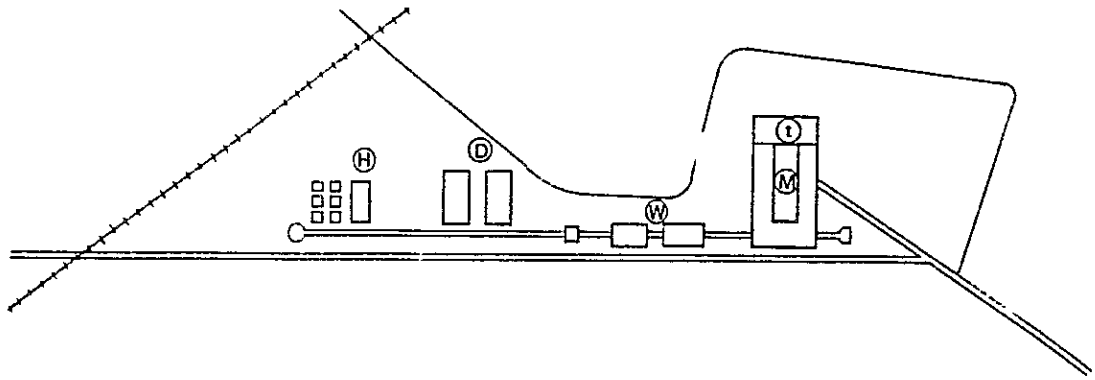
50-seat room x 3
30-seat room x 3
* 40-seat laboratory x 2
40-seat field room x 1

Upon examination of room utilization under training programme (contents of training on the typical day of each month) on the basis of the above constitution, it turns out that effective utilization rate of more than 66% can be assured.

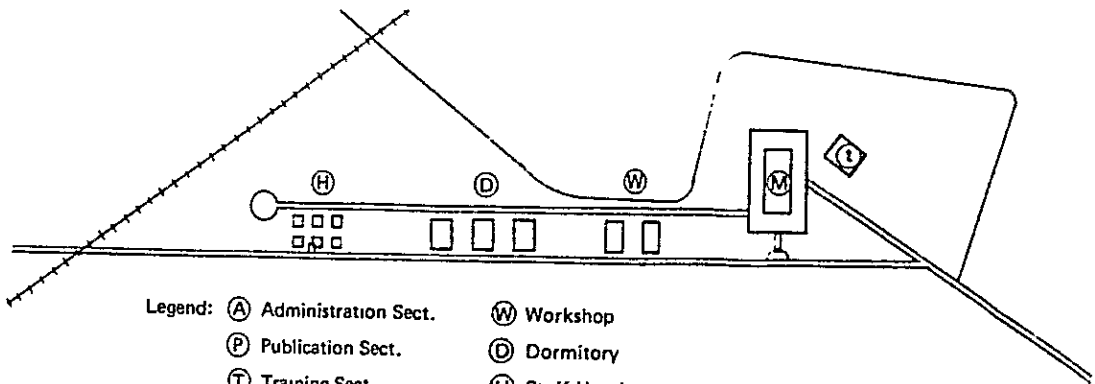
Future planning of detailed training curriculums should be based on the above constitution of facilities.



PLAN-A



PLAN-B



Legend:
Ⓐ Administration Sect.
Ⓟ Publication Sect.
Ⓣ Training Sect.
Ⓜ Main Building
Ⓦ Workshop
Ⓓ Dormitory
Ⓗ Staff Housing
ⓣ Training Hall

PLAN-C

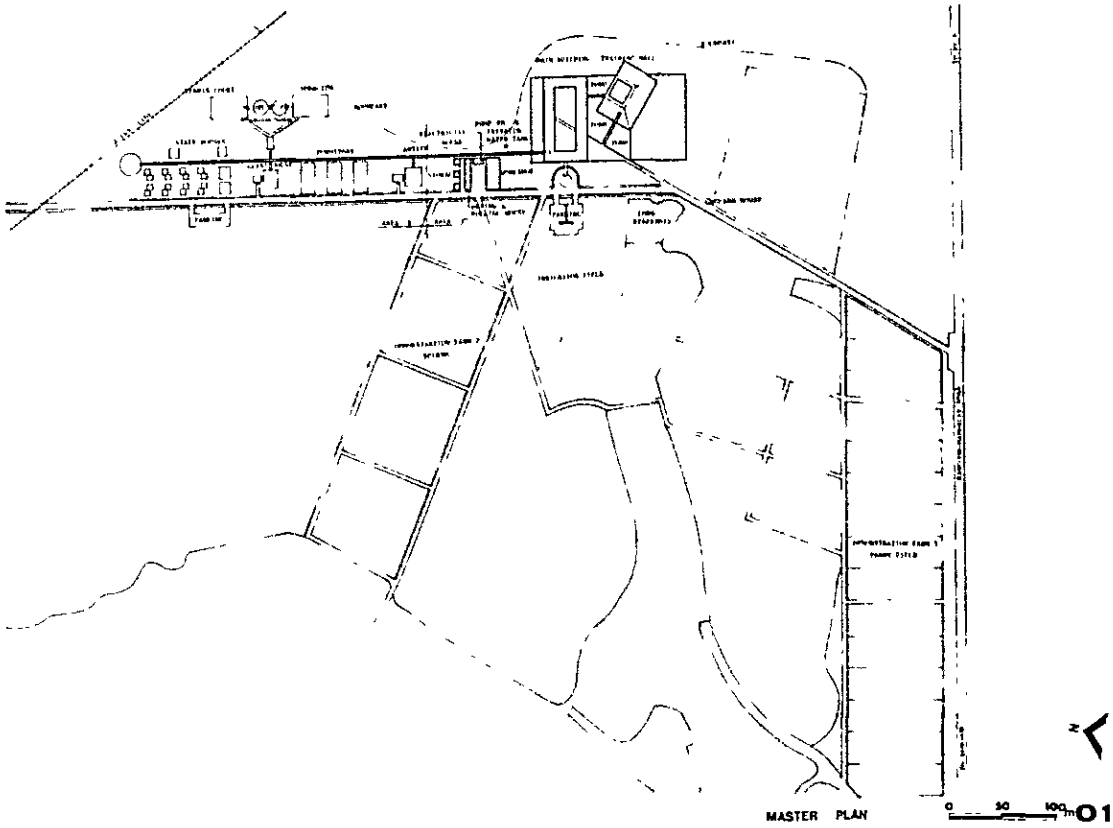
5-3. Process of Planning

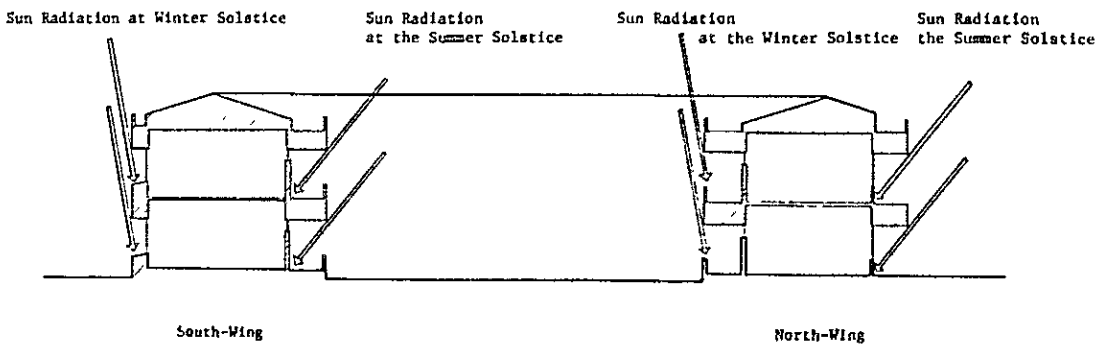
As the result of studies with regard to the purpose and position of the CADTC, the design concept for required building construction consists mainly of administration, training and publicity divisions. Besides those divisions, there should exist shed for Agricultural machinery in connection with experimental farm, workshop and warehouse for practical exercise and living facilities such as dormitory, staff quarters and canteen.

At an initial stage of planning, such divisions were planned as administration, training and publication to be individually separated and each having entrance hall, lavatories and meeting rooms, however, after studying these facilities should be concentrated to reduce more flow spaces. And facilities have been finally specified in the following basing on the discussions between the governmental officials of Burma and the Japanese Preliminary Survey Team for Cooperation.

The project manager's office section requires what it called in terms of office space, for instance, such as office room, meeting room and Manager's office. The training section is composed of classrooms for 30 and 50 trainees as main facilities, accompanied by the laboratory for 30 to 40 persons, large training room for 120 persons and Training hall for induction course trainees (accommodating capacity of about 300 persons). The publication section consists of library, exhibition room, publication room, audio-visual processing room and photo studio. Although All of those three sections may need each own office room and meeting room, it would be possible to utilize such room space jointly for those divisions if they can be contained collectively in one same building, aside from the Training hall which should need a large space structural framework. Such design concept will help large saving of any such extra space as toilet, corridor and stairway and encourage flexible utilization of office space, meeting room and classroom.

Farm machinery storage, repairing workshop and field lecture room will be housed in one building with the annexed building for manure and fuel storages. Canteen will be located in the middle between training main building and living facilities so as to enhance convenience of mutual utilization.





Sun Shading Devices

5-4. Site Planning

In view of the climatic speciality in Burma that temperature rises up to an extreme high degree and sun beam becomes intensified increasingly for a period of March to May, the first consideration must be given to how to screen direct sunshine to the building, same as in any other tropical countries. Therefore all the building is recommended to be plotted on the east-west axis so as to be lighted on both south and north sides.

The site is situated at the north of Rangoon-Mandaley Road, with an extension of the linear road running through the rubber plantation after the access road. In the site planning, positive use of this road are planned as the main traffic line, thus setting the axial lines of main buildings along with the road extension. The net deviation to the S-W direction is estimated at 12°. About 36 m east of the road, the covered way to serve as the trunk line of the pipe and cable conduit will be provided for organic linkage of all existing facilities.

The Training main building as the administrative all facilities will be plotted at the extreme south of all facilities, connected with the access road and having the Training hall in the front.

On the north side other buildings in the order of Workshop, Storages, Canteen, Dormitories and Staff Quarters will be plotted. Main buildings will be situated on the cleared land for consideration of saving time of construction. However, since other annexed buildings such as Canteen and Dormitory will be in the midst of rubber plantation, that only the required land is recommended to be cleared and the balance to be utilized as the wood for environmental preservation.

5-5. Facility Planning

1) Training Main Building

The building contains project manager's office, training and publication section all together in one unity. It serves as the main core of this Centre. It has both south and north wings, interconnected with the entrance hall on the western side and the stairway hall on the eastern side. The first floor consists mainly of administrative space (for office room, Manager's room, leader's room and meeting room), laboratory (for chemical and biological experiments) and lecturers' room. The second floor area constitutes publicity space (for office, publication, photo, library and exhibition), audiovisual class room, three (3) classrooms for 30 persons and three others for 50 persons and experts' room. A large space of courtyard is provided to enhance air flow.

2) Training Hall

As a part of the function assigned to the Centre, the induction-training course is incorporated into the curriculum.
This requires establishment of a large facility to accommodate a great number of trainees at one time. The Training hall with accommodating capacity for 300 persons should be built in close proximity to the administrative training building. It is designed for an independent structure with space in a calm atmosphere.

3) Workshop

Farm machine shed, repairing workshop, field lecture room, office and warehouses for products and chemicals are all housed in this building. Tools, engine lathe and weld shop will be provided in the repairing shop.

4) Storage, Hulling and Drying Yard

Manure and fuel storage will be plotted as annexed buildings to the workshop.

5) Canteen

The building has a capacity of 200 seats mainly on a self-service by 2-shift rotation system for lunch.

6) Trainees' Dormitories

Three buildings of dormitories, each containing 34 rooms shared by two beds, will be built to accommodate 204 trainees.

7) Guest House

Accommodation room, together with hall and dining room, will be provided for visiting guests to the Centre. The dining room is also used for the Centre's Staff.

8) Staff's Quarters

Quarters for the staff will include six (6) buildings of 12 bedrooms for each, with sex distinction for male and female, and two (2) independent houses.

9) Shower Room & Sporting Facilities

Sporting facilities will be provided for trainees and staff recreation purpose because the site is far distanced from the city centre.

5-6. Scale of Facilities

The building floor area is planned on the following scale for individual facilities:

Facility	Floor Area (m^2)
(1) Main training building	
Project Manager Rm.	40
Project Manager's Office Section	166
Secretary/Drawing Rm.	40
Japanese Project Leader Rm.	40
Counterpart's Rm.	81
Training Sect. Office	112
Training Laboratory (2 Rms.)	324
Training Preparation Rm.	40
Meeting Rm. (2 Rms.)	135
Publication Sect. Office	94
Photo Rm.	90
Print Rm.	94
Library & Exhibition Rm.	184
Training Class Rm. (120 p. x 1 Rm.)	202
" (50 p. x 3 Rms.)	243
" (30 p. x 3 Rms.)	189
Meeting Rm.	94
Hall, lavatory, (corridor, staircase, pantry, etc.)	2,002
Sub-Total	4,170
(2) Training hall	
Lecture hall	324
Hall, lavatory, corridor, etc.	252
Sub-Ttoal	576
(3) Workshop	
Field office	36
Lecture Rm.	54
Agriculture Machinery Shop, Reparing Shop, Welding Tool Storage	240
Others	90
Sub-Total	420

Facility	Floor Area (m^2)
(4) Hulling & Drying facility	
Hulling Rm.	72
Drying Yard	108
Sub-Total	180
(5) Storage, Pump & Utilities	
Fuel Storage	36
Manure Storage	72
Pump Rm.	24
Electricity Rm.	48
Sub-Total	180
(6) Covered Way	426
Total (1) - (6)	5,952
(7) Laboures' Quarter	500
(8) Guardman's house	40
(9) Canteen	380
(10) Trainees' Dormitory	2,300
(11) Guest House	320
(12) Staff Houses	2,050
(13) Gymnasium, shower house	864
(14) Covered Way	780
Total (7) - (14)	7,158
GRAND TOTAL (1) - (14)	13,110

Detail scales will be changed in accordance with the progress of preparing working Drawings.

5-7. Element Planning

Local meteorological conditions and interior environmental conditions are very important factors in designing building elements. Indeed, in this hot and humid region where the season is divided distinctly into wet and dry periods, such climatic factors as solar radiation, rainfall and natural ventilation are greatly influential to the building design, and appropriate means of these factors will create comfortable indoor environmental conditions. The plan should be suited respectively for high and low temperature periods and rainly period.

1) Roof

Roof is the building element that is most affected by solar radiation and adequate heat insulating layers against radiation heat should be provided on and between roof and inner room.
In case of reinforced concrete structure, roof slab must be corrugated asbestos cement covering on roof slab is the general and rational way to protect inner room from radiating heat, making good use of the air-space between the cover and concrete slab as insulating layers.

2) Exterior Finish Materials

Exterior wall are also affected largely by the solar radiation. It is essential to provide eaves and louvers as well as to use materials with greater total resistance of heat transmission to minimize the effect of solar radiation. In Burma, wind blow is sufficient from monsoon all the year round. Making the best use of this natural benefit, opening will be provided in buildings to facilitate natural ventilation.

3) Floor Level

In this region of Hlegu township and its surroundings has experienced flooding quite often caused by the concentrated heavy rainfall in the rainy season. Therefore, designing of ground floor level should be

set up with ample allowance to prevent any possible submergence underwater.

5-8. Material Planning

The Training main building is designed at 2-storied, reinforced concrete structure in order to meet its need to serve as the core facility. Roof is of sloped type to be suited for local climate, with small roof making use of truss of steel or wooden structure.
Roofing material will be asbestos slate.
External wall and partition wall will be finished with either dressed brick or mortar-trowelled paint coating.
In the workshop, preferred choice of materials for warehouse buildings would be of wooden structure as it may be better fitted for local site conditions rather than reinforced concrete structure. It would be suitable to use slate for roofing and also to have the floor finished with mortar. Form the overall point of view, it can be said that the plan well fitted for local natural conditions, along with the structural framework locally acceptable, will contribute greatly toward saving of construction costs and enhancement of building durability and service-life. However, in order to complete construction within the stipulated limited time major structural materials including reinforcing bar, equipment and other materials should be nesessary to be supplied from Japan.

5-9. Structural Planning

1) Basic Concept

In Burma, the Euro-Asian earthquake zone runs through the whole country and there are past records of earthquake damages in the vicinity of the proposed project site of the CADTC.
In the structural planning of the CADTC, seismic design should be considered accordingly.

The soil research of the proposed site was executed by Construction Corporation. In March, 1982 test pit and trixial compression test was executed and in June, 1982, Soil bearing test and soil analysis was executed. According to the site reconnaisance and testing reports, the site constitutes aluvial soil of clay silt and at the permanent ground water level of GL - 4 - 5 meters, soil bearing capacity is lowered. Soil conditions of the Rangoon city area is almost some or rather soft compared with the proposed site, and the building foundation of the reinforced-concrete structure building are mostly designed to be independent foundation.
Judging from these facts, in the structural foundation planning of the CADTC, independent foundation method is adopted, however, careful consideration of the decline of the bearing capacity in the rainy season should be taken for the countermeasures of the differential settlement of the soil.

2) Structural Design

In Burma there exist only one general specifications of Construction Corporation applicable to structural design. In general, design method based upon the British standards are prevalent, however in the structural designing, it is better to adopt Japanese standards becouse the British standards itself will not apply for the earthquake countries. Therefore, structural design for the CADTC should be made in accordance with the Japanese Standards, and with regard to designed intensities of earthquake and wind pressures, the corresponding value as instanced from the record of observation and

the example of designs in Burma will be adopted and incorporated into design.

(1) Dead load

All dead weight of structural material, finished material and other materials of internal fixture shall be calculated.

(2) Live load

Live load for main rooms of the Centre shall be calculated in accordance with the Building Standards Law in Japan.

Unit: Kg/cm^2

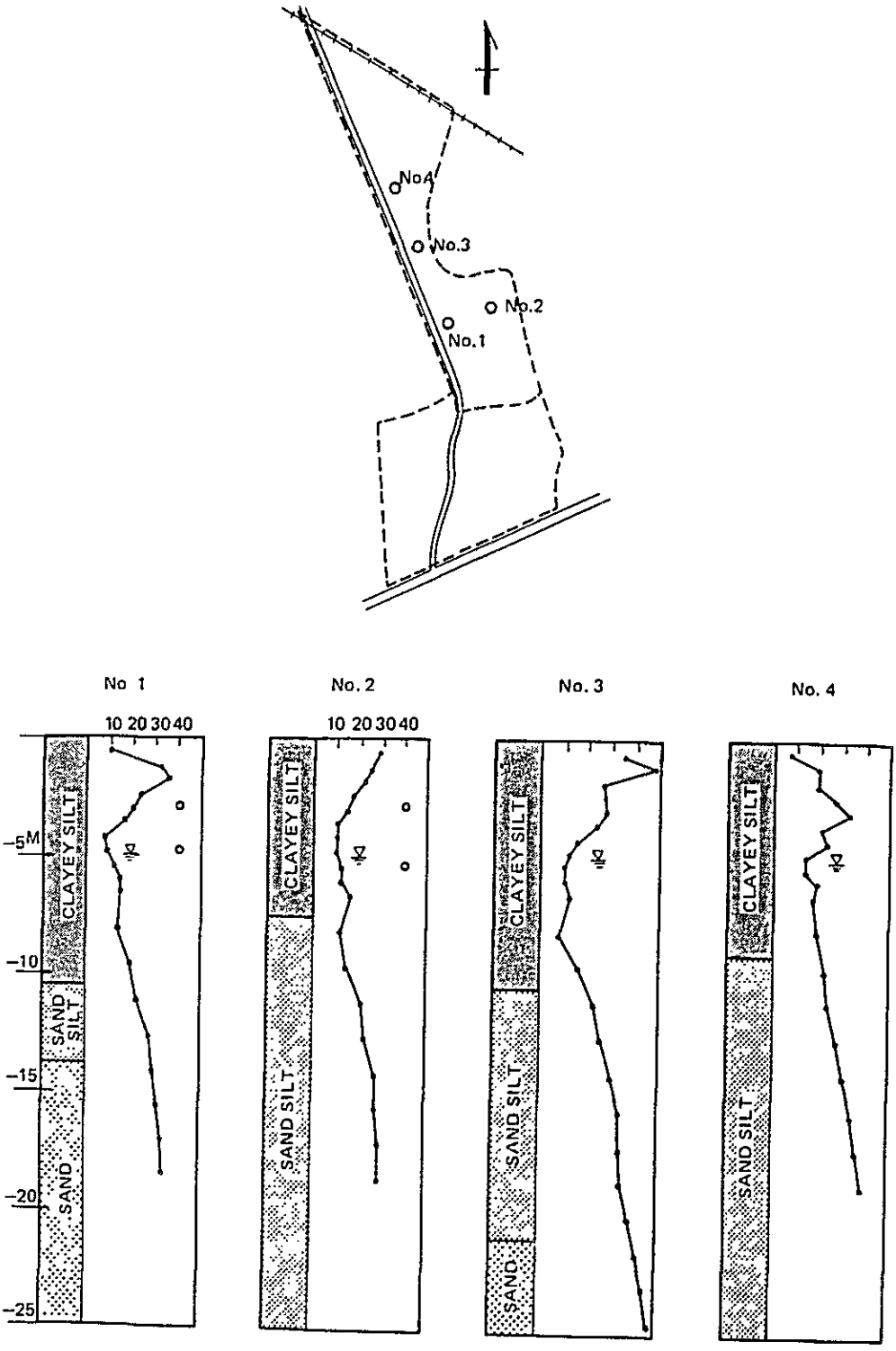
	for Floor Load	for Main Beam, Foundation	for Seismic	BS-CP3V (1952)
Class Rm.	230	210	110	60psf = 293
Office Rm.	300	180	80	50 psf. = 244
Meeting Rm. Corridor Hall Storage Library	360	330	210	80 psf. = 390
	400	300	200	

(3) Wind load

According to the structural design guidelines of the Construction Corporation, the design wind velocity is corresponding to a larger value of 100 miles/hour (44.7 meters/sec.) equivalent to 30 $lb./ft^2$ (approx. 146.5 Kg/m^2) of conversion into velocity pressure. Therefore, the design for the CADTC should be based upon this wind velocity.

The maximum wind velocity recorded in about 70 miles/hour (approx. 31.3 meters/sec.) at Mingaladon Airport.

Fig. 5.9 STANDARD PENETRATION TEST (BROW PER FOOT)



(4) Seismic force

Earthquake intensity in past near the construction site of the CADTC is recorded at a degree of 6 to 7 of corrected Merkali intensity, 44 to 94 gal. in equivalent conversion into acceleration at the Pegu Earthquake in May 6, 1930.
In Burma the standards of seismic design has not yet established, the K-value of 0.12 to 0.14 are used which is calculated by adding some important factor's ration on the basis of seismic force of 0.1. The K-value of 0.12 for design intensity should be adopted in compliance with the draft standards of seismic design in Burma as proposed by Japanese Earthquake Mission.

(5) Soil Bearing Capacity

According to the Soil testing report of the standard penetration tests and unconfined tests at the proposed site, the earthquake bearing capacity of subsurface ground of GL.-1 to 3 meters shows a clay silt of N-value = 20 and qu. = 2 to 3 Kg/cm^2, however, at the level of GL.-3 to 10 meters is showing a N-value = 10 and qu. = 10 Kg/cm^2. Annex data is showing that the softest sail is layed arround the permanent ground water level and this will be considered to influence the top soil in the rainy season. At the time of site reconnaissonce, the ground water level of the existing well near the site of the CADTC is reported to go up about 2 to 3 meters. Therefore, in the structural planning of the designed bearing strength should be determined at approx. 10 ton/m^2 adopting qu.-value at the permanent ground water level in accordance with the foundation criteria of the Japan Institute of Architecture.
According to the informations of Construction Corporation, designed bearing strength is used at 7.5 ton/m^2 in the Rangoon City area, 5.0 ton/m^2 in the riverside area and 10 ton/m^2 in the outskirts of Rangoon.
(Refer to Fig.5.9 and details are shown in APPENDIX 3.5)

3) Structural materials and construction method

The major components of this Centre, such as Training main building and Training hall, are designed for reinforced concrete structure. For roofing design, Training hall is designed for steel structure while the rest is of wooden truss structure. Small buildings such as storages and Electricity house are designed for construction of brick block following local construction practice. Structural materials to be used for the Centre are specified as follows with due consideration to quality, supply capacity and purchase price.

(1) Concrete

Cement shall be, in principle, Portland cement producted in Burma and the design standard strength of Fc = 180 kg/cm^2.
However, if any decline is anticipated in the domestic supply capacity, import from Japan or any other third country should have to be taken into consideration.
All necessary aggregates, fine and course, shall be procured locally in Burma. In order to ensure quality control of concrete under crucial conditions of high temperature, careful carrying of concrete will be required because of the high temperature in this region.

(2) Reinforcing bar

In Burma, hot rolled steel bar with tensil strength of ft. = 1,400 Kg/m^2 is produced in accordance with the Burmesestandards of UBS-27 which is based upon the British Standards of BS.-4449, however it is unstable in its supply capacity. Therefore, deformed bar of SD 30 and SD 35 from Japan shall be used, however, considering the shortening of the construction period, Burmese round steel for shall be used for the part of construction such as foundation work and column work and the necessary procured quantities has been informed to Burmese Government Authorities concerned.

(3) Structural steel

Structural H-section steel of SS 41 manufactured in Japan shall be used for main structure and light gauge channel shall be used for roof structure. Assembling system of simple member components of parts shall be introduced to economize election costs and to simplify erection of frame as well.

5-10. Air Conditioning and Ventilating System

Air conditioning and ventilation system shall be planned with consideration of economical running costs and easy maintenance of the machinery.

1) Design Conditions for Air Conditioning

Outdoor conditions: Temperature 37°C, Humidity 75%

Indoor conditions: Temperature 28°C, Humidity 50%

2) Air Conditioning System

Rooms for Project Manager and Project Leaders will be air conditioned by use of wind coolers. Both of office room and experts' room will be provided with the power supply source for future additional installation of coolers.

3) Ventilation System

Although the whole building may be designed mainly for natural ventilation, the mechanical ventilation system will be planned on the lavatories, laboratories and pantry where deemed necessary because of difficulty in natural ventilation.

5-11. Plumbing System

) Water Resources

For the lack of the city water service system near the project site, tube wells will be drilled to supply water to the Centre. The plan includes four (4) wells, each being of 200 mm diameter, 60 m depth and 350 m^3 per day in supply capacity. One of those four will be utilized as the source for the Centre while the rest three will be used for supply to farms. The well will be provided with an submerged pump of 80 dia x 400 L./min. x 30 m x 3.7 KW.

2) Necessary Water Supply

For irrigation purpose:

Demonstration Paddy Field	5 ha. x 2 L./sec./ha. =	10 L./sec.
Demonstration Upland (1) (Irrigated Upland)	1 ha. x 1 L./sec./ha. =	1 L./sec.
Demonstration Upland (2) (Rainfed Upland)	4 ha. x 0 =	0
Necessary Water supply /h.	11 L./sec. x 60 x 60 =	39,6000 L./h.
Necessary Water supply /day	$39.6m^3$ x 24^{hr} =	$950.4m^3$/day

Well water $350m^3$/day x 3 ($14.6m^3$/h. = 243 L./min.)

For CADTC facilities purpose:

450 persons x 250 Litres = 112,500 Litres/10 hours

112,500 Litres x 24/10 = $270m^3$/day

Well water $350m^3$/day x 1 ($12.5m^3$/hr. = 208 L./min.)

3) Water Supply System

Pumped-up water from the well will be reserved in the sand settling tank and then transferred into the elevated tank after sand settlement by lifting pump. Water will be distributed into each building from the tank.
Elevated tank and underwater pump should be capable of supplying water to all the buildings.

4) Indoor Hydrant Equipment

Indoor hydrants will be designed roughly in compliance with the Japanese applicable standards.

5) Drainage and Sewerage

The drainage system shall be designed to enhance full function of the building. The system from the Centre can be classified into four subsystems: sanitary sewage, miscellaneous drainage, rain water drainage, and experiment waste water drainage from laboratory.
Drainage over the whole site is designed for discharge into the storm reservoir on the west side of the road after being led to south through the side ditch, since the site is slightly declined to south.

(1) Sanitary sewage
The waste water from the lavatories is led to a septic tank and after going through purifying process, then be discharged into the side ditch with miscellaneous drainage.

(2) Miscellaneous drainage
Miscellaneous drainage from the facilities shall be collected into outdoor drainage side ditch.

(3) Rain water drainage
Rain water drainage from the roof and from open space within the site shall be discharged into the side ditch after collected outdoors same as in the case of miscellaneous drainage.

(4) Experimental waste water drainage

With regard to drain from the laboratory, chemical waste will be processed by a separate system. Any other experimental drain of acid or alkaline content will be discharged into the side ditch by confluence into other miscellaneous drain after being processed in the neutral tank.

6) Sanitary System

Sanitary fixtures will be provided for each toilet and wash room. Sanitary fixtures to be furnished for trainees' toilet will be of local traditional style.

7) Septic Tank

Aeration type septic tank will be installed separately and individually for each toilet.

5-12. Electrical System

1) Power-receiving Substation

Transformer sub-station will be planned inside or adjacent to the site, electricity incoming cable by aerial wiring from the 3-phase, 3-wire 11 KV distribution line operated by EPC on the Burmese side. After the sub-station underground cable will be induced to the power receiving substation, from which electricity will be distributed to each facility.
Loads for service facilities are:

(1) General lighting, receptacles
(2) Air conditioning and well water pumping
(3) Power supply to audio-video equipment
(4) Power supply to laboratories

One 250 KVA transformer will be installed inside the receiving substation for power distribution into the building to be constructed on the Japanese side and will serve to distribute power to each cabinet panel by way of the low voltage switchboard.
for the building to be constructed on the Burmese side, the work will be performed by the Burmese for aerial power distribution at 3-phase, 3-wire 11 KV rating from the receiving sub-station. It is planned that power will be distributed to each facility at 1-phase, 2-wire, 230 volts through the transformer on the pole.

2) Power Circuit System

Power will be distributed through underground cable from power-receiving sub-station to building. Interior main wiring will be connected to each distribution panel and power switchboard through the metal conduit wiring system.
The voltage classification are graded as follows:

Power load: 3-phase, 3-wire, 400 volts
Lighting receptacle load: 3-phase, 4-wire, 400/230 volts

3) Lighting Wiring System

Wiring will be laid through conduit after distribution panel to lighting fixture, switch plug and ceiling fan on the secondary side. Section switches will be provided for each small zone so as to switch on/off the lighting circuit at each room for saving running cost. Switches will be installed so as to thin out lighting for halls and corridors.

4) Lighting Fixtures

Fluorescent lamps will be provided as major lighting source considering of running cost saving. Incandescent and mercury lamps will be used if required for specific purposes.
The intensity of illumination in main rooms as follows:

Office, conference room and Laboratories	400 lx
Training hall and lecture room	300 lx
Hall and machine room	200 lx
Corridor and Storage	50 lx

5) Telephone Line Installation

The telephone line from the PTC's main will be connected overhead by the lead-in pole in joint use with the power line. After that pole on, the line is led through underground conduit up to the MDF (Main Distribution Frame) in the office room at the ground floor of the Training main building. The cable conduit shall be used from the MDF to the IDF board or each wall outlet.
The incoming office cable line from the PTC's line will be of about four trunk lines; one for the Training main building, one for the Guest house and two for the Staff quarters.

6) Telephone Exchange System

Telephone exchange will be designed for the push-button system to plan for installation of ten (10) telephone units for extension service.

7) Public Address System

Amplifier will be installed in the office room at the ground floor of the Training main building so as to enable broadcasting by paging or chiming. The independent broadcasting system will be provided for the lecture hall mainly to announce the lecture and will be planned for the large classroom accommodating 120 trainees. AM-broadcasting antenna and outlet will also be provided for the audio-video equipment.

8) Common TV Receiving

Master antenna with TV outlets will be equipped at the installed point of audio-video euipment.

9) Interphone System

Interphone system will be installed to interconnect each-classroom and office room.

10) Fire Alarm System

Manually operated alarm bells which, in case fire, will inform the people in the building of a fire hazard and allow them to escape quickly. The indicator panel will be installed at the office room of Training main building.

11) Lightning Arrester

Radio isotope lightning arrester will be installed at the highest part of the building.

12) Outdoor Lighting

Outdoor lighting will be provided along the road within the premises for security purpose through underground cable and automatic flashing device will be installed to put on or off lighting at optional time.

5-13. Equipment Planning

List of necessary equipment and materials for the CADTC is as shown in Annex 1-5. Preferred selection of equipment should require special considerations as itemized hereunder:

1) Teaching materials for training and experimental purpose should be selected at such content and level as may ensure enhancement of educational effects, aiming at improvement of the extension staff's quality in Burma.

2) Instead of introducing the modernized farming equipment only for modernizing purpose, the prior selection of equipment made from easier approach to maintenance by periodical inspection and availability of spare parts, with particular importance upon the after care service of the equipment. Such selection must be made together with selection of maintenance materials.

3) Equipment which requires high running cost shall be avoided, and also equipment with easy maintenance shall be selected mainly.

4) Quantity of equipment shall be determined with due consideration to the training programme and the number of operation staff.
Equipment, if possible, shall be utilized in common by sections of the Centre for its effective utilization Purpose.

5) Selection shall be made of such equipment as may serve as a media for publication service, which will encourage wide acceptance of new technology among peasants.

In order to hold equipment as originally aimed at, it is necessary to provide guidance to technical staff in Burma with regard to technologies on maintenance and operation of such equipment and,

furthermore, to follow up such guidance periodically after completion of the CADTC. To meet this purpose, by close relationship with the Japan's technical cooperation programme on a project basis to the GSRUB must establish the organization system for reception of technical staff, provide guidance for the operating technology and supply necessary spare parts for the equipment.

5-14. Demonstration Farm Planning

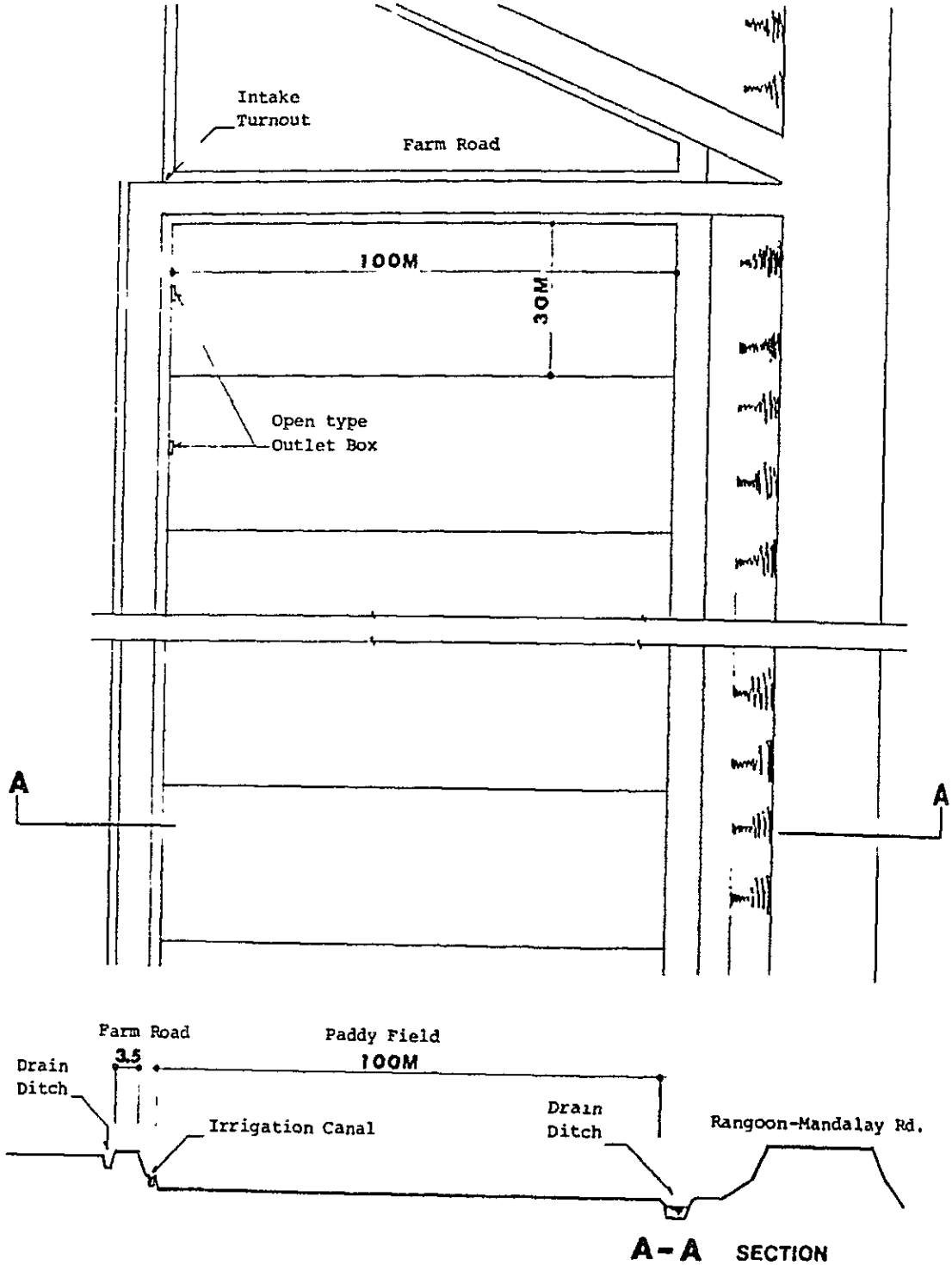
CADTC construction site stands on the delta of the Irrawaddy River, which is composed of typical alluvial soil. The annual precipitation there totals 100 inches, of which 74% is concentrated on the wet season from mid-May to mid-September. The soil is heavy clay soil of meadow gray soil type, which is suitable to cultivation of paddy rice in the wet season but not in the dry season. This area, forming part of rainwater paddy field in HLEGU Township, is a typical paddy field zone which produces more than Burmese nation-wide average crop.

A lot of 5 ha along the Rangoon-Mandalay road, west of CADTC construction site shall be transformed to the exhibition farm, where irrigation and drainage network shall be constructed. Drainage control in a level area is an important factor to paddy rice production and effective utilisation of paddy field. Therefore, small drainage and branch drainage shall be perfectly separated from irrigation in view of rational drainage control.

Terminals fairlities between irrigation and drainage is indispensable to water control but necessary care shall be taken in wide-area basis to reutilize drainage water as irrigation water.
As the farm is not only a field for agricultural production activity but also is closely related with life in rural communities and is a main component of rural environment, the land consolidation plan shall contribute to improvement and preservation of the environment as a part of development project in the region concerned. As to farm lot, 5 ha is a suitable size on the basis of over 70% working efficiency of small tractor (walking type).

It is desirable to locate the demonstration upland farm in an upland composed of yellow brown forest soil, near which CADTC construction site is situated. So, actual rubber trees shall be hewed off to create a corner lot of 5 ha on the paddy farm side, west of the Center. The upland farm shall be created by borrowing yellow brown forest soil from northern upland so that cultivation of maize, pulse, peanut, sesame, jute, fruit trees and vegetables can be exhibited. The plan shall also aim at establishing a production system based on

Fig. 5.14.1 PLAN OF LAND CONSOLIDATION FOR DEMONSTRATION FARM



corresponding equipments and facilities to this effect. Fruit tree and vegetable cultivation farm (approx. 1 ha) shall be equipped with irrigation facilities.

1) Basic Planning for Demonstration Paddy Field (Refer to Fig.5.14.1)

(1) Size of Demonstration Paddy Field

As for planning of paddy field, existing rain-fed paddy field along the Rangoon-Mandalay Rd. will be consolidated and the size is 100 meters x 500 meters with 5 hectares. Cultivated area is unified as 30 meters x 100 meters.

(2) Farm road, Irrigation Canal and Unified Paddy Field

Considering natural conditions and roads network, farm road, irrigation canal and unified paddy field are planned as Fig.5.14. Pipe line system from the well to demo.farm will be provided for water supply trunk line. In=take turnout will be provided in the northern part of paddy field and water supply ditches will be provided in the northern side and drain ditches will be provided along the Rangoon-Mandalay Road.

Ground water table in rainy season is expected to be high, therefore, drainage ditches should be separated from water supply ditches as a rational solution for water control.

Water supply distribution is planned as Fig.5.14.

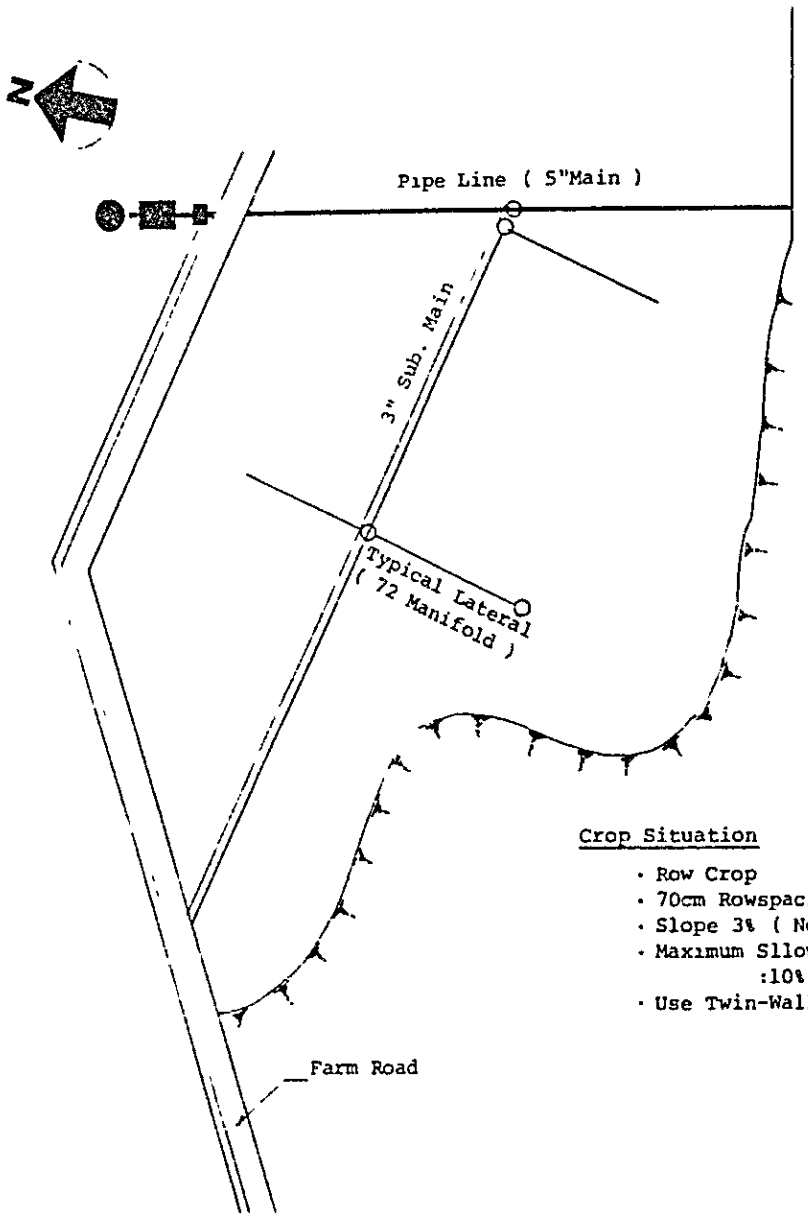
Trunk water line	total 550 meters extension
Small farm ditches	total 1,700 meters extension
Drain ditches	total 700 meters extension
Small drain ditches	total 1,700 meters extension

Farm road is planned to be plotted along the farm ditches.

Truck road	500 meters
Farm road	800 meters

Demonstration farm should be unified as 100 meters x 500 meters and 100 meters x 200 meters considering the working efficiency of tractor and tillers.

Fig. 5.14.2 LAYOUT OF TRILLE IRRIGATION SYSTEM FOR DEMONSTRATIONFARM (UPLAND)



Crop Situation

- Row Crop
- 70cm Rowspacing
- Slope 3% (North to South)
- Maximum Sllowable Flow Variation :10% of Design Flow
- Use Twin-Wall Hose

Letails are shown in Appendix-6, and detail design should be in accordance with the design criteria in Appendix-6.

2) Basic Planning for Demonstration Upland (Refer to Fig.5.14.2)

(1) Size of Demonstration Upland

As for planning of demonstration upland, existing rubber estate in the west side of CADTC should be cleared to develop total 5 ha. upland consisting of one unit of 100 meters x 400 meters and one unit of 1 hectare.

(2) Cultivated Area

Size and form of cultivated area should be determined as 100 meters x 400 meters considering workablitity of farm machines and operation control. Considering irrigation method, demonstration upland is unified 4 square shape of the size of 100 meters x 100 meters.

(3) Farm Road

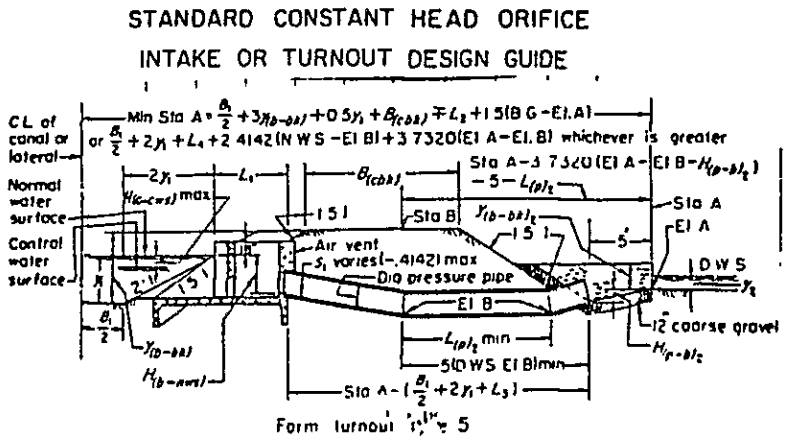
Farm road is planned so as to the four demonstration upland is surrounded by farm road and for the connecting between CADTC and demonstration upland existing road will be used to be developed.

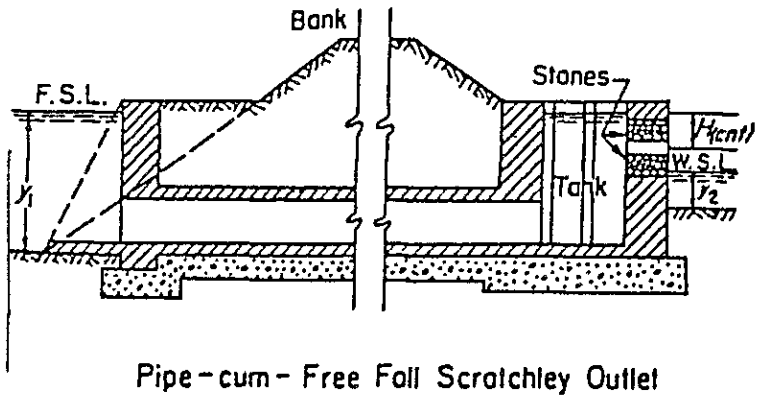
(4) Width of Farm Road

The width of farm road should be 3.5 meters considering the safety traffic flow of tructors and vehicles.

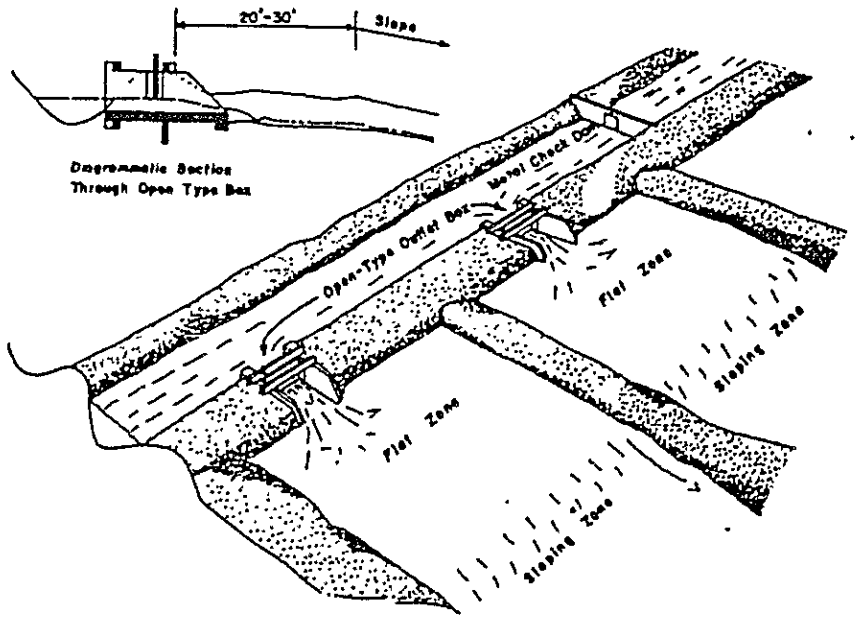
Farm road - total 600 meters extension.

Fig. 5.14.3 Outlet Boxes for Border Irrigation





Pipe-cum-Free Fall Scratchley Outlet



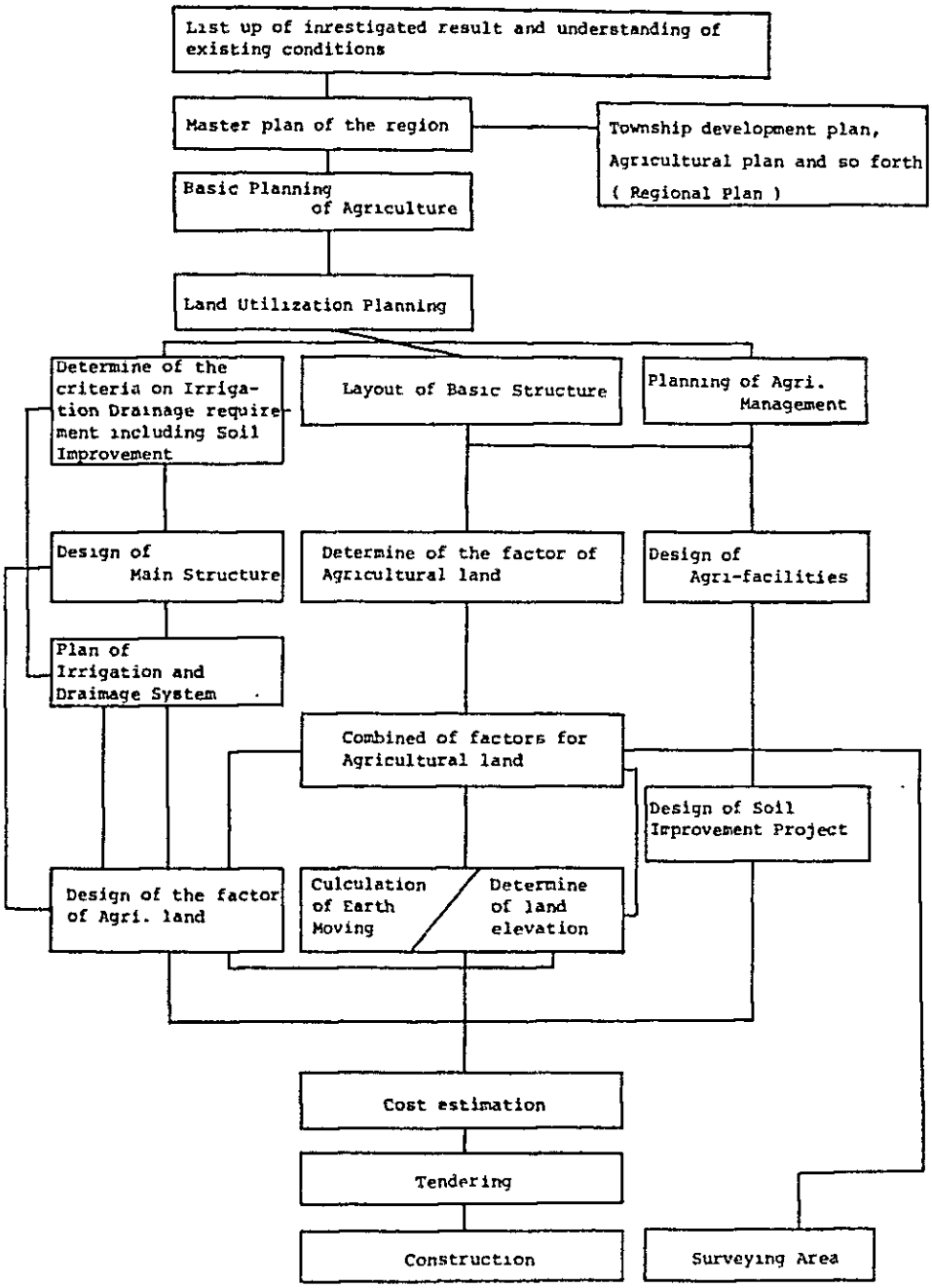
(5) Water Distribution & Drain Ditches

Considering ground water table, water distribution and drain ditches should be planned on the lower level of upland to admit maximum expected water volume.

Drain ditches - total 600 meters extension.

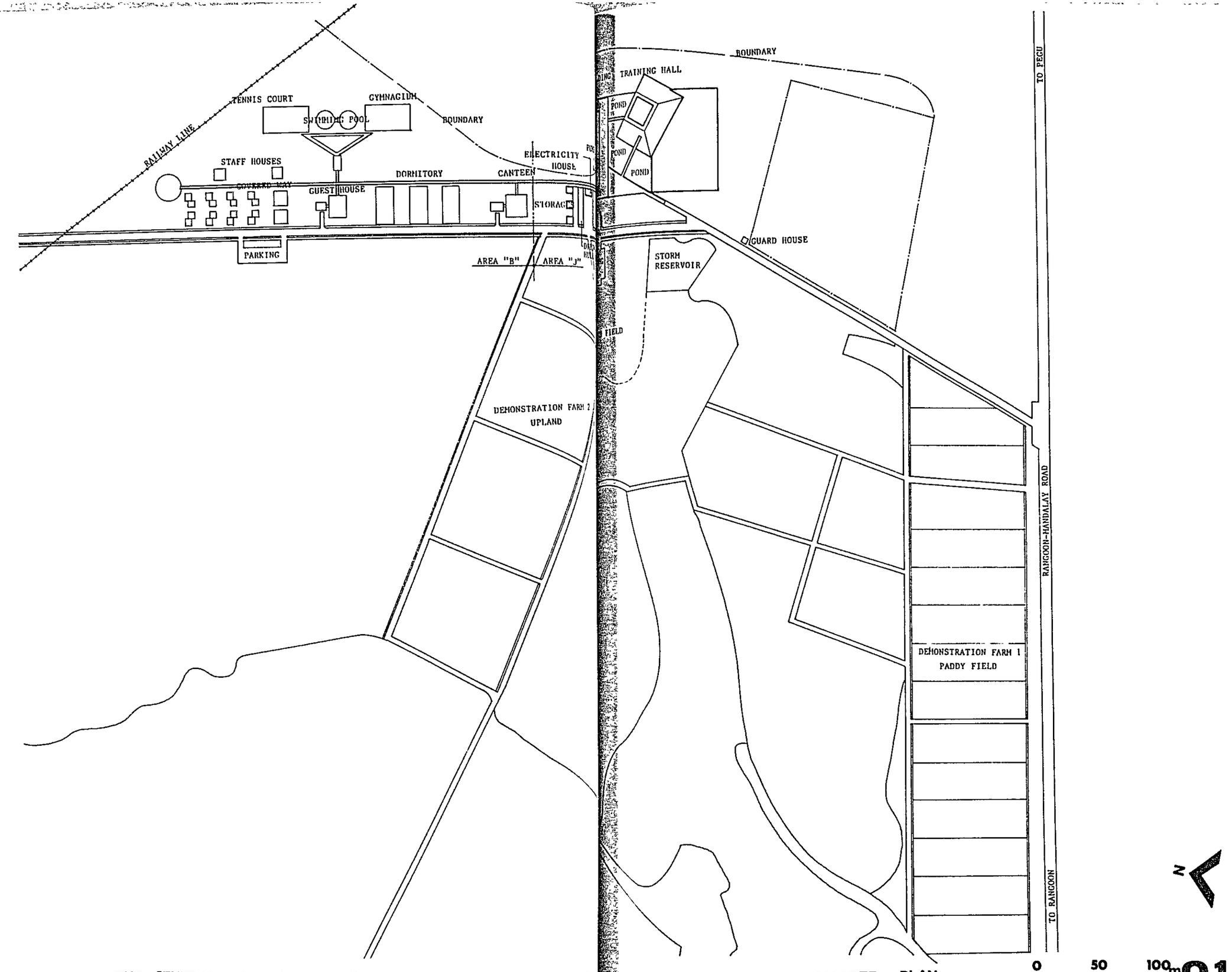
For the irrigated demonstration upland, low-pressure type of drip and sprinkler will be provided.

Fig. 5.14.4 Procedure of Land Consolidation (Demo-Farm)

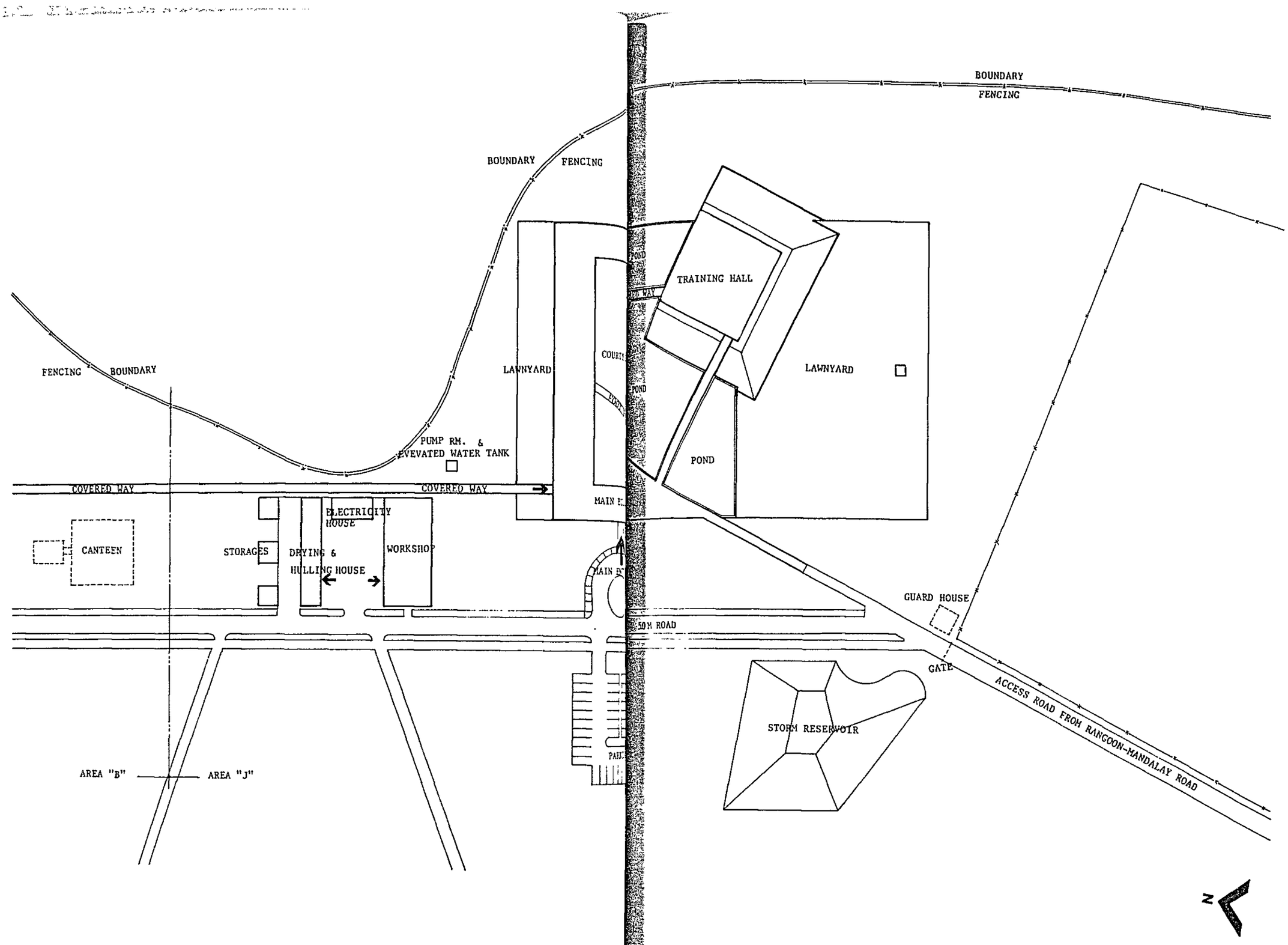


List of Drawings

01. Master Plan
02. Plot Plan
03. Main Bldg. Ground Floor Plan
04. Main Bldg. First Floor Plan
05. Main Bldg. Elevations & Sections
06. Training Hall Plan, Elevations & Sections
07. Pump Rm. Elevated Water Tank Workshop Drying & Hulling House Electricity House & Storages Plans Elevations & Sections
08. Water supply System
09. Drainage System
10. Electrical System
11. Telephone System
12. Canteen Tennis Court & Swimming Pool Plans
13. Dormitory Guard House Gymnasium Manager House Staff Houses Guest House Shower House Plans



MASTER PLAN 01

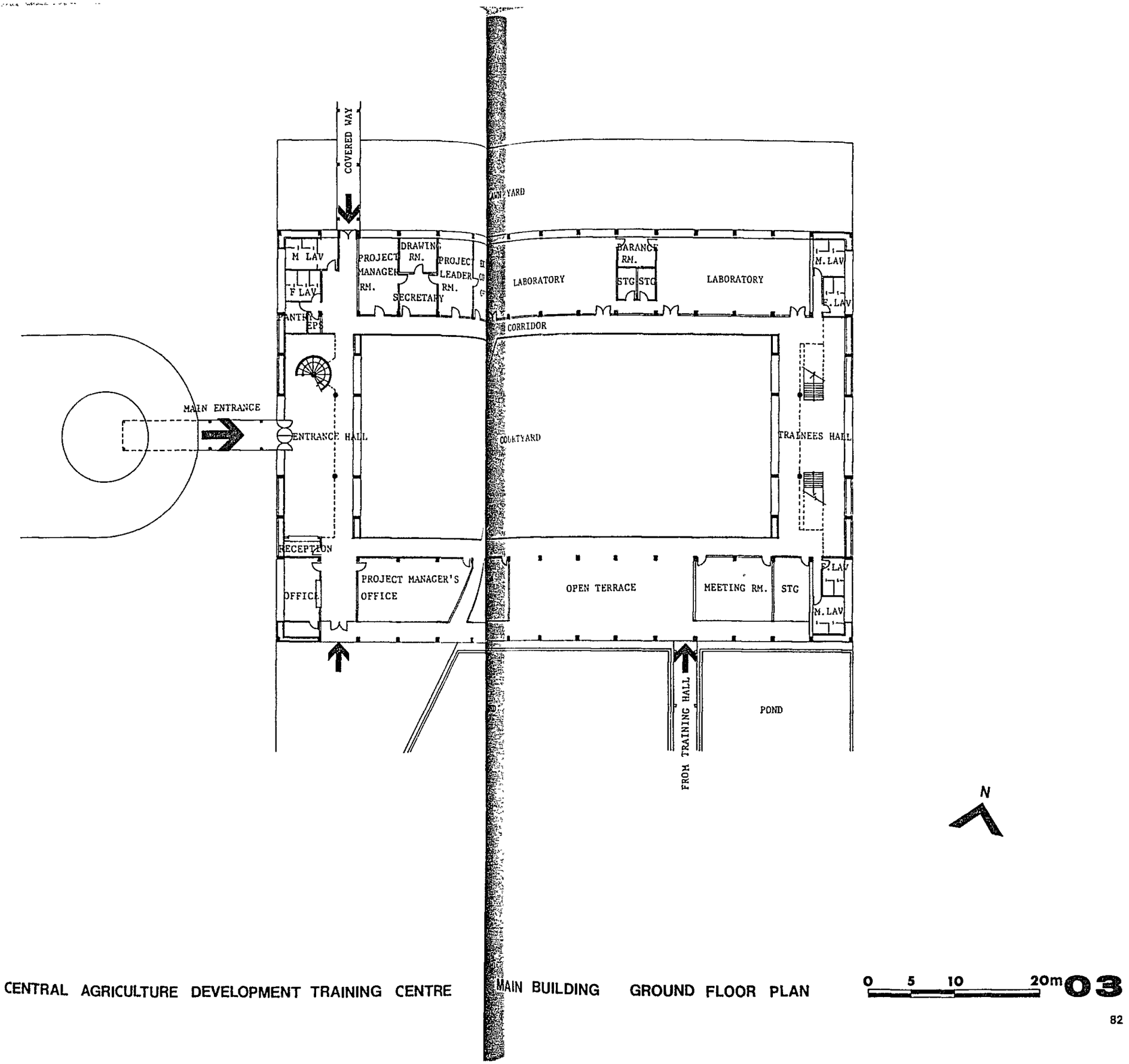


THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

PLOT PLAN

0 10 20 50m

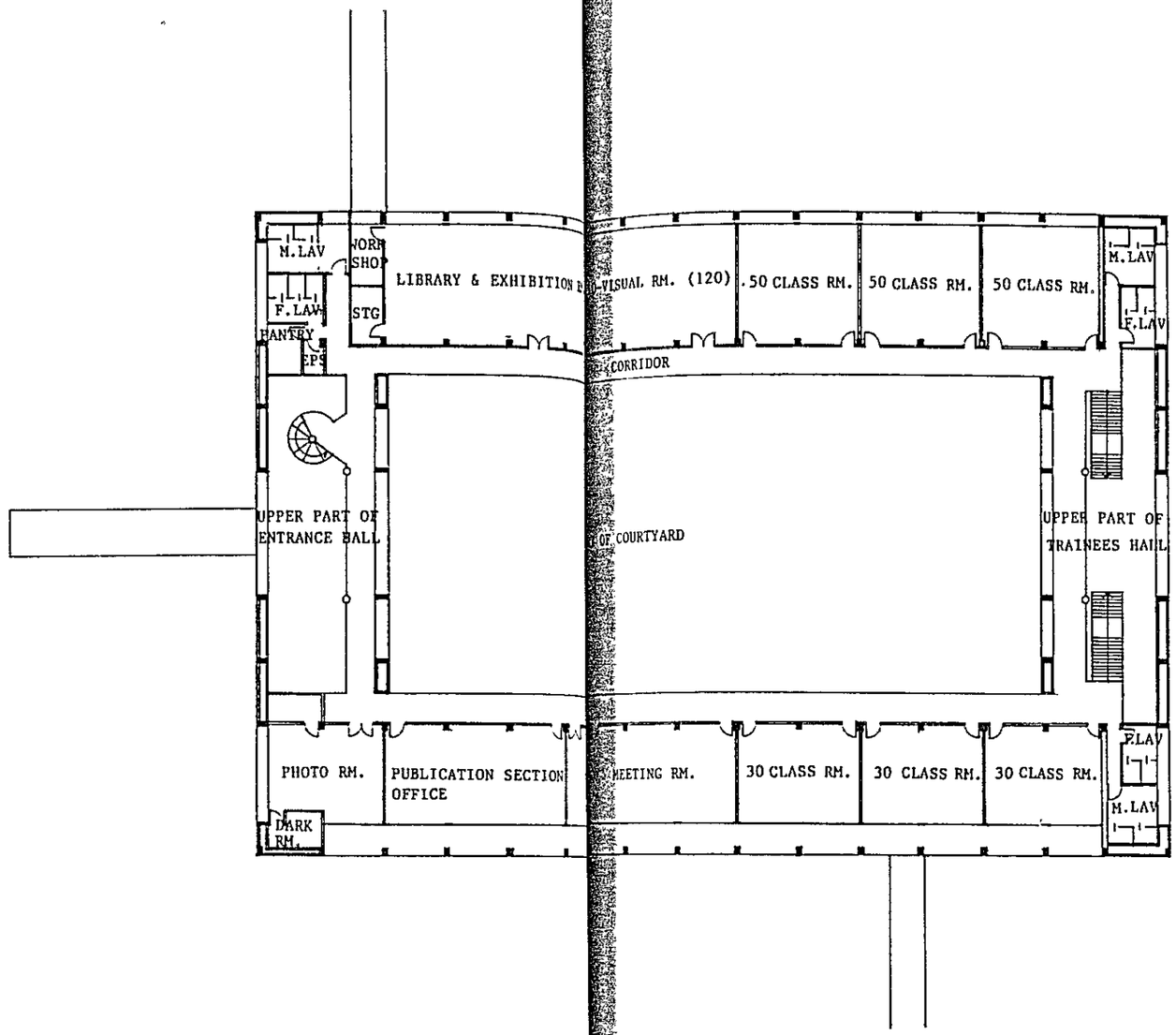
02



THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

MAIN BUILDING GROUND FLOOR PLAN

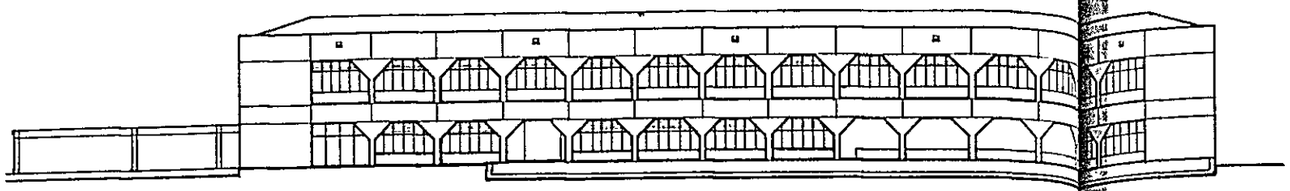
03



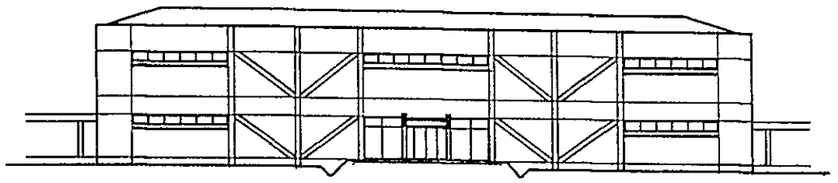
N

THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE MAIN BUILDING FIRST FLOOR PLAN

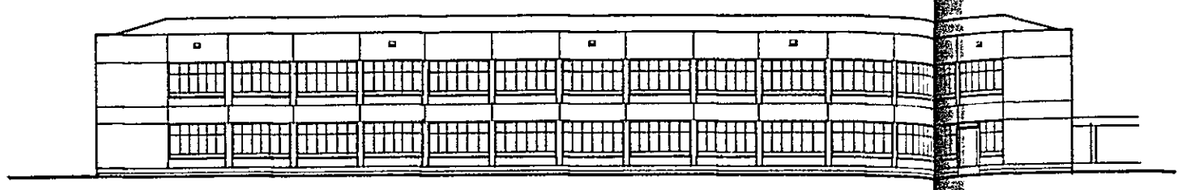
0 5 10 20m 04



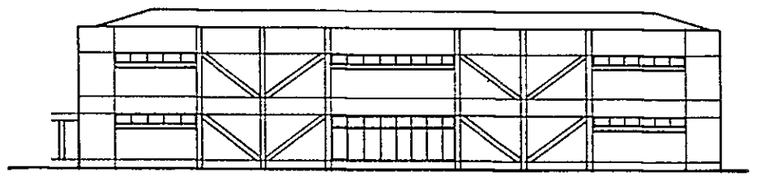
SOUTH



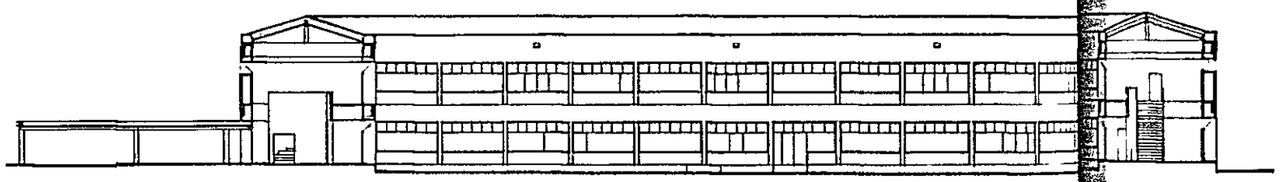
WEST ELEVATION



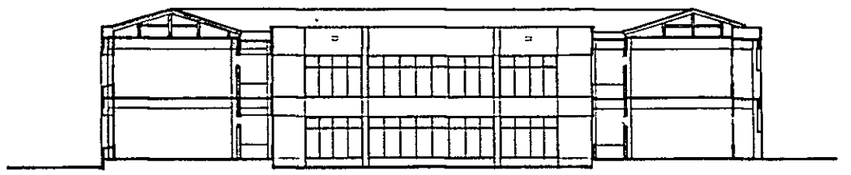
NORTH



EAST ELEVATION



SECTION



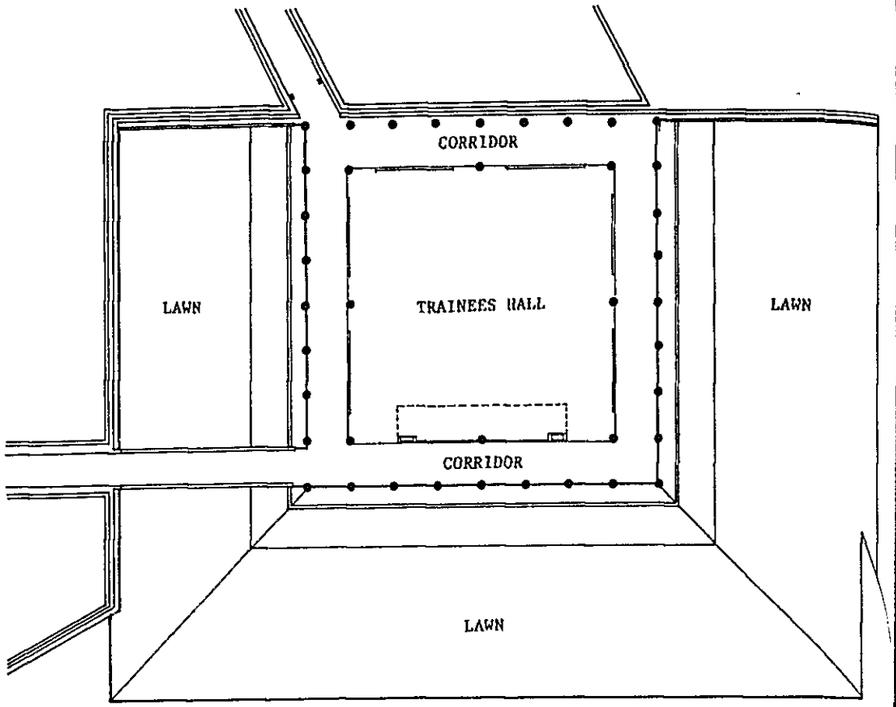
SECTION

THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

MAIN BUILDING ELEVATIONS & SECTIONS

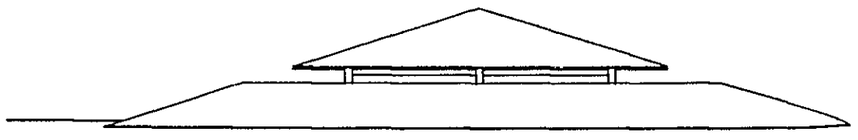
0 5 10 20m

05

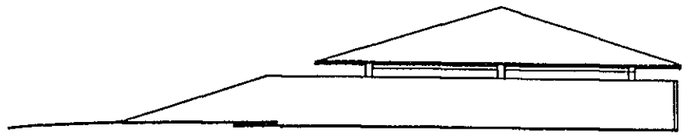


PLAN

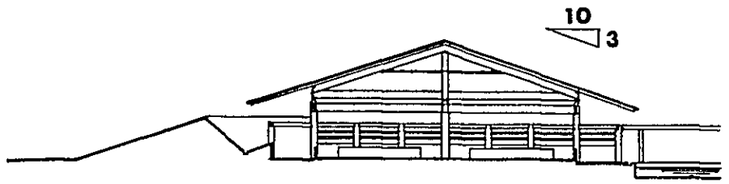
NORTH ELEVATION



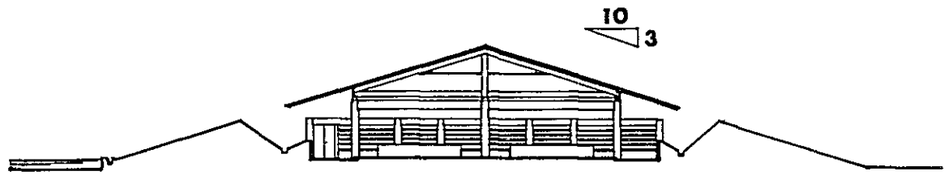
SOUTH ELEVATION



EAST ELEVATION



SECTION

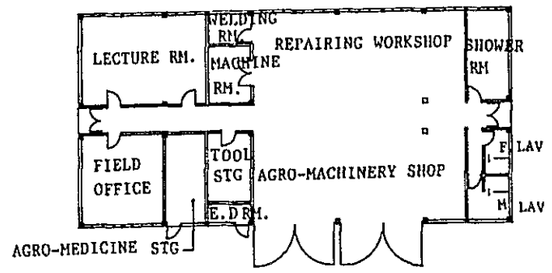


SECTION

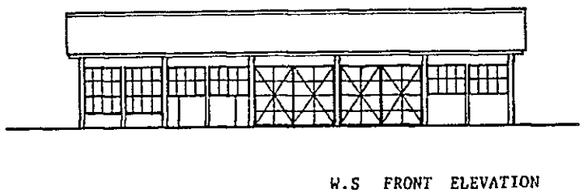
THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

AINIG HALL PLAN ELEVATIONS & SECTIONS

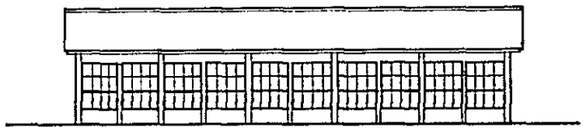
0 5 10 20m 06



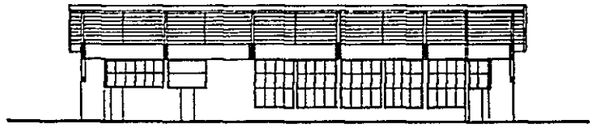
WORKSHOP PLAN



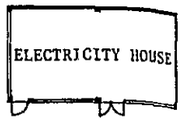
W.S FRONT ELEVATION



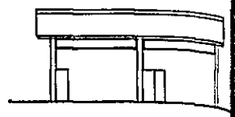
W.S REAR ELEVATION



W.S SECTION



ELECTRICITY HOUSE PLAN



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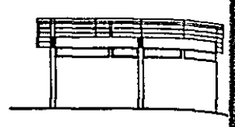

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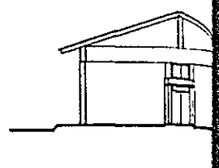

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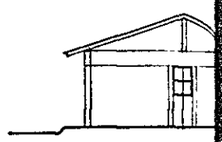

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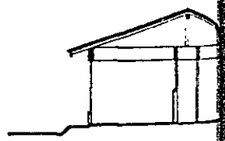

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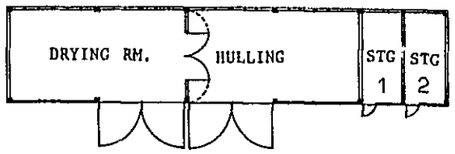
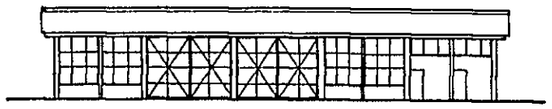


DRYING & HULLING HOUSE PLAN



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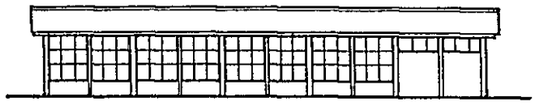

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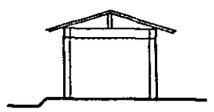

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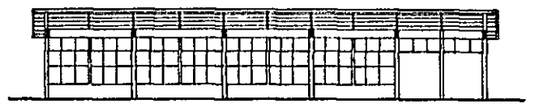

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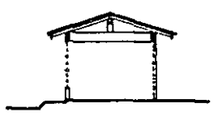

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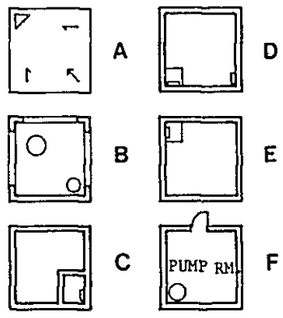
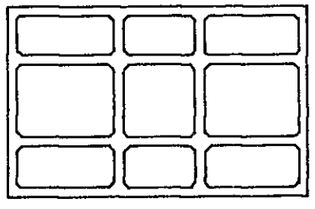
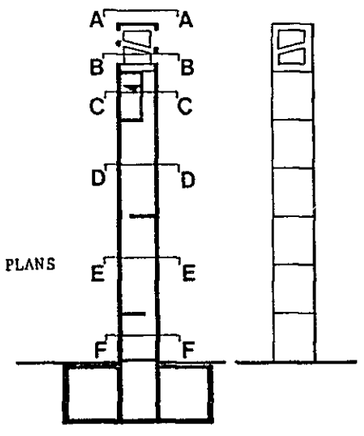


PUMP RM. & ELEVATED WATER TANK PLANS



UNDERGROUND WATER TANK PLAN



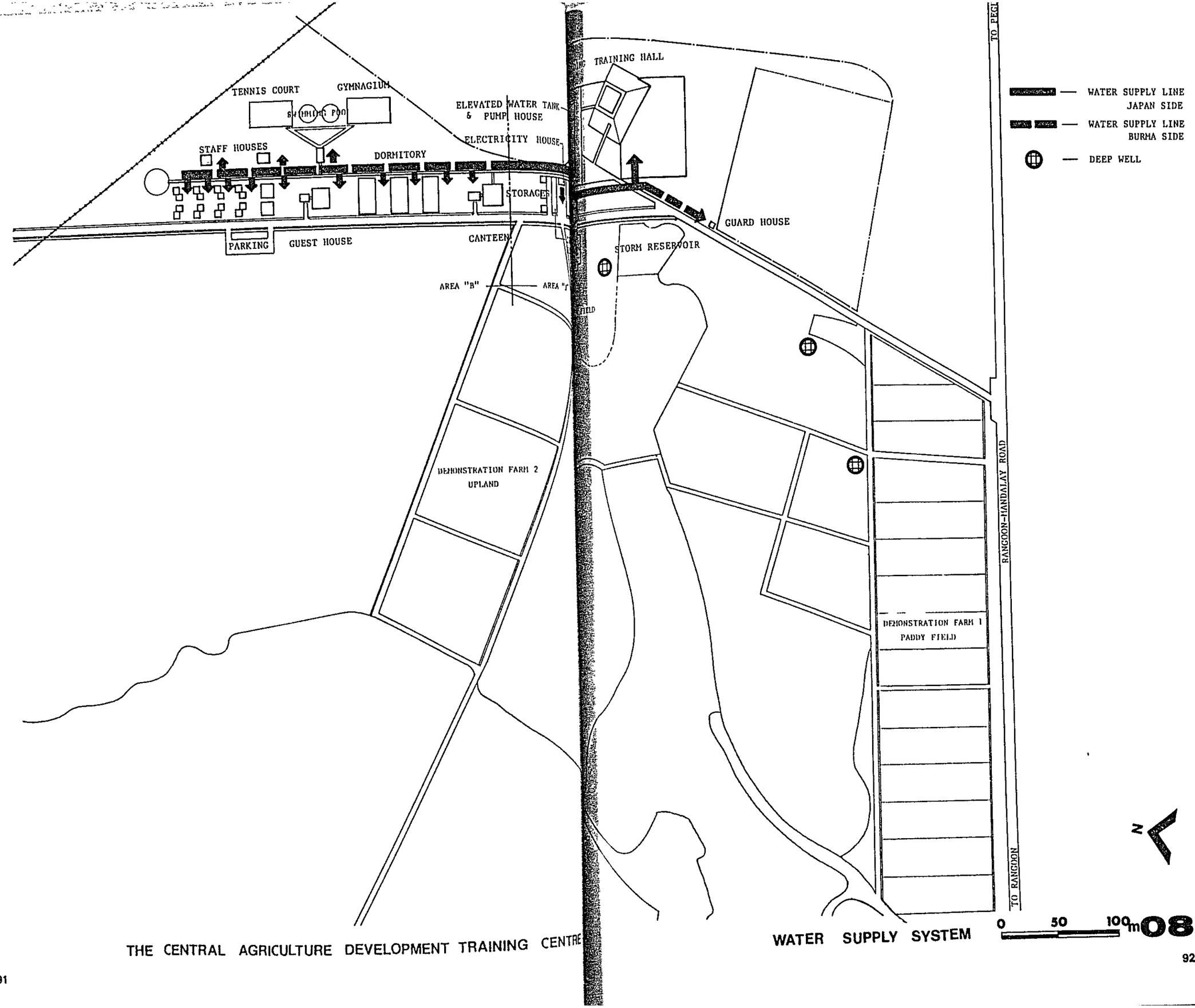
SECTION ELEVATION

THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

P RM & ELEVATED WATER TOWER
RKSHOP · DRYING & HULLING HOUSE
CTRICITY HOUSE · STORAGES

0 5 10 20m **07**

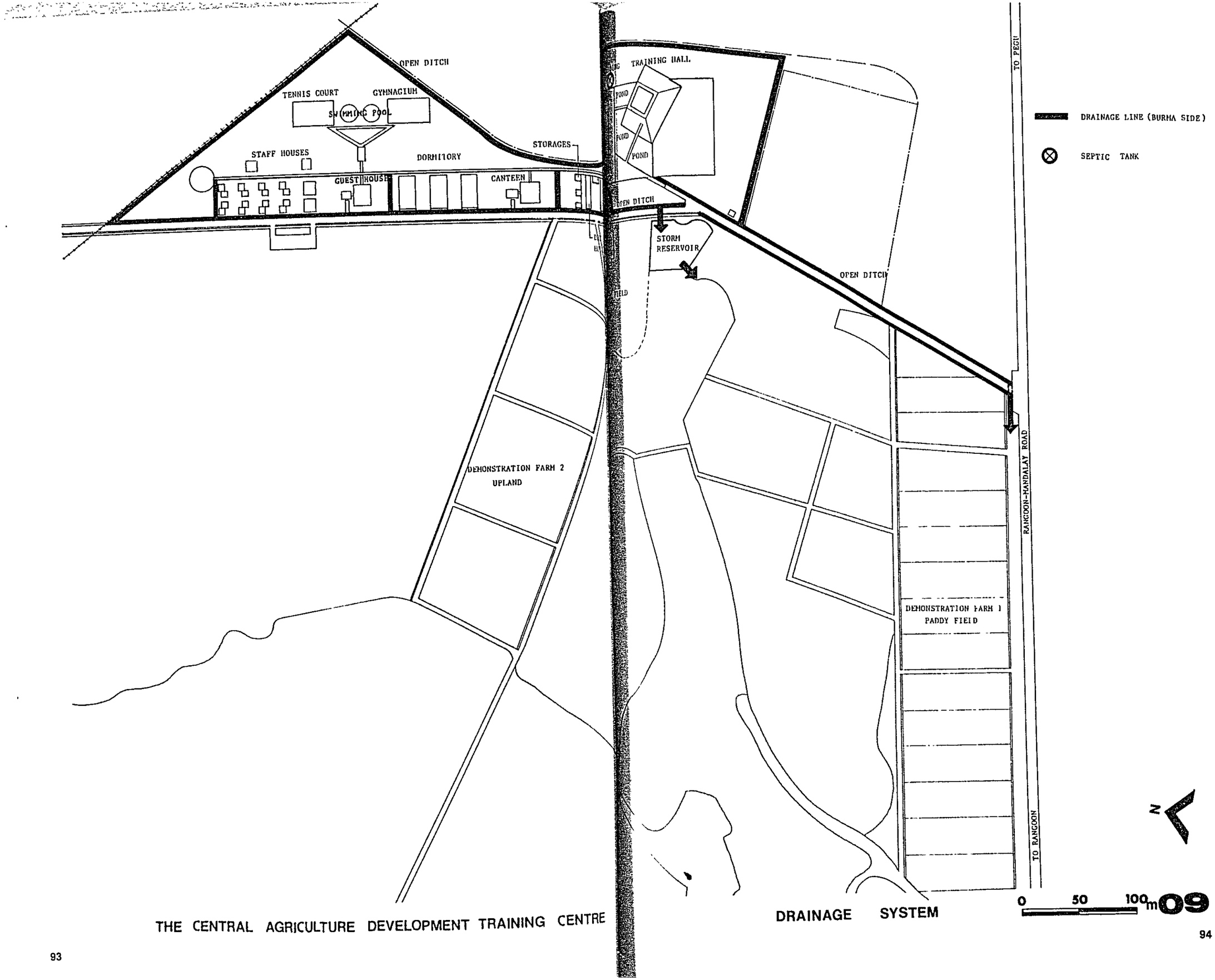
PLANS ELEVATIONS & SECTIONS



WATER SUPPLY SYSTEM

08

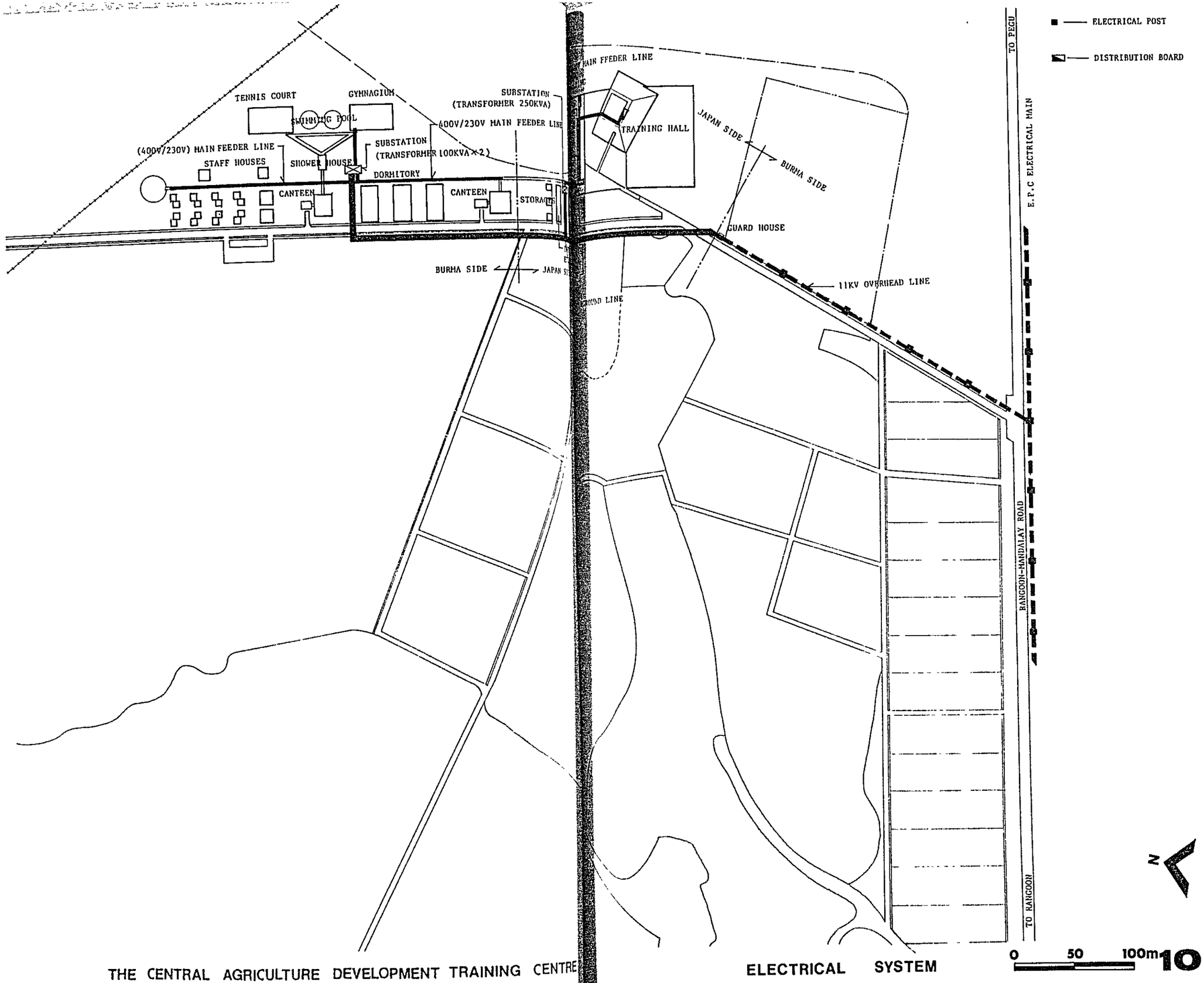
THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE



THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

DRAINAGE SYSTEM

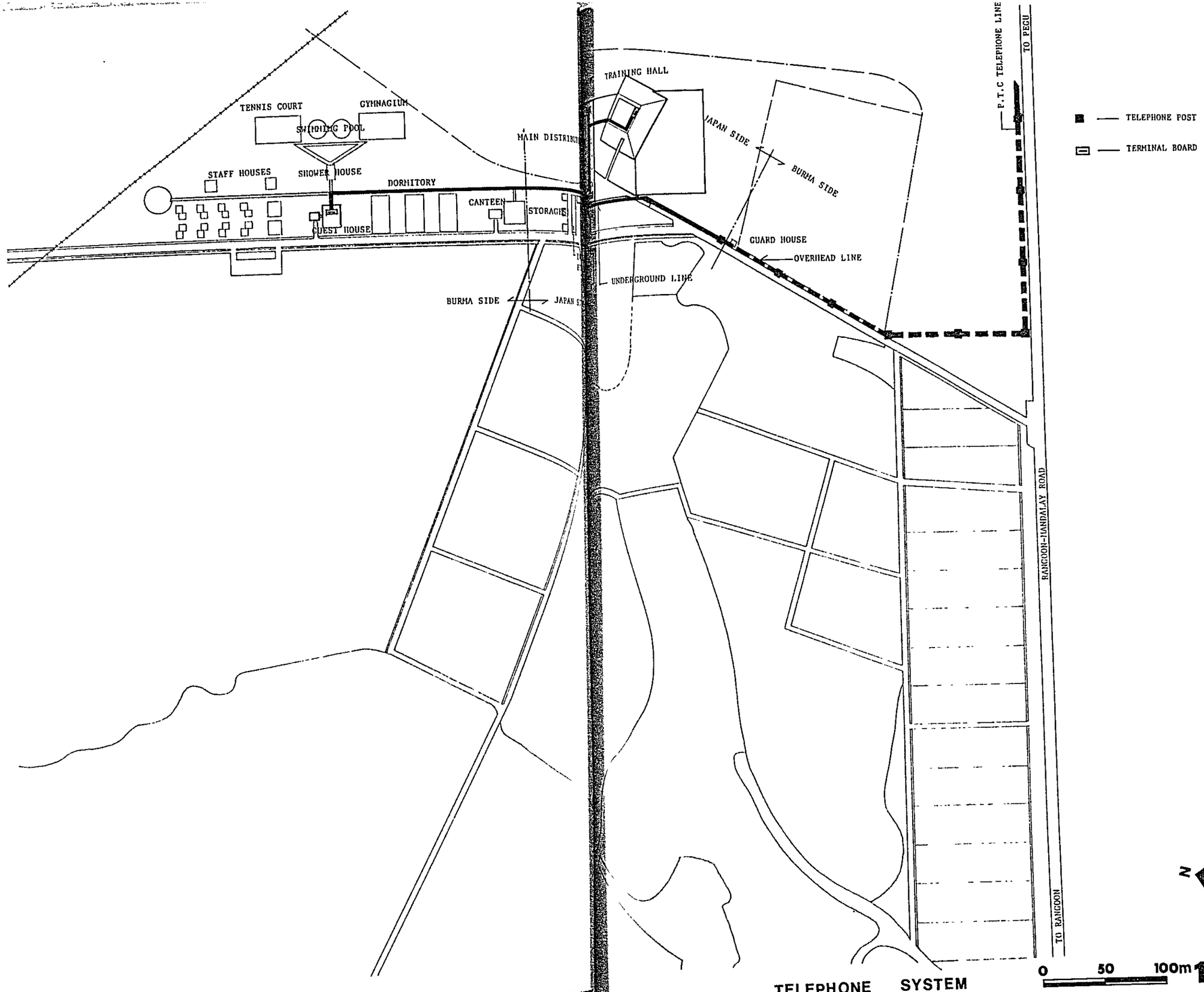
09



THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

ELECTRICAL SYSTEM

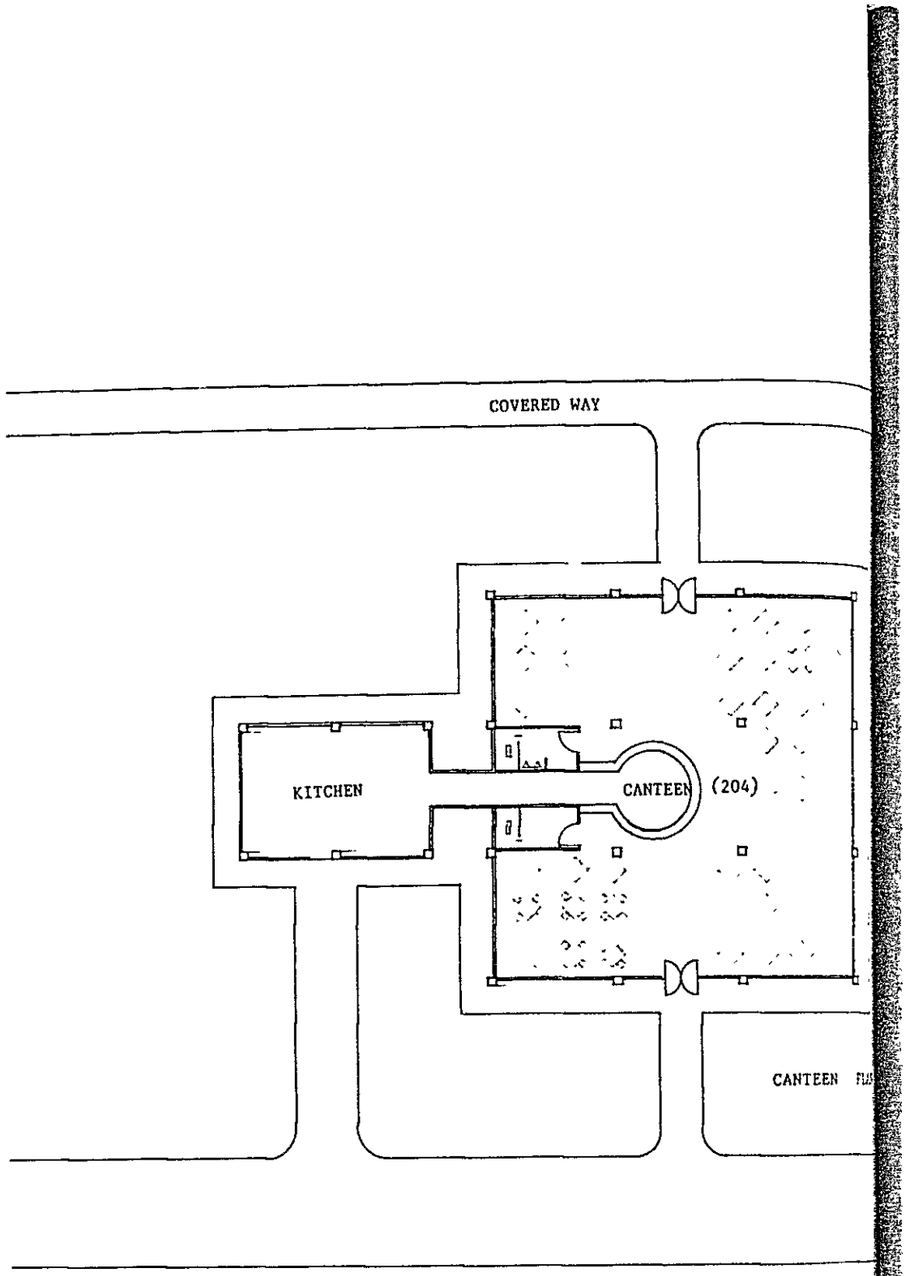
10

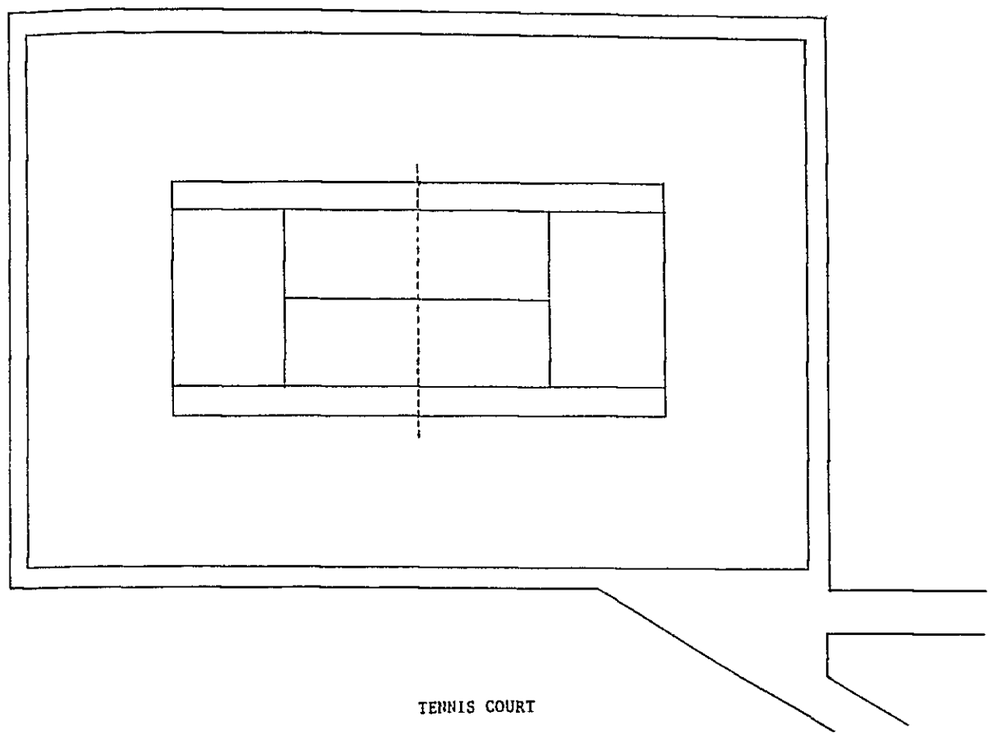


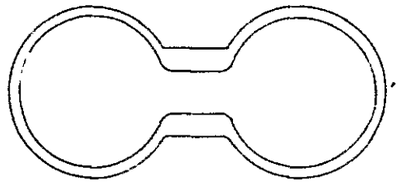
TELEPHONE SYSTEM

11

THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTR







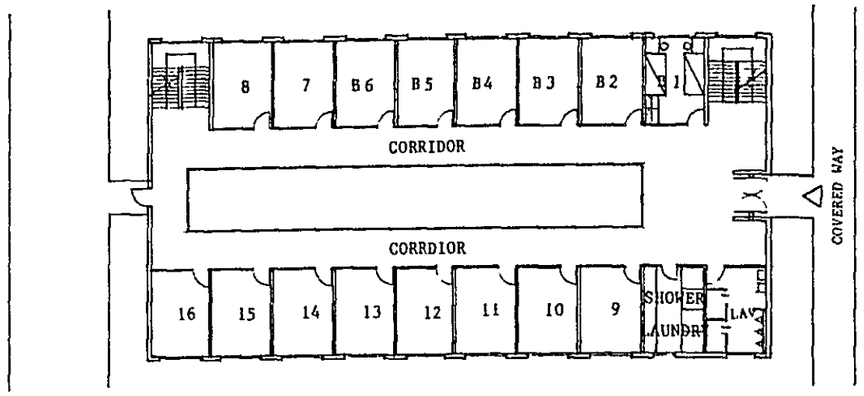
SWIMMING POOL

THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

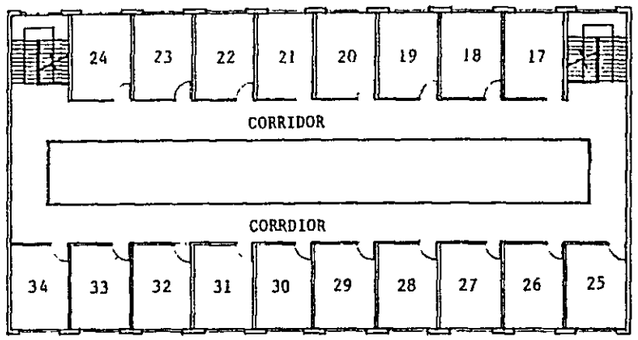
PLANS
CANTEEN
TENNICE COURT
SWIMMING POOL

0 5 10 15m

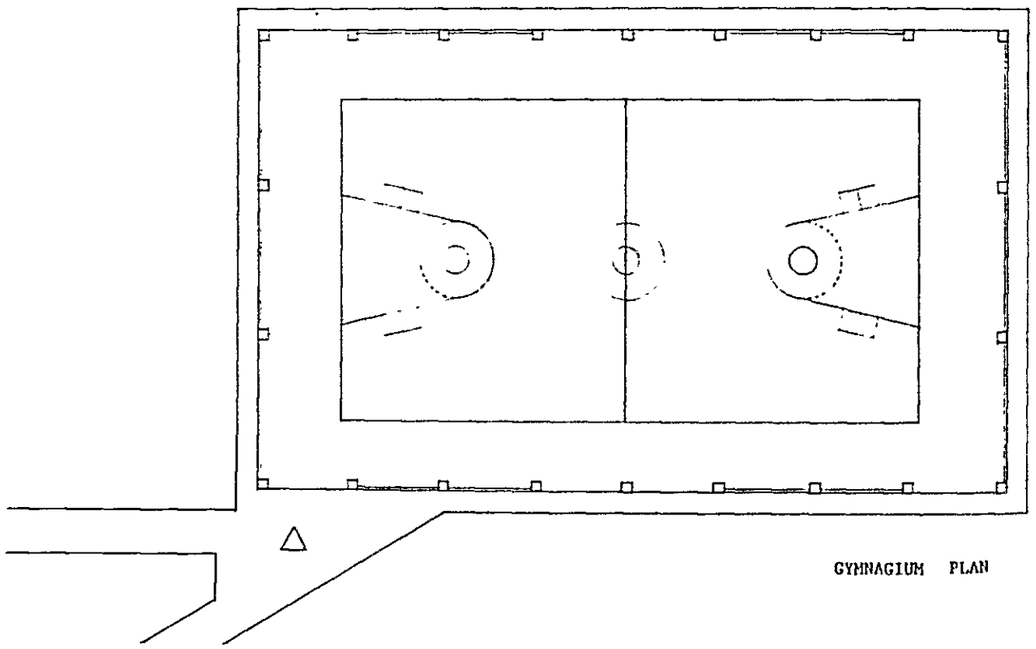
12



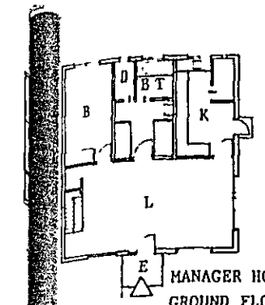
DORMITORY GROUND FLOOR PLAN

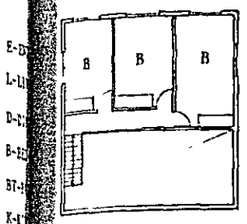


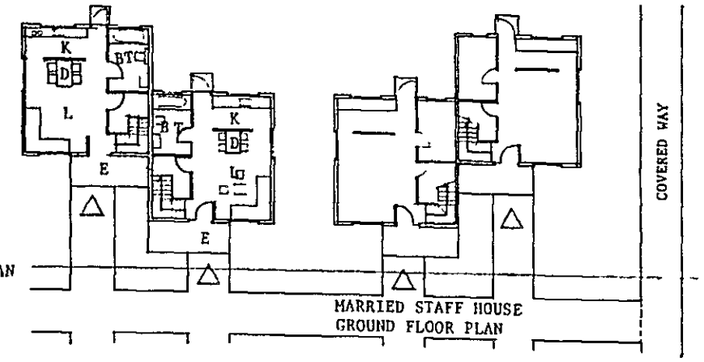
FIRST FLOOR PLAN

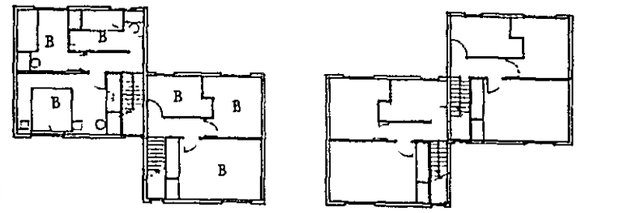


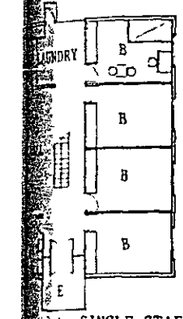
THE CENTRAL AGRICULTURE DEVELOPMENT TRAINING CENTRE

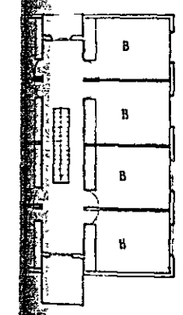


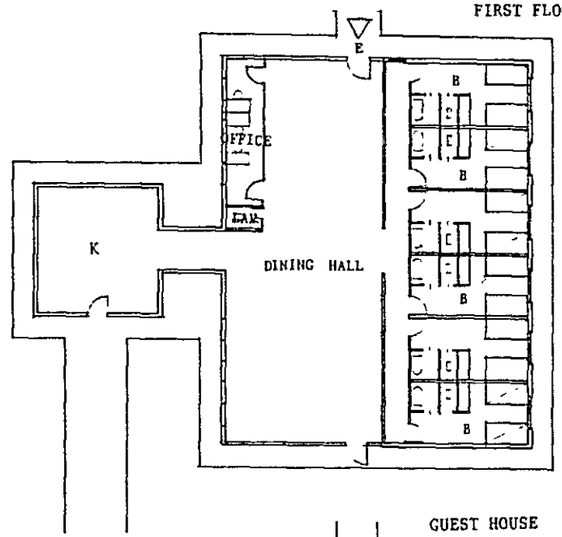


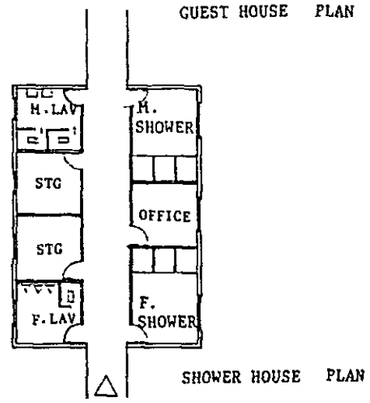












PLANS

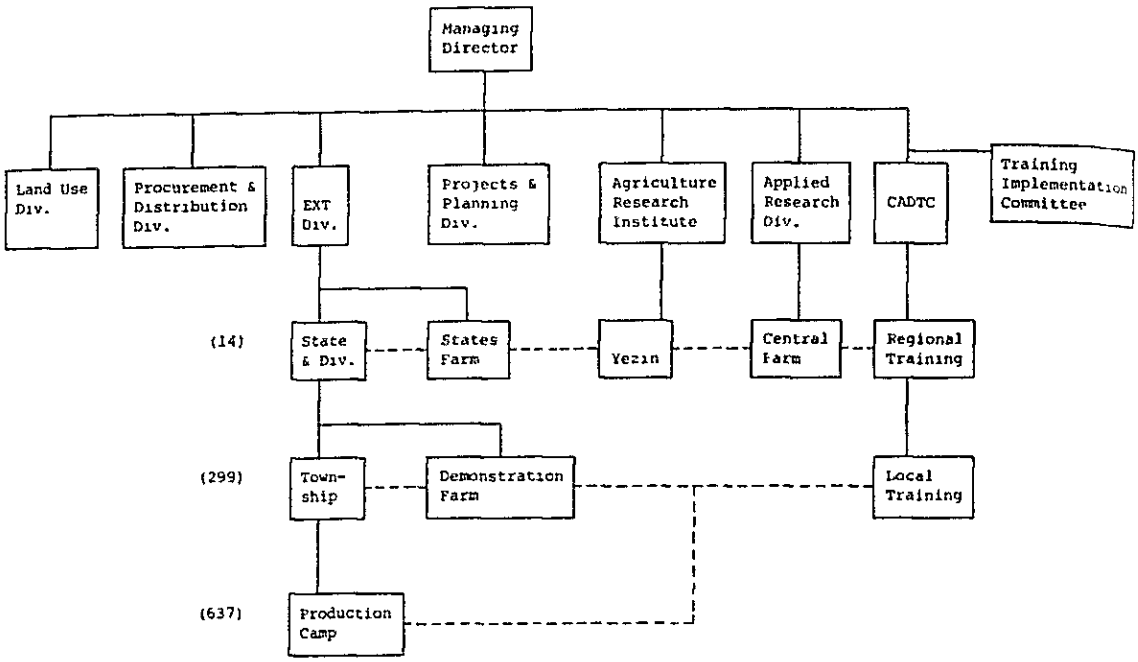
DORMITORY
GYMNASIUM
GUEST HOUSE
SHOWER HOUSE

GUARD HOUSE
MANAGER HOUSE
MARRIED STAFF HOUSE
SINGLE STAFF HOUSE

0 5 10 15m

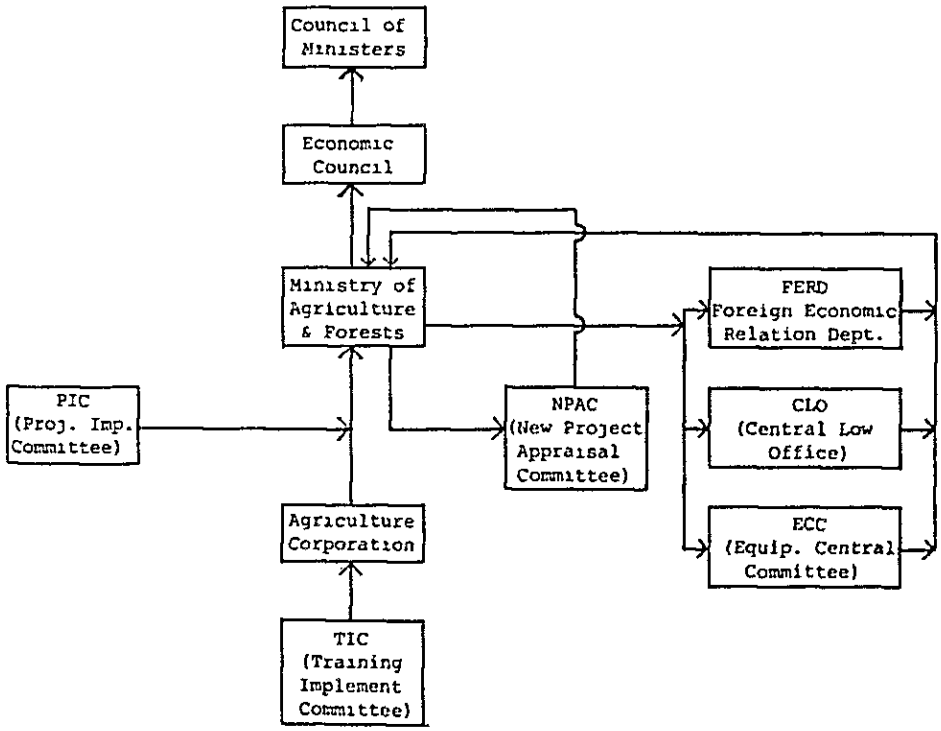
13

Fig. 6.1.1 CADTC Organizational Chart



Source Agriculture Corporation (March, 1982)

Fig. 6.1.2 Project Approval Flow



Source: Agriculture Corporation (March, 1982)

CHAPTER 6. PROJECT EXECUTION

6-1. Execution System

The AC, the Ministry of Agriculture and Forests will be responsible bodies for the planning and execution of Project in Burma. The AC will serve as the responsible government organization for the application with Project Implementing Committee (PIC), Economic Council and Council of Ministers. The PIC is headed by Managing Director of AC as chairman, and is consisting of Dy. Minister of MAF, Director General of FERD of the Ministry of Planning and Finance, Director General of Construction Corporation and General Managers of EPC, AMD, ID as members.

The Managing Director of AC will be a responsible government official of the consultant agreement for architectural and supervision services, the contract agreement for construction of the building, however the contractual matters are subjected to be reviewed by Foreign Economic Relation Department, Central Law Office and Equipment Control Committee.
On the Other hand, with regard to planning and execution of the construction project, the Centre Construction Committee will be organized mainly by the officials concerned within AC, joined by officials from Construction Corporation as regular members of the Committee.
The yearly training programme will be carried out by establishment of the Training Implementation Committee which will be organized by Managing Director of AC as Chairman, Project Manager of the Centre as Secretary and each head of divisions managers of the Corporation as Committee members.
In addition to the above, Foreign Economic Relation Department will be responsible for the GSRUB to deal with and adjust affairs and procedures concerning the government agreement for the Japanese grant aid and to adjust the Myanma Foreign Trade Bank will be the sole agent for banking arrangement (Refer to Fig.6.1.1 & Fig.6.1.2).

6-2. Construction Planning

6-2-1. System

The establishment of the Central Agriculture Development Training Centre is expected to be implemented under the Grant Aid Cooperation by the Government of Japan. After the decision of execution of the Project, the BSRUB shall make banking agreement with one of foreign exchange banks in Burma for payments concerned to the establishment of the Project, then shall select a consultant for designing and supervisory services and a construction company from Japanese corporations.

6-2-2. Construction Planning

As the first step toward implementation of this construction project, the infrastructure works will start with site reclamation and clearance as the basic foundation for construction and gravel pavement for the access road from the main road to the Project site, so that the construction work can be embarked following the preparation of detail drawings and specifications and awarding of the contract or for the construction.

Following the establishment of the Centre Construction Committee and the nomination of its member staffs mainly in the AC, arrangement of opinions on detail drawings and practical business on tendering and contracting procedures, adjustment of internal census about, supply of information and issue of instruction to the Japanese counterparts.

As for the construction planning, the Centre Construction Committee and the Japanese personnel incharge will carefully study the detail construction schedule, demarcation of works to be undertaken by both parties, and procurement and transportation of construction materials.

Due to the climatic conditions of Burma, piling work, foundation work, structural frame work, exerior wall finish work and outdoor work shall be planned to be constructed during day season. During rainy season interior finish works and related equipment works should be executed.

All materials and machineries to be used for temporary works may be depreciable. Therefore, the temporary work must be planned so as to enable the used materials to demonstrate their maximum effect at minimum quantity with characteristics of wide acceptability and transferrability for

any other purposes. Prior adjustment must be made to ensure good coordination between the timing for delivery to the site of materials and machineries to be procured from Japan and the timing for commencement of the work by use of materials locally available in Burma. Skilled workers must be assigned to the job site during the process of work progress, so that any loss of time by waiting for the turn to start the work or by going backward to the reversed sequence of construction can be eliminated.

6-2-3. Supervisory Planning

Under Japan's Grant aid cooperation, the construction supervision will be executed by the agreement for architectural and supervisory services between the AC, Ministry of Agriculture and Forests and a Japanese corporation consultant. The purposes of the supervision is to cooperate in fair contract agreement, in faithful realization of the design objectives, and in instruction to the contractor for its adequate execution of the construction.

The supervisory services are as follows;

1) Cooperation on contract agreement

Selection of construction companies, Preparation of contract documents, Assistance in letting construction contracts, Examination of cost breakdown for construction, Attendance on contract agreement.

2) Check and confirmation of shop drawings

Examination of shop drawings, materials, finish samples, and equipment submitted from contractor during construction.

3) Instruction of construction

Study of construction planning and schedule, Instruction to staffs of contractor, Presentation of supervision report for construction progress.

4) Cooperation of authorization to pay

Examination of contents of payment requests during and after construction and cooperation on payment procedure.

5) Inspection of construction

Inspections of construction on each completed amount of work during the construction term from commencement to completion.

The consultant will confirm the completion of construction and fulfillment of conditions of contract agreement. By the attendance on the delivery and acceptance of the Project, the consultant will complete its supervision services. Moreover, the Project will be reported its necessary and essential matters to the Government of Japan through consultant such as construction progress, payment procedure, and completion and delivery, etc.

6-3. Demarcation of Construction

The Basic Design Survey team held a series of discussion and exchanged views on the demarcation of construction works with Mr. Khin Win, Managing Director of AC, and other officials concerned. The following items are summaries of the construction works and necessary measures to be undertaken by the both Governments.

6-3-1. Items to be Borne by the Government of Japan

1) Facilities
   a) Training Main Building
   b) Training Hall
   c) Hulling & Drying Yard
   d) Storage, pump room and utility Bldg.
   e) Covered Way

2) Outdoor Works
   a) Road & Parking pavements
   b) Architectural Drainage
   c) Outdoor lighting

3) Infrastructure Works
   a) Elevated water tank
   b) Water supply distribution (Area-J & pumping equipment)
   c) Drainage Work (Area-J)
   d) Septic Tank (Area-J)
   e) Electricity receiving system
      (transformer (11KV - 400V), cubicle, receiving cable, lighting equipment, electricity distribution cable, telephone receiving)
   f) Cable for Electricity and telephone
      (11KV cable: 540 mt. cable 500 mt. telephone cable: 10 km., Transformer (100KVA x 2 units, 450KVA x 1 units (33KV - 11KV)))
   g) Lighting equipment equipment & Water and Drainage pipe
      (Area-B & Wind-Cooler 12 units)

4) Equipment

a) Agro-Biology laboratory equipment
b) Agro-chemistry laboratory equipment
c) Farm Machinery
d) Irrigation equipment
e) Publication equipment
f) Audio visual equipment

6-3-2. Arrangements to be undertaken by the Government of Burma

1) Provision of respective data and information to a Japanese consultant and a contractor necessary for the detailed engineering services and construction.

2) Land acquisition necessary for the construction of CADTC facilities.

3) Execution of groundwater survey including water lifting test and core boring including penetration test.

4) Land consolidation and Improvement of soil in the demonstration plot.

5) Facilities

a) Canteen
b) Guest house, staff's quarters and labourer's quaters
c) Trainees' dormitories
d) Gymnasium
e) Demonstration farm
f) Pump house and guard house

6) Outdoor works

a) Fencing, Land-scaping and road pavements
b) Storm reservoir & pond
c) Sports field
d) Exterior drainage
e) Site preparation

7) Infrastructure work
   a) Water supply (well drilling)
   b) Drainage (side ditch excavation)
   c) Electric supply (at 11 kV rating)
   d) Telephone (Connection with 2 lines to MDF)
   e) Septic tank

8) Furniture and fixture
   Furniture, carpet, curtains and other furnishings

9) Budgetary arrangement and expenditure of maintenance and operating cost and expenses

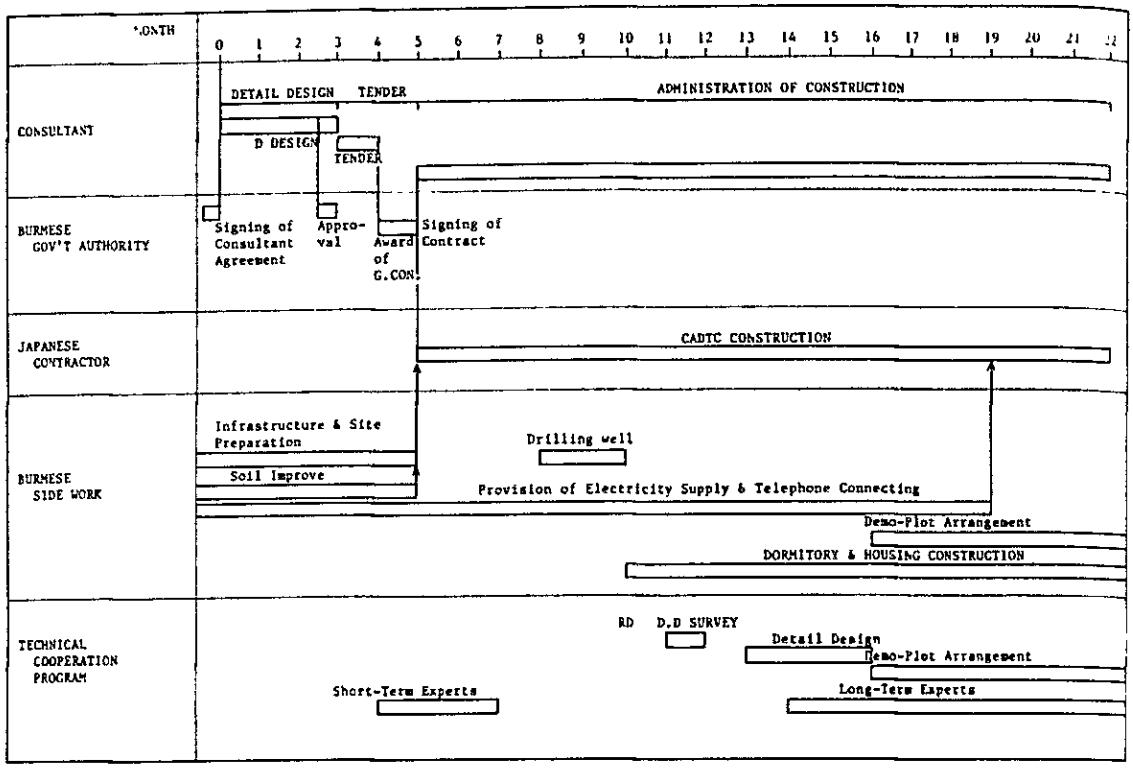
10) To ensure prompt unloading and customs clearance in Burma of imported materials and equipment for the construction and facilitate the internal transportation for them.

11) To exempt Japanese nationals concerned from customs duties, internal tax and other fiscal levies which may be imposed in Burma on the occasion of the supply of materials and services for construction.

12) To provide and accord necessary permissions, licences and other authorization required for the execution of CADTC construction.

Fig. 6.4 Execution Schedule

Construction Schedule



Technical Cooperation Schedule

ITEM \ YEAR	1st year	2nd year	3rd year	4th year	5th year	6th year
1. CADTC Basic Design						
2. CADTC Detail Design						
3. CADTC Construction						
4. Procuremen & Installation of Equipment						
5. Recruitment of Staff						
6. Preparation of Training Programme						
7. Implementation of Training						
8. Preparation & Implementation of the Project Types Technical Cooperation						
(a) Dispatch of Long Terms Expert (Preparation)						
(b) Acceptance of Burmese Counterpart in Japan						

6-4. Execution Schedule

The preparation for working drawings for the CADTC under the grant aid cooperation by the Government of Japan will start following the conclusion of the Exchange of Notes between the Government of Burma and Japanese Government.
The Schedule consists of three phases, detail design, tendering and construction.

Detail Design

About three months will be required for the Project. The tender documents will be prepared based on the Basic Design Report. During this phase confirmations will be made to the Burmese side in three stages, preliminary, intermediary and final stage.

Tendering

About two months will be required for the construction including the installation of medical equipment, expecting procured materials will be in good condition.

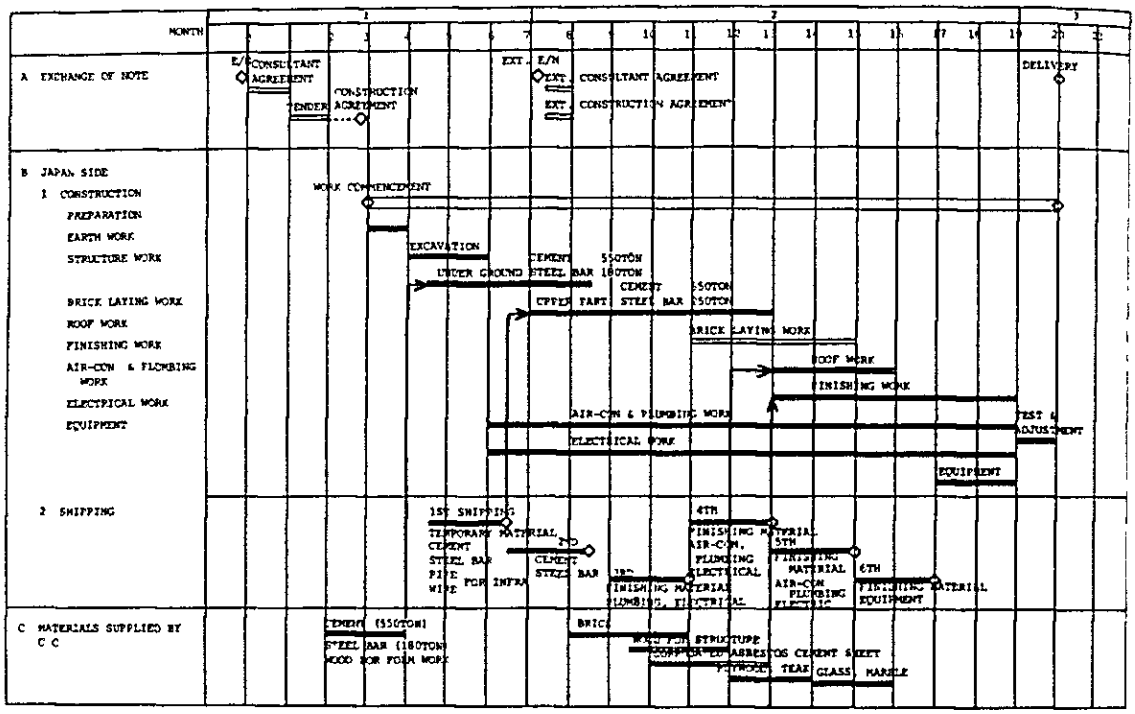
Construction

The construction work will start after the verification of the agreement by the Japanese Government after signing of the contract. The total period of construction can be estimated at about 17 months, provided that the work will be ready to start immediately after the rainy season if construction materials can be procured without difficulty.

Technical Cooperation

Total term of cooperation, which includes both preparation and implementation stages, will be four years corresponding to the operation start of the CADTC.

Fig. 6.5 Procurement Schedule



6-5. Procurement of Construction Materials

For the execution of the construction of the CADTC, the procurement of construction materials and equipment shall be planned to be procured in large quantity from Japan as well as from any other third countries considering Burma's construction method, maintenance ability and construction term.
As for the procurement of the labour force for construction and equipment installation. Skilled labourers for concrete work, reinforced bar arrangement, metal work, metal fitting work, painting work and electrical work should be dispatched from Japan for the supervising local workers in the job performance.

Procurement from the third countries should meet such conditions that the technical level is satisfactorily acceptable at a lower cost. In this respect, the countries satisfying such requirement are Malaysia, Singapore and Thailand. Although Singapore may be the best supplier when viewed from available transport means and cost factors, further market research must be made carefully with regard to quantity and quality of supplies during the detail design phase. The outline of procurement planning of construction materials and equipment is as follows:

1) Construction Materials to be procured in Burma

Cement and aggregate (sand, gravel)
Brick
Timber
Flooring block
Slate
Wooden fittings
Office furnitures and fittings

2) Construction materials to be procured from Japan and third countries

Reinforcing bar and light-weight shape steel
Metal fittings

Glass
Paint
Interior finish material
Construction equipment
(batcher plant, pump waggon, crane and heavy behicle)
Temporary work materials
(plywood, timber support, scaffold, generator and tools)
Piping
Wiring, cable, conduit and panel
Lighting fixture, plug and switch
Transformer
Training laboratory equipment and materials
Pump and casing
Air conditioner

All materials of local material will be supplied from individual corporation concerned through Construction Corporation. Materials needed for construction of the CADTC include aggregate (sand and gravel) to be furnished by Construction Corporation and cement, slate and brick to be furnished by Ceramic Industries Corporation and timber to be furnished by Timber Corporation.

In procuring materials of local availability, lead time of a considerable length is required for pre-arrangement of supplies, because the total quantity of supplies is limited.

Besides that, because of diversity in the grade of quality, strict screening of grades is required after careful check of quantity for use and selection of place of application. This will bring about a great advantage in the maintenance of building after its completion.

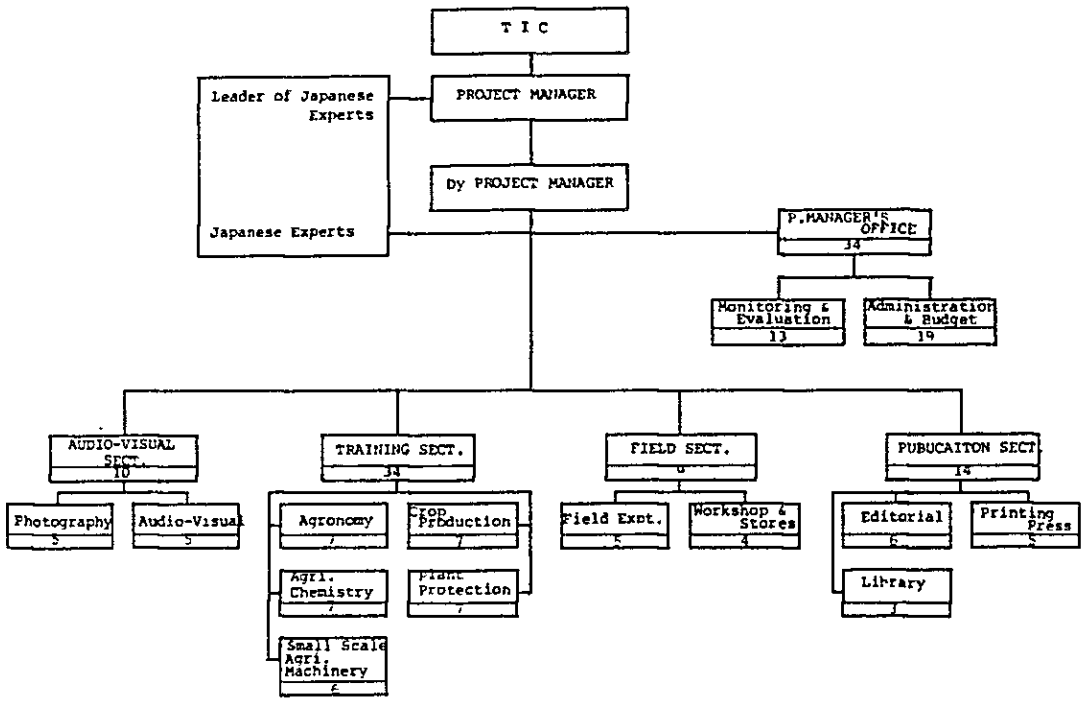
6-6. Project Cost

The total investment cost for the establishment of the CADTC is estimated by the Team as imediately follows: Estimation is based on the price rate of March, 1982 and exchange rate is set at 1 US$ = ¥240 = 8.0 Kyats.

ITEM (JAPANESE PORTION)	INVESTMENT COST (¥'000)		ITEM (BURMESE PORTION) (Evaluated by the Team)	INVESTMENT COST(K'000)	
1.BUILDING WORK			1. BUILDING WORK		
1) Main Training Building	728,200		1) Labourers' Quarter	200	
2) Training Hall	132,600		2) Guardman's House	48	
3) Workshop	80,600		3) Canteen/Dining Hall	600	
4) Hulling & Drying Facility	24,000		4) Trainees' Dormitory	2,400	
5) Storage, Pump & Utility	23,000		5) Staff House	4,985	
6) Covered Way	34,700		6) Guest House	300	
			7) Godowns	100	
			8) Covered Way	500	
Sub-Total		1,023,100	Sub-Total		9,161
2. OUTDOOR WORK			2. OUTDOOR WORKS		
1) Outdoor Work	60,000		1) Fencing, Land-scaping and road pavements	933	
			2) Storm reservoir	580	
			3) Sports field	40	
			4) Out-door lighting	270	
			5) Exterior drainage	400	
			6) Site preparation	200	
			7) Demonstration Farm	100	
Sub-Total		60,000	Sub-Total		2,523 *1
3. INFRASTRUCTURE WORK		294,000	3. INFRASTRUCTURE WORK		
			1) Water supply (well drilling)	600	
			2) Drainage (side ditch excavation)	710	
			3) Electric supply (at 11 KV rating)	680	
			4) Telephone (Connection with 2 lines to MDF)	135	
			5) Septic tank and Sewer	150	
			Sub-Total		2,275
4. TRAINING EQUIPMENT			4. FURNITURE & FIXTURE		400
1) Training Equipment	300,000				
Sub-Total		300,000			
5. CONTINGENCIES		72,900	5. TRAINING EQUIPMENT		100 *2
6. CONSULTANT'S SERVICE		160,000			
TOTAL (1 - 6)		1,910,000	TOTAL (1 - 5)		14,459

*1 & *2 These figures do not include the costs which will be expected to be covered by the Japanese Technical Cooperation Program and these costs should be fixed upon discussions with Japanese Technical Cooperation Team.

Fig. 7.1 CADTC Organization



Source: Agriculture Corporation (March, 1982)

CHAPTER 7. OPERATION AND MAINTENANCE

7-1. Administration & Maintenance System

For the effective operations of the activities of the CADTC, adequate administration and maintenance system should be established.
The CADTC will be organized under the Project Manager as the chief of the centre, the training staff and administration staff selected within AC.

As shown in the organization chart and staff allocation schedule of the CADTC, five sections such as Training, Field, Audio-Visual, Publication and Administration will be constituted to operate the CADTC. (Refer to Fig.7.1)

7-2. Maintenance Planning

The planning of the facilities of the CADTC shall be based on the easy maintenance and operation. On the occasion of the delivery of the buildings, maintenance and operation for the buildings and equipment will be instructed to the staffs of the CADTC together with presentation of operation manuals and explanation notes.
The maintenance consists of usages and cleaning of buildings and equipment. The necessary informations about reparing and spare parts will be also presented to the staff of the CADTC.

For the operation and maintenance of the CADTC facilities, effective measures for budget is indispensable and furthermore, the CADTC should be backed up strongly by supplies of follow-up equipment and materials under the Technical Cooperation by the Government of Japan.

7-3. Operation & Maintenance Costs

For the operation and maintenance of the CADTC,

The currency budgets will be covered by the following funds.