Folder Title: Paddyland Development Project (03) - Myanmar - PX00469 - Correspondence - Volume 1

Folder ID: 1167401

Project ID: PX00469

Dates: 6/10/1981 – 1/31/1984

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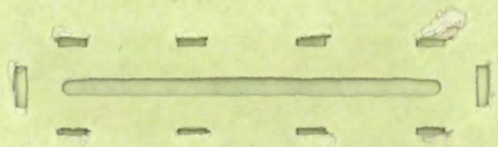



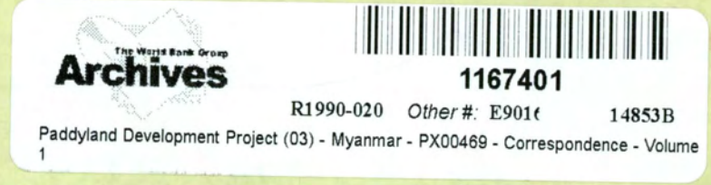

FORM NO. 635
(6–77)

# CLOSE – OUT SHEET

This file is closed as of JANUARY 31, 1984.

For further correspondence, please see VOL. II.

RECORDS MANAGEMENT SECTION

euroconsult

SAIC
Burma: Proposed Paddy III

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BA-Paddyland
Dev. (3)

Y/ref.: O/ref.: 5/4.55.001 Arnhem, 31 January 1984

Subject: Paddy III - Follow-up to two ongoing Paddy development projects, Burma

Dear Sir,

We understand that there is to be a follow-up to two ongoing Paddy development projects to increase Paddy production through the construction of flood protection and drainage facilities.

Euroconsult is currently providing its services for similar projects in Bangladesh and Indonesia, and we have also provided our services in Burma for World Bank projects in the past.

Should international consultants be required for this project, we would appreciate being placed on the short list of consultants.

Yours faithfully,
Euroconsult

W.F.T. van Ellen
Regional manager

cc: Ministry of Agriculture and Forests, Rangoon

MV/IM

BA-Paddyland Dev(3) 5 A1C
Received 12/1/83
Burma:
Proposed Paddy III
Project



BURMA

KAWHMU RECLAMATION PROJECT (PADDYLAND III)

OIL SEED CROPS AND THEIR ADAPTATION

1. At the request of GOB, the mission looked into the potential of growing oil seed crops after the monsoon paddy in the project area. The mission's findings are discussed in this paper.

General

2. Important oil seed crops grown in Burma include sesame, groundnuts and to a lesser extent sunflower. These crops are mostly grown under rainfed conditions in Central Burma, where the monsoon rainfall is not sufficient to grow paddy and soils are lighter than the Delta paddy lands.

3. The present oil seed cropped area in three townships involved in the project totals only about 2,000 acres or 0.5% of total cultivated area. Within the project area, only a negligible area - mostly backyard garden - is devoted to these crops, mainly because of lack of water in the dry season and lack of proven technology to cope with adverse soil conditions in the project area.

Government Policy

4. The reasons for the GOB's special interest in oil seed crops in the Delta are mainly political ones. Soils in the Delta are not ideally suitable for these crops. High monsoon rain in the Delta precludes the cultivation of upland crops in the monsoon season and availability of fresh water for the dry season irrigation is very limited, particularly in the Lower Delta.

5. The GOB estimates that about an additional 7,000 tons of edible oil per year are required to meet the present national demand 1/. In view of this, the GOB is now seeking to achieve regional self-sufficiency in oil seed production. It appears, however, that the GOB has not as yet laid out any definite plan and strategy on regional self-sufficiency, as the mission was unable to obtain information on these except for the planned increase in oil seed area in the Delta. The mission was informed by the Agricultural Corporation that about 500,000 acres increase in oil seed area is planned for the Delta. However, it is not known which oil seed crop is to be produced nor how the target will be achieved.

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1/ The consultants estimate that shortfall is about 7,000 tons of oil seed or some 2,300 tons of edible oil. (Irrawaddy Delta Hydrological Investigations and Delta Survey, Vol. 4, January 1982 - Sir William Halcrow & Partners).

Agro-ecological Conditions in the Project Area

6. Climate in the Delta is a tropical monsoon, influenced by the southwest monsoon from mid-May to mid-October, and the dry northeast monsoon from November to April. Annual rainfall at Rangoon station averages about 100 inches, of which about 85% occurs during the southwest monsoon period with the maximum occuring in July and August. Monthly rainfalls between May and September are well over 200% of monthly ETo values during these months (see Fig. 1). The abundant southwest monsoon rainfall is therefore creating ideal conditions for rainfed paddy growing in the Delta. During the dry northeast monsoon season, practically no crops can be grown without irrigation in the area.

7. Mean monthly temperature ranges from 73 degrees F (January) to 86 degrees F (April), mean max. temperature from 84 degrees F (July) to 97 degrees F (April) and mean min. from 64 degrees F (January) to 77 degrees F (May). Mean monthly relative humidity ranges between 52% (February) and 81% (July and August).

8. Soils. Detailed information on soils is not available at present. According to a reconnaissance soil survey, most of the project area is occupied by Gleysols, which are the most representative soils in the Delta alluvial plain. They are characterized by fine-textured soils, mottled in the upper horizons and becoming increasingly strongly gleyed with depth. These soils quickly become dry after the end of the monsoon rain. When dry, they are very hard and massive, and crack widely.

9. Since the project area extends below the limit of the saline front penetration, the soils have a salt-affected profile at varying degrees. The distribution of the soils subject to regular salt-water flooding is presently unknown.

10. On slight elevations, the soil texture is somewhat lighter in the surface horizon. From the mission's visit in the field and from aerial photographty, these lighter-textured soils are most likely to be found in a narrow strip along Twante-Kawhmu-Kungyangong road and in a slightly elevated narrow stretch connecting Tawkayan and Tawku in Kungyangong Township. From aerial photography, it appears that light-textured soils are also found along the coastal plain. The acreage of these soils is perhaps not more than 10,000 acres in total. The mission considers that these are the areas suitable for the cultivation of oil seed crops in the project area, provided that irrigation water is available.

11. According to the consultants' study 1/, the Gleysols found in the Delta are not suitable for the cultivation of dryland crops except where there is a surface horizon with slightly lighter texture. The consultants consider that the gleysols with fine-textured soils have a very limited potential for growing a second crop on residual moisture after the harvest of monsoon paddy for the following reasons.

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1/ Irrawaddy Delta Hydrological Investigations and Delta Study, Vol. 4, Sir William Halcrow & Partners, January 1982.

12. It is estimated that stored water in these soils is about 180 mm at the time of paddy harvest (Nov./Dec.), assuming the water penetrates to a depth of 900 mm and available water holding capacity of these soils is some 20%. Of this stored water, some 60% or about 110 mm will be readily available to plants before wilting becomes apparent. This amount is only sufficient to supply the first month of crop evapo-transpiration. (Monthly ETo in November and December is in the range of 120 to 130 mm; see Fig. 1).

13. With regard to oil seed crops, the consultants concluded that they can only be reliably grown if irrigated, as they are poorly adapted to withstand drought during the early growth stages and they do not thrive on the heavier paddy clay soils.

14. The mission, from its observation of the soils in the field and discussions with farmers, extension agents, local soil specialists and research agronomists, shares the views of the consultants on the above points.

## Notes on Individual Crops

15. Sesame. About 3.2 million acres are planted to sesame in Burma (1980/81). In terms of the planted area, sesame ranks second to paddy. It is mostly grown under rainfed conditions in the dry zones of Central Burma (Magwe, Mandalay and Sagaing Divisions). As the monsoon rainfall is unstable and the distribution is uneven year to year, the annual planted area varies considerably. In spite of being a relatively drought tolerant crop, about one-third of the planted area is not harvested every year. Consequently, annual production fluctuates widely. Over the last five years, the countrywise average yield varied from 77 lbs to 149 lbs per planted acre. Annual production varies from 91,000 to 206,000 tons. Sesame cultivation in the Delta is presently very limited and confined to lighter soils and above the limit of saline front penetration (i.e. middle and upper Delta areas).

16. Introduction of high yielding varieties is still at the embryonic stage. FAO/UNDP is presently assisting on sesame varietal improvement under Crop Development Project (BUR 77/009). Hnanni 25/60 (red sesame) and Sin Yadana-1, both local improved varieties, appear to be the most suitable, with a high yield potential. Hnanni 25/60 is recommended by the Agricultural Corporation for lighter soils in the Delta. It is a photoperiod sensitive variety maturing in about 150 days in the monsoon and about 90 days in the dry season. Yielding capacity is reported to be 10 to 15 baskets per acre (540 to 810 lbs) with good management.

17. Traditionally, sesame in Burma is planted over the following three ranges of period:

| | | Planting time |
|---|---|---|
| (1) | Early monsoon | mid May-mid June |
| (2) | Late monsoon | Sept.-Oct. |
| (3) | Pre-monsoon | mid Feb.-mid March |

The majority of sesame is planted in the early monsoon and the crop grown in this season usually out yields the late monsoon one.

18. Since sesame is grown in a rather extensive way under unstable monsoon rain, cash inputs are hardly used.

19. It is estimated that only 560 tons of chemical fertilizers were distributed for this crop in 1980/81, against a total sesame planted area of 3.2 million acres in that year.

20. Important pests and diseases for sesame identified in Burma include jassids, aphid, and phyllody (virus). The use of agro-chemicals is presently very limited.

21. Very little research on sesame has been conducted so far, and what has been done is confined to Central Burma. Hmawbi Central Research Farm 1/, located about 50 miles north of the project area, has initiated recently a preliminary observation trial on the cropping system under irrigated conditions for paddy-oil seed crops. The soil type at Hmawbi Farm is heavy clay identical to the project area. Sesame was planted in mid February and a yield of 8 baskets (430 lbs) per acre was reportedly obtained last year under this cropping system. The mission observed this year's trial. Plant growth was uneven and the plot was waterlogged in places. The mission was told that this is due to difficulties of seed bed preparation and application of irrigation water on the heavy paddy soils.

22. Optimum sowing time for sesame after the monsoon paddy is considered to be in mid February in the Delta. Although no research on time of sowing has been conducted, it is said that if sesame is sown in December and January, no satisfactorty germination is expected and the plant growth is retarded even if germinated, due to low temperature during these months. Mean air temperatures at Rangoon station during these months are above the lower limit for germination 2/. The question of germination response to temperature deserves research attention.

23. From this it can be seen that if sesame is to be grown with residual moisture after paddy, it must be sown earlier than December - possibly before mid-November - as the optimum sowing time for the late sesame is considered to be in September/October. In theory, only the early paddy area, which is harvested in the beginning of November, could be used for planting sesame with residual moisture. As mentioned in para 12, supplementary irrigation would be required at the late growth stage in January. In practice, to what extent a good seed bed for sesame can be prepared in such a short time is questionable. Since the majority of the paddy crop is still in the field, there would be only limited access for power tillers in November.

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1/ There are two Central Research Farms in the Delta. Both are basically paddy research stations and are located above the limit of saline front penetration.

2/ Mean air temperature of 18 degrees C and soil temperature of 21 degrees C are considered to be the lower limit for sesame germination. Considerable genotypic variation, however, exists in the germination response of sesame to temperature.

24. If irrigation water is available, sowing in mid-February as pre-monsoon sesame is recommendable, which would allow enough time for paddy harvesting followed by seed bed preparation. Since sesame is sensitive to salinity 1/, availability of fresh water for irrigation after February has to be viewed with caution.

25. The suitability of paddy soils in the project area for sesame would also require careful examination, as they are strongly puddled heavy-textured soils with a plough-pan layer at a depth of about 6-7 inches. Sesame, which has a tap-root of 3-4 ft, requires ideally well-drained, deep medium-textured soils. Appropriate technology to prepare good seed beds for small-seeded sesame on such paddy soils has not yet been developed in Burma and elsewhere.

26. Groundnuts are as important an oil seed crop as sesame in Burma. Like sesame, it is a principal crop in Central Burma where the monsoon rainfall is not sufficient for paddy. In the Delta, groundnut cultivation is very limited and confined to the middle and the upper Delta. It is planted in October after the receding of the monsoon flood on the Kaing land (alluvial river bed) or after jute. It is also planted in November after the monsoon paddy on the lighter soils on a limited scale.

27. The annual planted area and production vary from year to year. Over the last five years, the planted area was in the range of 1.2 to 1.5 million acres. About 95% of the planted area was harvested annually. Average country-wise yields (unshelled) were between 620 lbs and 790 lbs per planted acre. Annual production was between 337,000 tons and 476,000 tons (unshelled).

28. Both spreading (runner) and erect (bunch) type of groundnuts are grown in Burma. The early monsoon crop comprises mostly the spreading type as the erect type is of a shorter growing period which matures before the end of the rain, causing a harvesting problem. The erect type is planted in the late and post-monsoon because of its shorter duration. Major varieties grown in the Delta include SP 122, Magme 9 and 10 (all erect types), which mature in about 120 days.

29. One of the rather decisive constraints to cultivation of groundnuts in Lower Burma, including the Delta, is that there are no existing techniques for successful on-farm seed storage during the monsoon. Storage of locally grown seed from the post-monsoon harvest is not possible because high atmospheric humidity in the monsoon reduces viability of groundnut seed in Lower Burma. Farmers in Lower Burma, therefore, must obtain seed from Upper Burma. The high cost of seed coupled with low germination percentage of seed obtained from Upper Burma discourages cultivation of groundnuts in Lower Burma.

30. To cope with this, the World Bank on-going seed project was designed to include a pilot groundnut seed programme, providing refrigerated and dehumidified seed stores. The programme is to determine the technical,

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1/ The saline tolerance level of the existing sesame variety in Burma is not known. A pot-trial conducted at Yezin under the FAO/UNDP project indicates that some varieties could not stand at 2,000 p.p.m. (NaCl solution) treatment and only a few varieties survived at 4,000 p.p.m. treatment.

financial and economic feasibility of the storage in Lower Burma. Hmawbi Central Research Farm is one of the selected sites for installing seed stores under the pilot programme. The mission visited Hmawbi Farm but no such seed stores had been provided and the Farm Manager was not well informed on this pilot component.

31. To add to this, research on groundnuts under the on-going FAO/UNDP Crop Development Project, is presently being carried out to study the seed problem in Lower Burma. It is reported that use of shrivelled seed may alleviate the problem but requires further research. The project is now planning to find out the possibility of growing the monsoon groundnuts in Lower Burma by using slopy and well-drained lands. It is evident that the whole question of groundnuts seed storage for Lower Burma has not been solved as yet.

32. From the soils point of view, groundnuts are best adapted to well-drained, loose, friable medium-textured soils. The majority of soils in the project area do not meet these requirements. Preparation of a good seed bed with loose top soils is important so as to allow the pegs to enter the soil easily. This would lead to a higher yield. Heavy textured soils would cause problems in lifting the crop at harvest. Technology to cope with these problems on heavy textured paddy soils has not yet been developed in Burma.

33. Since groundnuts grown in the post monsoon period take about 4 months to mature, supplemental irrigation would become essential in the later half of the growth stages. Like sesame, the crop is also sensitive to salinity 1/. Availability of fresh water for irrigation in February and March must be secured.

34. Sunflower is only a recent introduction as an oil seed crop in Burma. Until 1975, the annual planted area under this crop was below 10,000 acres. Since then, the area has increased very rapidly; about 143,000 acres were planted in 1980/81. About 85% of this area was estimated to be harvested. Total production was some 32,000 tons and the average yield was about 500 lb (15 baskets) per planted acre. Statistics on regional distribution of the sunflower area are not available at present. It is considered to be more widely scattered over the country than sesame and groundnuts.

35. Being a rather new crop in Burma, sunflower growing seasons according to different agro-ecological conditions have not yet been well established. In Pegu division (Lower Burma), where groundwater level is high (1-1.5 ft below ground level) even in the dry season, it is grown as a post-monsoon crop after paddy. In the Delta, it is mostly grown like groundnuts, as a late monsoon crop either after jute or after the monsoon flood on the Kaing land. Although limited in area, it is also grown after paddy as a post-monsoon crop in the Delta.

36. Research on time of sowing so far conducted under the FAO/UNDP Crop Development Project reveals that the optimum time of sowing in Lower Burma appears to be in the month of September, and if irrigation is available, it

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1/ More than 2,100 micromhos EC (irrigation water) would increasingly affect yields of groundnuts.

may be sown at any time from September to mid-December. Sowing beyond mid-December is not recommended because of high temperatures at flowering in February/March would cause pollen desiccation and eventual poor seed setting.

37. The most prevailing variety is Peredovic, an open pollinated variety from Australia, covering about 80% of the total sunflower area in the country. It matures in about 115 days in the Delta (post-monsoon). Hmawbi Central Research Farm has been using this variety after paddy in observation trials and 17 baskets (540 lb) per acre under irrigated conditions was reportedly obtained in the last year.

38. Varietal improvement on sunflower has been initiated recently at Yezin under FAO/UNDP assistance. In the evaluation of available material, six varieties including Peredovic, Chernianka-66, Armavirec, GOR104, Semena and VNNIMK 8883 were found to be promising. Among these, Chernianka-66 possessed the best characteristics, having shorter growing period, dwarf stature and good seed filling percentage. These are all synthetic varieties as it is considered that introduction of hybrid sunflower is still a little early for Burma.

39. Major technical constraints to introducing sunflower in the project area include (i) adverse soil conditions of paddylands; (ii) lack of pollinating insects; and (iii) inadequate soil moisture after paddy harvest.

40. As a considerable amount of sunflower is presently grown in rotation with the monsoon paddy in Lower Burma, the problem of growing sunflower, which has tap-roots of 4 to 5 ft, on paddy soils with plough pan layer 1/ has already been noted by the FAO sunflower expert stationed at Yezin. The current low yield of sunflower is partly attributed to this problem. No technical solution to this has yet been found except deep ploughing. Breaking the plough pan layer may prove harmful to paddy as it would alter water retention capacity of the paddylands. Further, destruction of this plough pan could be disastrous in certain kind of soils as they lose the capacity to bear either animals or tractors.

41. Since sunflower is a cross pollinated crop, it is necessary to have pollinating insects (bees). (It is claimed that one beehive for every 2 to 3 acres is required to expect satisfactory pollination, which would lead to higher yield). Practical means to introduce ~~beehives~~ bees in sunflower fields have not yet been studied.

42. Residual moisture after paddy in the Delta is only sufficient to meet the crop water requirements at an early stage of growth. Irrigation for the remaining growth period is therefore essential particularly at the flowering stage which would occur during the month of February, if it is sown in mid-December. The salinity tolerance level of the existing sunflower varieties in Burma is unknown. Since it is known as a moderately salt

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1/ The plough pan layer impedes root development of sunflower.

tolerant crop 1/, the possibility of using the Twante canal water for irrigation would be much higher than for sesame and groundnuts.

43. Another problem to be noted is parrot and rodent control. Heavy damage to sunflower trial plots caused by parrots and rodents is reported by the UNDP/FAO project at Yezin. It seems however, that no serious damage has been observed in the project area according to the Agricultural Corporation extension offices which conduct sunflower demonstration in the area.

## Conclusions

44. The majority of soils in the project area are not ideally suitable for cultivation of oil seed crops including sesame, groundnuts and sunflower in rotation with the monsoon paddy. More suitable lighter soil areas are limited, perhaps not more than 10,000 acres.

45. Of the above three important oil seed crops grown in Burma, sunflower could be introduced with less technical problems than sesame and groundnuts. First introduction, however should be confined to the above lighter textured paddylands. Higher yield of this crop could not be expected unless the breaking plough pan is proved not to be harmful for paddy cultivation and the pollinating bees are introduced. Irrigation is essential for sunflower cultivation after paddy in the project area.

46. The difficulty of introducing sesame and groundnuts after paddy is due to the following:

(a) sesame and groundnuts are less tolerant to salinity than sunflower;

(b) sesame cultivation after paddy requires further research on response to temperatures in the months of December and January; and

(c) procurement of quality groundnut seeds for Lower Burma is very difficult.

47. These conclusions require further confirmation from the Agricultural Corporation and Agricultural Research Institutes during the mission's next visit to Burma.

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1/ 3,500 to 4,000 micromhos EC (irrigation water) is generally considered to be a safe limit. Yields would be affected increasingly above this limit.

BA. Peabody Land (3)
11/27/83

BA Paddylands (3)
cc BA - Irrigation Rehab

# OFFICE MEMORANDUM

TO: Mr. Marius Veraart
FAO & IFAD Coordinator
Agriculture & Rural Development Dept., CPS
The World Bank
Washington, D.C.

DATE: 25 November 1983

FROM: Heye Groenewold
Chief, Service II, FAO/WB CP, Rome

SUBJECT: BURMA - Paddylands Development III Project
Irrigation Rehabilitation Project
Back-to-Office Report

... Please find enclosed herewith 8 copies of the Back-to-Office Report on the above mission.

RECEIVED
DEC 07 1983

BK 103/2.9

cc: RDG DDC (2)
Groenewold (2)
Zagni (chron.)

cc: Messrs. Yoon (4)
Tsantis (1)
LeMoigné (1)

# OFFICE MEMORANDUM

TO: Mr. Heye Groenewold
Chief, Service II, DDCB

DATE: 22 November 1983

FROM: A.F.E. Zagni
Service II, DDCB

SUBJECT: BURMA - Paddylands Development III Project
Irrigation Rehabilitation Project
Back-to-Office Report

General

1. Acting on Terms of Reference dated 16 September, the mission 1/ visited Burma from 22 October to 11 November. During that period, revisions were made to the drainage system of Paddylands III project, data collection for Irrigation Rehabilitation Project (Ye-U System) was virtually completed, and the main preparation mission for the Irrigation Rehabilitation Project (Workshops Component) was carried out. Discussions were held with Irrigation Department (ID) on the proposed Irrawaddy Delta Computer Model Study (Phase II). A field trip was made to Mandalay, Meiktilla and Prome to inspect workshops and mechanical facilities.

2. Visits were made to UNDP, USAID, and to OECF (Japan) Representatives. The FAO Representative was kept briefed on the mission activities. An Aide-Mémoire was left with the DG/ID reviewing the mission's findings and recommendations.

## A. Paddylands Development III Project

Background

3. The project was prepared by FAO/CP in November 1982. As initially conceived, the proposed project comprised the flood protection and drainage of a single polder of gross area 237,500 ac situated to the immediate southwest of Rangoon. At present it is subjected to excessive flooding over some 26,000 ac and tidal inundation over a further 4,000 ac. The monsoon paddy crop predominates, with only minor garden scale irrigation on patches of lighter soils adjacent to the hills to the west. There are no all weather feeder roads, and domestic drinking water is in very short supply over much of the area in the dry season.

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1/ A.F.E. Zagni (Irrigation Engineer and Mission Leader);
M. Elling (Project Analyst);
J. de Vos (Workshops Consultant);
G.H. Erkelens (Structural Engineering Consultant).

AFEZ:ap
BK 103/2.9 (BUR)(Paddylands)
(Irrigation Rehab.)

cc: Veraart, WB (8)
FAO Rep., Rangoon
UNDP Rep., Rangoon
All Team Members
Zagni (chron.)
RDG DDC

4. Peripheral embankments would be constructed with tidally controlled flap-gated structures at drainage creek outlets. The major arterial creek, the Bassein Creek, running through the project area would be closed at each end and would act as a major collector drain. Interconnecting channels between the six drainage basins would permit the distribution of fresh water throughout the project for domestic and irrigation requirements. Two sources of fresh water were identified: that near Twante in the north remaining fresh until late January, and that at Kungyangon in the south until late February. Lack of data has prevented the projection of a safe abstraction volume. As a result of the project, the production of HYV paddy would increase by some 96,000 ac, all waste land would be reclaimed, and some 8,000 ac of chick peas (gram) might be irrigated. Due to the heavy puddled clay soils and the very limited period of fresh water availability, only this crop was considered for irrigation.

5. In October 1983, the GOB decreed that the Bassein Creek may not be closed due to its designation as a reserve waterway for inland navigation. This decision was made in spite of excessive siltation which has occurred in recent years, to the extent that in the middle ten miles or so it is silted almost to ground level.

Mission Activities

6. In view of the important role the Bassein Creek was to have played in the drainage configuration of the southern part of the project, a redesign of the affected areas became necessary. It was proposed to include a drainage consultant in the mission to assist Irrigation Department (ID) engineers in this redesign using the topographic and creek survey data held in ID. GOB however declined to approve his inclusion, on the grounds that ID staff would carry out the redesign without FAO/CP assistance. This was done to a drainage scheme agreed with the present mission, but time constraints precluded a detailed examination of the ID engineers' calculations. In this new scheme, the entire Bassein Creek would be double embanked, and much of the drainage previously designated to enter the creek would be diverted through outlet structures into the Rangoon River and the China Bakir River. It is anticipated that the costs of both solutions would be similar.

7. As the production of irrigated chick peas is likely to make an important contribution to project viability, a further review was made of the export and price statistics of this crop. This indicated a rapidly rising trend in exports.

Further Activities

8. The mission recommended to ID a programme of site investigations prior to appraisal at the newly located structure sites to assess the foundation conditions.

9. FAO/CP will produce an Addendum to the report of November 1982 showing the revised drainage scheme, equipment requirements, irrigation potential, costs and benefits, and economic analysis.

10. DG/ID has indicated that GOB will request WB to appraise the project in February/March 1984.

## B. Irrigation Rehabilitation Project (Ye-U System)

Background

11. The Ye-U system of the Mu (Kabo) Project, situated in Sagaing Division in Upper Burma, was constructed in the first decade of this century, and originally commanded some 128,000 ac on the right bank of the Mu River. On the left bank, and deriving its water supply from the same headworks at Kabo, the Shwebo system originally commanded some 232,000 ac. The system operates under run-of-river conditions. It is now much deteriorated and contains copious silt and sand deposits. The GOB has requested World Bank to assist in financing its rehabilitation.

12. FAO/CP was requested to assist ID in project preparation. Engineering consultants (Messrs. Euroconsult) were retained to carry out the engineering studies with UNDP financing, working under the supervision of FAO/CP. They carried out their assignment from November 1982 through July 1983, when their draft engineering report was submitted. Following comments from ID and FAO/CP, their final report was submitted in October 1983. This will provide supporting engineering information to the FAO/CP report.

Mission Activities

13. During the data collection/preparation missions of February/March and June 1983, ID was requested to carry out discharge measurements in the drainage creeks of the project area with a view to reusing return flows and cross drainage in periods of low river flows, to check the Kabo weir calibration formula on which discharge records are based, to measure sediment loads in the river, and to carry out soil percolation tests under field conditions during the monsoon. This information was reviewed and assessed during the current mission.

14. The UNDP-financed Groundwater Project has been carrying out drilling and test pumping in the project area during the study period with a view to the combined use of groundwater and river flows. The mission held discussions with the ID and consultant hydrogeologists in this project, and received their interim report, safe yield estimates, well design criteria, and well costs.

15. Discussions were held with ID staff to finalise the proposed construction organisation, O & M organisation and costs, and the revised establishment of ID. Information on alternative sources of road surfacing material is still pending, and without this information the report cannot be finalised.

16. Soils, present land use, land classification and infrastructure maps of the project area were compiled and drawn to the FAO/CP base map format by the soils section of ID.

17. The mission leader visited Bangkok on 12/13 November en route to Rome to discuss final amendments to the computer simulation of the project with Mr. J. Kreuze (consultant). This was required following observations of apparent anomalies in previous runs, and to improve the rainfall inputs to give more representative cover.

Further Activities

18. All information is now available to finalise the project configuration by computer model. Following the receipt of further information on sources of road surfacing material, the project can be costed and analysed. It is anticipated that report production will be complete by end February 1984.

19. DG/ID has indicated that GOB plans to request appraisal by WB in late 1984.

C. Irrigation Rehabilitation Project (Workshops Component)

Background

20. ID possesses about 2,500 items of mechanical equipment, of which only some 1,400 are operational or awaiting repair. Workshop buildings are unsatisfactory and lack adequate machine shop facilities, tools and materials. Installed electric power, water supply, internal communications and staff facilities are deficient. Spare parts are in very short supply due to lack of foreign exchange and the tedious procurement procedures.

21. All construction and maintenance activities (with the exception of Kinda Dam) are carried out by ID on force account. The Mechanical Branch (MB/ID) has a competent and well qualified establishment of senior staff, but its operating, repair, stores and support staff is under strength and of low standards of training. This together

with the problems of maintaining equipment in work due to the inadequate repair facilities makes it difficult for MB/ID to sustain the demands imposed on it by the construction and maintenance requirements of ID.

22. In order to correct this adverse situation and to increase machine output, to reduce repair costs and to reduce the requirement for new machines, GOB has considered making a request to WB to assist in the financing of the rehabilitation of its repair facilities, to provide foreign exchange for spare parts, and to provide technical assistance for training activities.

23. FAO/CP was requested by DG/ID to review the status of the MB/ID in all its aspect in order that he might appreciate the extent of the shortcomings, and to assist him in formulating a programme of rehabilitation within acceptable cost limitations. In response, a FAO/CP mission (Mr. de Vos) visited Burma in May 1983, and submitted an identification report in June.

Mission Activities

24. Following the scrutiny of the identification report by both ID and WB, FAO/CP was requested to proceed with full project preparation consistent with the proposals presented in the report. The mission visited the MB/ID facilities at base/regional workshop and main stores in Rangoon, the regional workshops at Mandalay, Meiktilla and Prome, and the site workshop at Sedawgyi Dam. Based on these visits, new workshop building sites were located and a programme of site investigations recommended to ID. The water, electric power, communications, and fuel/lubricant services at each site were inspected, and uprating to required levels was recommended. Preliminary structural design of buildings was carried out, and unit rates for construction agreed with ID.

25. An in-depth study of the present ID equipment holdings and its status was made. Based on this and projections of future work programmes, analysis was made of equipment requirements and availability, and of the repair facilities, spares and training requirements. The planned reorganisation of ID was tentatively discussed.

Mission Recommendations

26. The mission has recommended the rationalisation of workshops, rather than the present widely dispersed repair and overhaul activities. This would confine the overhaul of heavy engines and undercarriages to Base Workshop, Rangoon, and the overhaul of light engines to Regional Workshop, Meiktilla. New workshop buildings with adequate installed equipment would be provided for these, and for other Regional Workshops at Mandalay, Prome and Rangoon.

27. A training programme is required, in which it is envisaged that a similar organisation to MB/ID in a developed country might act in association with it to provide expert instructors in plant operation, repair and maintenance, stores procedures and management. Fellowships would be provided to permit Burmese staff and technicians to visit the associated organisation for on-the-job and advanced training. Training facilities in MB/ID would be suitably uprated.

28. Spare parts to repair the existing equipment still within its economic life would be provided, together with workshop consumable materials and tools.

29. Having provided modern repair facilities and training, and having brought back into service presently broken down equipment, there will be a subsequent demand for continuing spare parts supply if the project is to be successful. It is tentatively estimated that this could amount to some $12 M just to maintain the rationalised future equipment establishment. The mission noted that most ID equipment is of Japanese or American origin, and it may be appropriate that the follow-up running spares requirement might be supplied through bilateral aid from these two countries. The mission held exploratory discussions with both OECF (Japan) and USAID representatives, at which both expressed interest in the proposal. These possible sources of joint financing could be further explored at appraisal.

Further Activities

30. Report preparation is scheduled during November/December 1983. DG/ID has indicated that if GOB finds the proposals outlined in the FAO/CP report acceptable, it will request WB appraisal concurrently with the Ye-U System component in late 1984 under the same credit.

ZCZC DIS7071 UUTZAIV
DTG?
WHEN REPLYING TO THIS MESSAGE REFER TO : TOP AT
ASADC ASE3A

642-BA.
cc. 835-BA.
cc. BA-Irrig Rehab & Maint.
Division 'A' cc / BA-Paddyland Dev.(3)

Log No. 2275
Dated 11/17
Action

21318 DPBUR BM

17 NOVEMBER 1983
TO: INTRAFRAD WASHINGTON DC

MISC2091 FOR YOON RE BURMA IRRIGATION PROJECTS FROM AZUMI

AAA YOU MIGHT HAVE ALREADY BEEN INFORMED BY ZAGNI (FAO/CP) BUT I WISH TO REPORT THAT IRRIGATION DEPARTMENT WISHES PADDY III BE APPRAISED IN FEBRUARY 84. APPARENTLY PROJECT IS ALREADY INCLUDED IN GOB FY84/85 BUDGET (WITH MAF CONCURRENCE BUT PERHAPS NOT YET WITH FINANCE MINISTRY). ID ALSO WISHES IRRIGATION REHAB PROJECT BE APPRAISED AROUND NOVEMBER/DECEMBER 84. YOU MAY WISH TO CONFIRM ABOVE WITH BURMESE DELEGATION CURRENTLY IN WASHINGTON.

BBB REPORT ON BENCH-MARK SURVEY FOR LOWER BURMA PADDY LAND DEVELOPMENT PROJECTS (SEPTEMBER 1983) IS NOW AVAILABLE. THIS REPORT HAS BEEN PREPARED BY PROJECT BENEFIT MONITORING UNIT UNDER MAF TO (1) PROVIDE INFORMATION ON THE IMPACT OF PADDY I AND II ACTIVITIES ON FARMERS IN THE PROJECT AREA AND (2) ESTABLISH A BASELINE FOR FUTURE MONITORING OF THE IMPACT OF PADDY I, II AND III. THE REPORT APPEARS VERY USEFUL FOR PADDY III APPRAISAL.

REGARDS.

(UNDEVPRO RANGOON)
COL CKD

184271 0909 171183 00590057 0905
01890109 480

1. Cir to all P.O.s on Burma
1. Urgently to discuss with
4 Khine Mang Latt.

NNNN

October 20, 1983

Mr. M. Veraart, AGR

Tae-Hee Yoon, Chief, ASPAA

3-2360/1

BA-Paddyland Develop (3)

Telex to FAO, Rome

Please send the following telex to FAO/CP, Rome.

"FOLLOWING TELEX SENT TO DIRECTOR GENERAL, IRRIGATION DEPARTMENT ON OCTOBER 19 QUOTE RE PADDY III. YOUR TEL 23 SEPTEMBER 1983 TO MR. FENN ROME, COPY TO US, PROPOSING CHANGES IN THE DESIGN OF THE PADDY III DRAINAGE SYSTEM TO EXCLUDE CLOSURE OF THE BASSEIN CREEK. WHILE WE HAVE NO OBJECTION IN PRINCIPLE TO THE ALTERNATIVE PROPOSED, WE BELIEVE A FULL REVIEW OF IMPLICATIONS FOR DESIGN OF DRAINAGE SYSTEM WILL BE REQUIRED PRIOR TO APPRAISAL. WE DO NOT THEREFORE UNDERSTAND REASON FOR YOUR NOT APPROVING INCLUSION OF DRAINAGE ENGINEER ON ZAGNI'S MISSION. GRATEFUL IF YOU WOULD RECONSIDER YOUR DECISION OR MAKE ALTERNATIVE ARRANGEMENTS SINCE THIS ESSENTIAL PREPARATION ACTIVITY WOULD HAVE TO BE UNDERTAKEN PRIOR TO PROJECT APPRAISAL. WARM REGARDS, YOON UNQUOTE. REGARDS, YOON

cc: Messrs. Baker, Unhanand, Tamboli

BJBerkoff/jcj

FORM NO. 27 - OCR
(3/82)

**WORLD BANK OUTGOING MESSAGE FORM Cable, Telex**

**ORTANT—PLEASE READ INSTRUCTIONS BELOW BEF TYPING FORM**

R

Typewritten Character Must Fall Completely In Box!

PAGE 1 OF 1

OFFICIAL DEPT/DIV ABBREVIATION: 32373

MESSAGE NUMBER

TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

DIRECTOR GENERAL, IRRIGATION DEPARTMENT, RANGOON, BURMA

RE PADDY III. YOUR TEL 23 SEPTEMBER 1983 TO MR. FENN ROME, COPY TO US, PROPOSING CHANGES IN THE DESIGN OF THE PADDY III DRAINAGE SYSTEM TO EXCLUDE CLOSURE OF THE BASSEIN CREEK. WHILE WE HAVE NO OBJECTION IN PRINCIPLE TO THE ALTERNATIVE PROPOSED, WE BELIEVE A FULL REVIEW OF IMPLICATIONS FOR DESIGN OF DRAINAGE SYSTEM WILL BE REQUIRED PRIOR TO APPRAISAL. WE DO NOT THEREFORE UNDERSTAND REASON FOR YOUR NOT APPROVING INCLUSION OF DRAINAGE ENGINEER ON ZAGNI'S MISSION. GRATEFUL IF YOU WOULD RECONSIDER YOUR DECISION OR MAKE ALTERNATIVE ARRANGEMENTS SINCE THIS ESSENTIAL PREPARATION ACTIVITY WOULD HAVE TO BE UNDERTAKEN PRIOR TO PROJECT APPRAISAL. WARM REGARDS, YOON.

BA- paddyland Develop (3)

END OF TEXT

PINK AREA TO BE LEFT BLANK AT ALL TIMES

INFORMATION BELOW NOT TO BE TRANSMITTED

CLASS OF SERVICE: TELEX 713 TELEX NO: 21217 IRRBUR DATE: Oct. 19, 1983

SUBJECT: BURMA - Paddylands III Project

DRAFTED BY: DJWBerkoff/jcj

EXTENSION: 32373

CLEARANCES AND COPY DISTRIBUTION:

Cleared with & cc: Messrs. Baker, Unhanand

cc: Mr. Tamboli

AUTHORIZED BY (Name and Signature): T.H. Yoon, Chief, Irrigation I

DEPARTMENT: South Asia Projects

SECTION BELOW FOR USE OF CABLE SECTION

CHECKED FOR DISPATCH

DISTRIBUTION: WHITE—File Copy CANARY—Bill Copy WHITE—Transmittal Copy BLUE—Originator to Keep

BA-Paddyland (3)
BA-Irrig. Rehab.

# OFFICE MEMORANDUM

TO: Mr. M. Elling, Economist
Service II, DDCB

DATE: 3 October 1983

FROM: H. Groenewold
Chief, Service II, DDCB

SUBJECT: BURMA - Paddylands Development III Project
Irrigation Rehabilitation Project - Terms of Reference

1. On or about 22 October you will travel to Burma and join the missions preparing the above projects led by Mr. Zagni.

2. Due to conditions imposed by the Government of Burma (GOB) since the preparation of Paddylands III project in November 1982, a redesign of certain elements of the drainage system will be required. It is intended that this redesign will be carried out in Rangoon. You should assist the Drainage Engineer with recosting this element, including notional and actual costs of using used and new machinery.

3. You should collect any outstanding economic and socio-economic data for Irrigation Rehabilitation Project (Ye-U Irrigation System). You should be briefed by Mr. Vita, DDC before your departure.

4. You should assist with the data collection for the Irrigation Rehabilitation Project (Workshop/Equipment Component). In particular, you should ensure, in conjunction with Mr. de Vos (workshop consultant), that you obtain sufficient data to permit a meaningful projection to be made of financial and economic benefits arising from the planned rehabilitation.

5. You should apportion your time over the above three projects as directed by Mr. Zagni. It is likely that field visits will be required.

6. On return to Rome you will assist in the economic analysis of the revised configuration of the Paddyland III project.

---

cc: Veraart, WB
Groenewold (2)
Fernando
Fenn
Sugimura
Vita
Zagni (chron.)
RDG DDC (3)

EK 103/2.9 BUR
PE 13/1 - Elling, E.
AFEZ:ap

RECEIVED
OCT 14 1983

cc: Messrs. Yoon (1)
Santis (1)
LeNoigné (1)

BA - Paddyland (3)

FAO
联合国粮食及农业组织 | FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS | ORGANISATION DES NATIONS UNIES POUR L'ALIMENTATION ET L'AGRICULTURE | ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION | منظمة الأغذية والزراعة للأمم المتحدة

Via delle Terme di Caracalla, 00100 Rome, Italy | Cables: FOODAGRI ROME | Telex: 610181 FAO I | Telephone: 57971

Ref.: BR 103/2.9 BUR

Mr. Yoon
We agreed that Mr. Zagni should take a drainage engineer to Burma DTW 10/7.

29 SEP 1983

SAIC.

Dear Tae-Hee,

BURMA: Paddylands III Project

You will have seen the telex of 23 September from the Director-General of Irrigation, Rangoon, which was addressed to us and copied to you.

We are of course disappointed at this further unforeseen complication. Although the message says that Mr. Unhanand has discussed and supported the new design proposal, we would like to confirm your Division's views, especially as Tony Zagni has serious misgivings as expressed in the attached memo to me. He has also discussed the matter by 'phone with Jeremy Berkoff.

If you are inclined to accept the Burmese proposals, we can engage a drainage consultant to accompany Tony Zagni on his next visit to Burma with a view to incorporating the changes in the project preparation. This would obviously delay further the issue of our report addendum by about two months.

Alternatively, we can issue our report addendum as it stands now; Zagni can discuss the matter with the ID on his visit and then recommend whether the changes should be incorporated before, or at, appraisal.

Can you please let us have your advice quickly so that, if necessary, we can recruit the drainage specialist.

With kind regards,

Yours sincerely,

Maurice Fenn
Chief, Service II
FAO/World Bank Cooperative Programme
Investment Centre

P.S. I gave Aida Eid your envelope.

Mr. Tae-Hee Yoon
Chief, Irrigation I Division
Projects Department (ASP)
The World Bank
1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

Division 'A'
Log No. 1788
Date Rec'd 10/5
Order/Info

# OFFICE MEMORANDUM

TO: Mr. Maurice Fenn
Chief, Service II, DDCB

DATE: 27 September 1983

FROM: A.F.E. Zagni
Service II, DDCB

SUBJECT: BURMA - Paddylands III Project

1. I attach a copy of a telex received today from the Director General, Irrigation Department, which has caused me some concern. As you know, I have already spent some two weeks of additional work on the addendum to our November 1982 preparation report, following our discussions with Mr. Berkoff and the problems over re-siting the structure at the north end of Bassein Creek. It is unfortunate that the ID could not have advised us sooner so this time would not have been wasted.

2. I would like to make various comments on the contents of the telex as follows:

(i) It is proposed to embank the Bassein Creek on both banks, such that the creek again becomes a navigable water way and yet does not inundate the project lands at high tides. The reopening of the creek will be a major dredging operation. The central 10 miles or so is totally silted such that one can now walk across the old course. By embanking, the siltation process would be accelerated, and it is doubtful if Inland Waterway Department realise what they are taking on with respect to maintenance.

(ii) I am totally opposed to the concept of evacuating drainage water into the Bassein Creek through small culvert sluices, or indeed any type of sluice. As it is by no means certain that the creek will be maintained, a clear drainage route would not be guaranteed. In addition, the small drainage culvert sluices as now constructed are of very poor quality pipes, leading to two collapses so far in other similar projects. Any further such structures should be properly designed and constructed to internationally accepted standards.

AFEZ:ap
BK 103/2.9 BUR

cc: Zagni (chron.)
RDG DDC (2)

(iii) It is my strong recommendation that the drainage system be redesigned on the following lines such that the Bassein Creek is not used:

- Drainage Basin 3; west side to the N-S conveyor evacuating at Kungyangon, east side to one or two structures on the Rangoon River;

- Drainage Basin 4; north-west side to NS conveyor, south-west side to China Bakir River, south-east side to China Bakir river.

For this I anticipate the requirement of a drainage expert for about two weeks in the field (including report writing).

(iv) It should be understood that the south-east polder of approximately one third the project area would be isolated from fresh water supplies, and it would thus have no irrigation and much reduced domestic water potential.

(v) I am not convinced that large savings would result in view of the additional embanking and drainage channel requirements. The only tangible savings are the two closures and the dredging of the creek, say $2 M plus machinery. To embank 42 km on each side of the creek would cost some $0.5 M plus machinery, and to enlarge planned and existing drainage channels with new sections requiring some 1.5 M cyd excavation would cost some $0.2 M plus machinery. It should be recalled that the machinery element of the two closures was very nominal, and I would anticipate very little difference in cost between the two alternatives.

3. I propose that a drainage specialist be recruited immediately to meet me in Rangoon on my forthcoming mission to examine the redesign the ID claims to have made. We would then be in a position to complete the addendum immediately after the mission such that Bank may appraise in December if they are requested by GOB.

# INCOMING TELEGRAM

| Action | Date | No. | Filing Codes |
|---|---|---|---|
| DDC FENN | 23/9 | 215 | BK 103/2.9 BUR Paddyland |

23/Q9 Q8.13 +
51Q181 FAO I+
51Q181 FAO I

cc:

T CENT
CONTROL N
RECEIVED: 23 SEP 1983

1. For Action: Initia
1. Fenn
2. Fernando
Orakien
Cromewold

TO : MR. FENN, FAO ROME.

COPY TO DR. YOON WORLD BANK WASHINGTON DC USA.

FM : DIRECTOR GENERAL IRRIGATION DEPARTMENT RANGOON BURMA.
TLX NO. 21217 IRRBUR BM.

SL NO : 8378Q/ID
DT : 23RD SEP 83.

PLS CONVEY THE FOLLOWING TO DR. ZAGNI RE PADDYLAND III PROJECT BURMA (.)

AAA OWING TO THE RECENT DEVELOPMENT OF INLAND WATERWAYS DEPT PLAN TO REHABILITATE N REUSE BASSEIN CREEK FOR STEAMERS BASSEIN CREEK CLOSURE HAS TO BE ALTERED (.)

BBB WE MAKE SMALL ALTERATION BY DOUBLE EMBANKING ALONG THE CREEK, REDIVERTING MIDDLE PORTION DRAINAGE TO RGN N KUNGYANGON CREEK N PROVIDING ONE WAY SMALL CULVERT SLUICES ALONG EMBANKMENTS USING FAO/CP DRAINAGE CRITERIA (.) THIS ELIMINATE BASSEIN CREEK CLOSURES AWA 2 MAJOR SLUICES AT ITS MOUTHS (.)

CCC BY BASIC CIVIL WORK COST USING SAME UNIT RATES DELETING CLOSURE, STRUCTURES N DREDGING SAVE 32 MILLION KYATS AGAINST 16[illegible]LION FOR DOUBLE EMBANKING N SMALL SLUICES OF 1Q NOS (.)

DDD SAVING ON EQUIPMENT N SPARES IS AGAIN ABOUT KYAT 2.7 MILLION (.)

EEE NEW ALTERNATIVE WAS DISCUSSED WITH MR K. UNHANAND (WB) ARRIVED RGN RECENTLY N HE PREFERRED OUR NEW ALT. (.) ALTERATION MAP RELEVANT COST N EQUIPMENT WORKING ABSTRACT TABLES ARE GIVEN THRU HIM FOR UR PERUSAL (.)

FFF HOPE THAT U CONCUR WITH OUR DECISION DUE TO UNAVOIDABLE CIRCUMSTANCES N WILL PRESENT DETAIL WORKING UPON UR ARRIVAL IN OCTOBER (.)

GGG THIS MESSAGE HAS BEEN ALSO SENT TO DR. YOON OF WB.

000215

WARM REGARDS.

+
61Q181 FAO I

21217 IRRBUR BMMMM.5

BA - Paddyland 3

September 28, 1983

Mr. A. Zagni
Asia and Pacific Service
FAO/World Bank Cooperative Program
Investment Centre
Via delle Terme di Caracalla
00100 Rome

Dear Tony,

BURMA - Proposed Paddylands III Project

1 Doc. #241,587 C.

1. As promised, I enclose a set of the working tables and the map given to Komain Unhanand by the Irrigation Department setting out their revised proposals based on double embanking of the Bassein Creek. As you can see, they present fairly rough estimates and the ID does not appear to have worked on these proposals in great depth. While Komain agreed that these proposals should be reviewed further because of certain advantages as explained to him by the ID officials, he certainly did not say - as stated in the GOB telex - that he 'preferred' them to your original proposals. He simply did not have the technical information to make such a judgement.

2. By now you will have received our telex agreeing to your suggestion that a drainage engineer should accompany you on your forthcoming mission and that, in the light of your review, you should prepare a second addendum to your report. I'm really sorry that you cannot finally finish this thing off - however, with the second addendum, the appraisal mission will have an excellently prepared project.

3. I do not know how far you can go in contacting the Inland Waterways Department. Whether or not they have prepared a formal plan to re-open the Bassein Creek (which I find hard to believe is a viable possibility), the Irrigation Department may well have cold feet about precluding this for all time. Furthermore, they will also be worried about the proposed closures and the poor foundations for the two proposed regulators in the Bassein Creek as obtained from the site investigations, and the revised proposals would minimize their risks.

All the best and I hope you have a good mission.

Yours sincerely,

D.J.W. Berkoff
Senior Economist
Irrigation I Division
South Asia Projects Department

Attachment

Cleared with & cc: Mr. Unhanand
cc: Messrs. Baker, Hatendi

DJWBerkoff/jcj

NNNN → SAIC ←

I. Bautista 9/27 - Mr Zagni will look into this on his mission: we should let him have his comments after Konrad's return

V. Unhanand 9/12 See notes below.

File 7

Let's discuss

9/26/83

ZCZC DIST3686 RCA3386
DIST
WHEN REPLYING TO THIS MESSAGE REFER TO : TCP MC
ASPAA ASADC

1983 SEP 23 PM 4:21

BA - Paddyland (3)

Division 'A'

Log No. 1691

Date Rec'd 9/26

Action/Info

RCA3386
248423 WORLDBANK

TO : MR. FENN, FAO ROME.

COPY TO DR. YOON WORLD BANK WASHINGTON DC USA.

FM : DIRECTOR GENERAL IRRIGATION DEPARTMENT RANGOON BURMA.
TLX NO. 21217 IRRBUR BM.

SL NO : 83781/ID
DT : 23RD SEP 83.

PLS CONVEY THE FOLLOWING TO DR. ZAGNI RE PADDYLAND III PROJECT BURMA (.)

AAA OWING TO THE RECENT DEVELOPMENT OF INLAND WATERWAYS DEPT PLAN TO REHABILITATE N REUSE BASSEIN CREEK FOR STEAMERS BASSEIN CREEK CLOSURE HAS TO BE ALTERED (.)

BBB WE MAKE SMALL ALTERATION BY DOUBLE EMBANKING ALONG THE CREEK, REDIVERTING MIDDLE PORTION DRAINAGE TO RGN N KUNGYANGON CREEK N PROVIDING ONE WAY SMALL CULVERT SLUICES ALONG EMBANKMENTS USING FAO/CP DRAINAGE CRITERIA (.) THIS ELIMINATE BASSEIN CREEK CLOSURES AWA 2 MAJOR SLUICES AT ITS MOUTHS (.)

CCC BY BASIC CIVIL WORK COST USING SAME UNIT RATES DELETING CLOSURE, STRUCTURES N DREDGING SAVE 32 MILLION KYATS AGAINST 16 MILLION FOR DOUBLE EMBANKING N SMALL SLUICES OF 10 NOS (.)

DDD SAVING ON EQUIPMENT N SPARES IS AGAIN ABOUT KYAT 2.7 MILLION (.)

EEE NEW ALTERNATIVE WAS DISCUSSED WITH MR K. UNHANAND (WB) ARRIVED RGN RECENTLY N HE PREFERRED OUR NEW ALT. (.) ALTERATION MAP RELEVANT COST N EQUIPMENT WORKING ABSTRACT TABLES ARE GIVEN THRU HIM FOR UR PERUSAL (.)

FFF HOPE THAT U CONCUR WITH OUR DECISION DUE TO UNAVOIDABLE CIRCUMSTANCES N WILL PRESENT DETAIL WORKING UPON UR ARRIVAL IN OCTOBER (.)

GGG THIS MESSAGE HAS BEEN ALSO SENT TO DR. YOON OF WB.

WARM REGARDS.

248423 WORLDBANK

21217 IRRBUR BMMM..

(1) U Thein Tun and Dr. Ong Myint discussed with me about the possible alternative described in BBB.

(2) Since technical information was not available for review at that time, I indicated that I had no objection if they pursue the investigation further and should inform FAO/CP. K. Unhanand Sep. 28, '83

SAIC

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM 725-BD

TO: Mr. K. Unhanand, ASPAA

DATE: September 8, 1983

FROM: Tae-Hee Yoon, Chief, ASPAA

BA- paddyland Dev (3)
BA- Irrig Rehab & Maintenance

SUBJECT: BANGLADESH: Supervision - Muhuri Irrigation Project Cr. 725-BD
BURMA: Preparation - Paddyland III Project
Irrigation Rehabilitation Project
Terms of Reference

1. On or about September 13, 1983 you should arrive in Dhaka where you will be joined by Mr. G. A. Greenwood, who should arrive Dhaka on the same day under separate terms of reference, for the review of the final design and tender documents for the Feni River Closure Dam, Muhuri Irrigation Project. In particular the mission should give special attention to:

(a) reviewing the design and providing appropriate comments;

(b) reviewing the implementation schedule for the construction of the closure dam and provide guidance as appropriate; and

(c) reviewing tender documents for the dam and provide guidance for modification as necessary in order to permit a prompt issuance of the tender documents.

2. On or about September 20, you should arrive in Rangoon where you will review progress of the preparation of Paddyland III Project and the Irrigation Rehabilitation Project.

3. Upon completing your mission on or about September 23, you will return to Washington where you will prepare a back-to-office report.

4. While in Bangladesh you should keep close liaison with the Resident Mission.

Cleared with and cc: Ms. Schaengold and Mr. Hatendi

cc: Messrs. West, Holsen (ASNVP); Wiehen (ASA);
Pilvin, Jansen (ASADR);
Thalwitz, Haynes, Nowicki, Saeed (ASPDR)(2);
Clift (ASADD)(3); Tsantis (ASADC);
Rajagapalan (2), Dickerson (PAS);
Yudelman (AGR); da Silva, Toft (LEG);
Gunnarsdottir (LOA)
Resident Mission (Dhaka)(4)
SAIC

KU
KUnhanand:cp

5. In each country visited, you should pay courtesy calls on the UNDP and FAO representatives to brief them of your activities.

6. On your return to Rome, you should submit a BTO, followed by the completion of the Irrigation Rehabilitation Project preparation report.

BD - Irrig - Barisal/P.
BA - Paddyland (3)

# OFFICE MEMORANDUM

DATE: 16 September 1983

BA - Irrig Rehab

EAPIC -

TO: Mr. A.F.E. Zagni
Irrigation Engineer, DDC

FROM: Maurice Fenn
Chief, Service II, DDCB

SUBJECT: BANGLADESH - Barisal/Patuakhali Project
INDONESIA - Technical Assistance to Water Resources Development
BURMA - Paddylands III Project and Irrigation Rehabilitation Project

1. You should travel to Bangladesh on or about 10 October and spend about two days reviewing progress on the designs and construction of the pilot project for the Barisal/Patuakhali project. In particular, you should discuss with the appropriate officers of World Bank Resident Mission the current status of low lift pump uptake in the country and the development of minor irrigation generally. You should review design criteria and associated problems with the consultants Northwest Hydraulics relating to the pilot project, and discuss these with Bangladesh Water Development Board. A visit to the project area is not required at this stage.

2. You will then proceed to Indonesia via Bangkok on about 14/15 October. In Bangkok, you should discuss the finalisation of computer simulation work on Burma-Irrigation Rehabilitation Project with Mr. Kreuze (consultant), who will be in Bangkok at that time. In Indonesia, you will join Mr. MacMillan, DDC, for meetings with Directorate General of Water Resources, World Bank, UNDP and FAO in connection with the establishment of a Technical Assistance element to DGWR. This is covered by separate TOR dated 9 August 1983.

3. You will then proceed to Burma on about 22 October, and mobilise the mission for the preparation of the workshop component of Irrigation Rehabilitation Project, covered by separate TOR dated 16 September 1983. In conjunction with your inputs to the workshop component, you will ensure that all remaining data and mapping for the irrigation component of Rehabilitation Project are obtained such that the report may be completed.

4. The outstanding site investigations for the proposed structures on the Bassein Creek are programmed by ID to be made in November as the final data requirement for the updating of Paddylands III preparation. You should press ID to carry out this work during your visit, and you should attend on site to assist in the location of suitable foundation conditions. Every effort should be made to carry the results to Rome for assessment by our structures consultant.

.../...

RECEIVED
SEP 26 1983
RDC, DDC

Bangladesh
Messrs. Yoon (1)
Clift (1)
Le Moigne (1)

AFEZ:ap
BK 103/2.9 BGD, INS, BUR
PE 13/1 - Zagni, A.F.E.

cc: Veraart, WB
Fernando
Fenn (6)
Granieri
Zagni (chron.)
MacMillan

August 19, 1983

Mr. D.C. Lefebvre
French Engineering Bureau
1825 Jefferson Place, N.W.
Washington, D.C. 20036

Burma - Irrig Rehab + maint.
(Burma - Paddy Land Dev 43)

Dear Mr. Lefebvre,

BURMA - Paddy III Project
Irrigation Rehabilitation Project

Thank you for your letter dated August 9, 1983. I fear the information provided to you is incorrect in respect of the two irrigation projects. Both the above projects are currently under preparation by the FAO/IBRD Cooperative Program, based in Rome. Engineering consultants' were recruited to assist the Cooperative Program in preparation of the Irrigation Rehabilitation Project but at this stage no further consultancies are envisaged. We expect to appraise the two projects during 1984/85. The exact timing of these two appraisals will be decided following discussions with the Burmese Authorities. It is possible that technical assistance components will be included once the projects are approved but the scope is likely to be limited. I doubt it would be worth your while but if you wish to enquire further, I suggest you write to:

U Maung Maung Kyi
Director General
Department of Irrigation
9/21 Strand Road
Rangoon, Burma

I have passed on your letter to Mr. Harold Brandreth, Division Chief, Power and Transportation Division, South Asia Projects Department, who may be able to assist you in connection with the Ports project.

Yours sincerely,

D.J.W. Berkoff
Senior Economist
Irrigation I Division
South Asia Projects Department

DJWBerkoff/jcj

# Wallace Evans and Partners

CONSULTING CIVIL AND STRUCTURAL ENGINEERS

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**OUR REF:** CJE/JD **YOUR REF:**

22nd July 1983

Mr Lars Vidaeus
Room A522
South Asia - Projects Department
The World Bank
1818 H Street N W
Washington D C 20433
U S A

BA - paddyland DW (3)

Dear Mr Vidaeus

re: Paddy III Project - Burma

We note from the latest edition of the World Bank Operational Summary that a new project is under consideration to increase paddy production in Burma through the construction of flood protection and drainage facilities, and we are writing to express our interest in providing consulting engineering services for this project. As you know, we have previously worked in Burma as consulting engineers for the Irrawaddy Fishing Port, and we have considerable experience in the fields of land reclamation, flood protection and drainage facilities.

Full details of our experience are given in our registration documents with the Bank, but if you would like any additional information, please let us know.

We would be grateful if you would let us have any further information about this project and in particular, who will be the implementing agency responsible for the appointment of consultants. We hope that we will have an opportunity of submitting a proposal for this project, particularly in view of our experience in Burma, and look forward to hearing from you,

I hope also that we shall have another opportunity of meeting again in the near future.

With kind personal regards,

Yours truly
For WALLACE EVANS & PARTNERS

C J Evans




*Also at*
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Burma - Paddyland Dev. (3)
July 19/83

Back to office report

Burma - Paddyland Dev. (3) SAIC
Burma - Irrigation Rehab. & Maintenance

# OFFICE MEMORANDUM

TO: Mr. Marius Veraart
FAO & IFAD Coordinator
Agriculture and Rural Development
Department, OPS
The World Bank, Washington, D.C.

DATE: 19 July 1983

FROM: Maurice Fenn
Chief, Service II, FAO/WB CP, Rome

SUBJECT: BURMA - Paddylands Development III Project
Irrigation Rehabilitation Project
Back-to-Office Report

... Please find enclosed herewith 8 copies of the Back-to-Office Report on the above mission.

cc: Messrs. Yoon (4)
Shibusawa (1)
Le Morgne (1)

BK 103/2.9 BUR

cc: RDG DDC (2)
Fenn (2)
Zagni (chron.)

Recd 7/27/83

# OFFICE MEMORANDUM

TO: Mr. Maurice Fenn
Chief, Service II, DDCB

DATE: 15 July 1983

FROM: A.F.E. Zagni
Service II, DDCB

SUBJECT: BURMA - Paddylands Development III Project
Irrigation Rehabilitation Project
Back-to-Office Report

General

1. Acting on Terms of Reference dated 20 May 1983, the mission 1/ visited Burma from 11 June to 2 July. During that period, it carried out further studies for the Paddylands III Project Preparation following World Bank comments on the preparation report, and continued data collection for Irrigation Rehabilitation project. A field visit was made to the Kungyangon, Kawhmu and Twante areas of Paddylands III project area.

2. Close liaison was maintained with the office of the FAO Representative, and a courtesy call was made to UNDP Representative.

## A. Paddylands III Project

Background

3. The project was prepared by FAO/CP during 1982, with report submission in November 1982. It has previously been described in BTOs dated 22 December 1981, 13 April 1982 and 6 July 1982.

4. As proposed in the report, it comprises a single polder of some 237,500 ac gross in area situated to the immediate southwest of Rangoon. At present it is subjected to excessive flooding over some 26,000 ac and tidal inundation over a further 4,000 ac. The monsoon paddy crop predominates, with only minor garden scale irrigation on patches of lighter soils adjacent to the hills to the west in the dry season, when domestic water is also in very short supply over much of the area. There are no all-weather feeder roads.

---

1/ A.F.E. Zagni (Irrigation Engineer and Mission Leader); M. Sugimura (Agronomist) and F. Vita (Project Analyst).

cc: Veraart, WB (8)
FAO Rep., Rangoon
UNDP Rep., Rangoon
All Team Members
Zagni (chron.)
RDC DDC

AFEZ:ap
BK 103/2.9 BUR (Paddylands Development)
(Irrigation Rehabilitation)

5. FAO/CP recommended that the peripheral embankments should be completed with the addition of tidally controlled flap-gated drainage structures. Arterial and field drainage channels would be provided, with interconnectors between the six drainage basins to permit the distribution of fresh water for domestic and irrigation requirements. The source of water at the northern end of the project area was thought to remain fresh at least until late February, thus coinciding with the irrigation season for chick peas (the only crop besides paddy deemed suitable on the heavy clay soils of the project). To improve the support services, limited surfaced feeder roads and agricultural extension services were included. As a result of the project, it was projected that HYV paddy would increase by about 96,000 ac, all waste and fallow land would be reclaimed, and some 22,000 ac of chick peas might be grown with irrigation.

6. Due to below-optimum support by the Burma Irrigation Department (ID), the preparation mission had reservations on the accuracy of topographic and hydrological data, and were particularly concerned that contrary to their recommendations no structure site investigations had been carried out. The World Bank (the potential financing agency) insisted that these data be improved before appraisal.

7. A World Bank pre-appraisal mission visited the project area briefly during March 1983, and based on information from farmers and local officials made the following observations:

(a) that paddy land is being progressively abandoned due to increasing flooding as a result of siltation of the Bassein Creek;

(b) that oil seeds and other upland crops besides chick peas are being irrigated in the project area and might constitute a significant second crop;

(c) that another potential source of fresh water for irrigation would appear to exist at the southern end of the project area at Kungyangon town from a creek joining the China Bakir river.

Mission Findings

8. The present mission made specific enquiries in the project area on the points raised in para 7 (a), (b) and (c) above. Their findings were:

(a) Based upon six years of village tract and ten years of township statistics, there is no discernable trend of paddyland being progressively abandoned;

(b) although some minor areas of oil seeds are being irrigated on a garden scale on lighter soils near the hills to the west there are, apart from Agricultural Corporation trials, none on the heavy clay soils;

(c) fresh water is known to be available at Kungyangon until the end of February, but the safe extraction limit before this may not be quantified due to the sensitivity of the saline front.

Thus only in item (c) is the mission able to amend the project concept to consider fresh water intake at Kungyangon in undefined quantities until late February.

9. The mission examined the results of additional tidal/salinity surveys, and found them to be adequate. The ID assured the mission that the topographic mapping had been checked, and had been amended where necessary with only minor changes. The site investigation analysis was partially complete and the results of standard penetration tests were presented. Laboratory analysis of collected samples had not been completed.

10. From the standard penetration results, it is apparent that the two proposed major drainage structure sites at each end of the Bassein Creek are underlain by sand and silt layers extending to considerable depth, thus rendering the sites highly unsuitable for such large structures. This is a major cause for concern, as the creek was regarded in the FAO/CP designs as the key element in the drainage system. The mission requested ID to attempt to find suitable sites close to those previously selected as soon as the area is dry enough following the end of the monsoon. Should this not prove possible, a redesign of the entire central and southern drainage network and embankments would be required, followed by revisions to the costs and economic analysis. The foundation conditions at the other four structure sites appear favourable.

Further Activities

11. The mission immediately contacted World Bank on its return and informed the pertinent projects division of the above findings. It was agreed that FAO/CP would revise the costs and benefits to 1983 values and carry out analysis assuming only minor shifts in the locations of the Bassein Creek structures. Potential irrigation supplies will be reassessed.

12. Should the further site investigations at these two sites indicate major relocations, a redesign of the drainage system would be required. This would be carried out only with the approval of World Bank.

## B. Irrigation Rehabilitation Project (Ye-U System, Mu (Kabo) Project)

Background

13. The background to the project preparation has been described in FTOs dated 13 April 1982, 6 July 1982, 2 November 1982, 21 December 1982, 25 January 1983 and 17 March 1983.

14. The Ye-U system of the Mu (Kabo) Project was constructed in the first decade of this century, and at that time commanded 128,000 ac on the right bank of the Mu river (Ye-U system) and 232,000 ac on the left bank (Shwebo system). The project operates under run-of-river conditions. The system is now much deteriorated and contains copious sand and silt deposits, and the Government of Burma (GOB) has requested

World Bank to assist in financing its rehabilitation, and FAO/CP to assist with project preparation.

15. Engineering consultants mobilised in mid-November 1982 carried out preliminary hydrological and computer studies to assess the adequacy of water resources in the Mu river. A positive indication was demonstrated in January 1983, and the feasibility study was commenced. GOB and World Bank directed that the Ye-U system would form Phase I of the programme for rehabilitation.

Mission Activities

16. This was the second full preparation mission. The mission completed much of the outstanding data collection, and worked closely with the consultants. All available data on the economics, socio-economics, agronomy and infrastructure were collected and assessed. The production of soils and present land use maps is continuing for completion by October 1983.

17. The engineering consultants, Messrs. Euroconsult, were in the course of draft report preparation. The mission reviewed the engineering designs, and ascertained that they were in accordance with recommendations presented by the previous mission. Those sections of the report which were completed were also reviewed. Their report production will continue until approximately mid-July 1983.

18. The mission presented ID with a further programme of monitoring during the monsoon season, such as infiltration tests, return flow measurements, offtake calibration, and cross-drainage flows. These will be completed by October 1983.

19. The mission held discussions with the ongoing Groundwater Project funded by UNDP. A good aquifer exists in the project area, and this will be considered as a possible supplemental source in the monsoon season, and for primary irrigation in the dry season.

Further Activities

20. Following the receipt of comments from GOB, World Bank and FAO/CP, the consultants will finalise their report in early September 1983. The mission leader and consultant structures/channels expert are scheduled to visit the consultant's office in Holland to consider any final modifications. A further mission to Burma is scheduled for the mission leader in October, and all outstanding data will be collected. Thereafter final analysis and report completion will be carried out, with submission anticipated in late January 1984.

## C. Irrigation Rehabilitation Project (Workshop Component)

### Background

21. The background to project preparation has been described in BTOs dated 17 March and 18 May 1983.

22. ID possesses some 2,408 items of construction equipment, of which only 1,418 are operational. Of the remainder, some 410 items are repairable but lack spare parts. The workshop repair facilities are severely deficient in buildings, fixed equipment, tools and materials. GOB has approached World Bank to assist in a programme to improve the workshop facilities and to overhaul items of equipment with remaining economic lives.

23. A FAO/CP mission visited Burma in April/May 1983 and thereafter prepared a discussion paper for consideration by GOB and World Bank.

### Mission Activities

24. The discussion paper was presented to ID, and the contents reviewed in some detail. Minor amendments were made on the basis of these. Further data requests were presented to Mechanical Circle, ID.

### Further Activities

25. The ID have undertaken to provide FAO/CP with clear guidelines for a full project preparation, should GOB approve the proposed project, by end July 1983. These would provide the basis for TORs for a full FAO/CP mission tentatively scheduled for October 1983.

BR - Paddylands L.U.(P)
BR - Irrigation Rehab. Project
July 15, 1983

Mr. Tae-Hee Yoon, Chief, ASPAA

D.J.W. Berkoff, ASPAA

BURMA - Paddylands III Project
Irrigation Rehabilitation Project
Irrigation Lending Program

1. As requested, I telephoned Mr. Zagni in Rome to discuss the outcome of his recent mission to Burma. The major points are summarized below.

Paddylands III

2. As forewarned in the telex from Mr. Fenn dated July 6, 1983, site investigations at the location of the two proposed closure dams on the Bassein creek have unfortunately revealed very poor foundation conditions. There appear to be two alternatives:

(a) To locate the closure dams at parallel sites to those initially proposed. This would only prove feasible if (i) foundation conditions are satisfactory, and (ii) the additional channel excavation required proved economic. It is not possible to schedule the necessary site investigations until after the monsoon season and therefore an answer cannot be obtained before November 1983 at the earliest.

(b) To dispense with the two major structures and to run embankments up both sides of the creek until simple closure procedures proved feasible. This would require redesign of the drainage system in the southern part of the project area and would increase costs. Such a redesign could be undertaken: (i) after the results of the site investigations discussed under (b) have been undertaken, or (ii) in advance of the latter, so that a prepared alternative is available when these investigations have been completed. Mr. Zagni estimates that one man month of FAO/CP time and one man month of consultant time (preferably that of Mr. Colombi - although he is currently in Bangladesh) would be required.

3. Mr. Zagni is currently reassessing the overall FAO/CP staffing position in respect of the Burma projects. It should be possible to provide for two man months within the present staff allocations and, if so, the redesign of the drainage system (alternative (b) above) could be undertaken in advance of the site investigations. However, I do not feel that much would be lost if such a redesign was delayed. While it

may still be technically possible to present the project to the Board this financial year (i.e. appraisal in December/January), the uncertainties are very considerable, and it seems preferable to schedule appraisal, taking into account other possibilities (para 8 below) early in calendar 1984 for Board presentation in FY85. If the November investigations prove negative, there would still be time to redesign the drainage system prior to an appraisal in, say, March 1984.

4. Mr. Zagni mentioned a number of other points in respect of Paddy III:

(a) Analysis of agricultural production data over the last ten years provides no basis for assuming that the situation in the project is deteriorating (as was suggested in my memo dated May 12, 1983).

(b) There does, however, appear to be fresh water at the Kunyangon structure site, at least until end-February (see the same memo). How much can only be determined by undertaking relevant tests but in Mr. Zagni's view the prospects are not promising. Nevertheless, provision for irrigation at the structure can be made at no significant cost and Mr. Zagni agrees that the irrigation component should be provided for on the basis suggested in my May 12 memo.

(c) FAO/CP will evaluate the effect of assuming HYV paddy varieties are grown throughout the project area although in their view farmers with an established agriculture as in the Paddy III area will continue to grow local varieties for their own consumption.

5. In due course, we can expect a memorandum from FAO/CP taking into account these various considerations and setting out their position with respect to the revisions necessary to the project evaluated in the Preparation Report.

Irrigation Rehabilitation (Mu (Kabo)) Project

6. Preparation of this project is broadly on schedule, although FAO/CP are still waiting for the final results of the land use mapping and soil infiltration exercises. In Mr. Zagni's view, the consultants have performed well and it should be possible to finalize the report by end-1983. This represents a slight delay relative to the original November date. As forwarned in previous memos, the project concept is likely to be fairly modest given the relatively limited potential benefits that are to be expected.

Workshop and Machinery Rehabilitation

7. Mr. Zagni is optimistic about this possible component. A final mission comprising Mr. de Vos (Consultant), Mr. Zagni and possibly an Architect (Consultant) is scheduled for September/October 1983, and a final report will be prepared in parallel with that of the Irrigation Rehabilitation (Mu (Kabo)) Project.

Conclusions

8. If the above target dates are met, then by early-1984, three possible projects/project components should be prepared in a form suitable for appraisal in, say, March 1984. It would be possible to combine the workshop rehabilitation component with either Paddy III or Rehabilitation (Mu (Kabo)) although Rehabilitation alone would comprise a fairly small project (possibly no more than $15-20 M in total). I recommend that the various options should be discussed with GOB in, say, January 1984, and that firm agreement should then be reached on which project should be given priority and when appraisal should take place.

9. According to Mr. Zagni, the Irrigation Department wishes to consolidate its investment program and is hesitant about investigating further projects. Nevertheless, they are considering a possible project on the Salin river which would comprise a storage dam together with rehabilitation of an existing system.1/ It is apparently envisaged that this should be prepared by the Consultants to be recruited under the Tanks I Project, possibly assisted (according to Mr. Zagni) by FAO/CP. This possibility could also be discussed with GOB in early 1984, and others could also be reviewed, for instance, a program for identifying further priority Paddy and Rehabilitation Projects.

cc: Messrs. Hatendi, Baker, Gupta, Azumi, Tamboli, Unhanand

1/ See the Irrigation Sector Review, dated September 7, 1982.

DJWBerkoff/jcj

Burma - Paddyland Dev. (3)

July 12/83

FAO
AIDE-MÉMOIRE

Decision memorandum

SAIC

联合国粮食及农业组织 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS ORGANISATION DES NATIONS UNIES POUR L'ALIMENTATION ET L'AGRICULTURE ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION منظمة الأغذية والزراعة للأمم المتحدة

Via delle Terme di Caracalla, 00100 Rome, Italy Cables: FOODAGRI ROME Telex: 610181 FAO I Telephone: 57971

Burma - Paddylands Dev. (3)
& Burma - Irrig. Rehab & Maintenance

Ref.: BK 103/2.9 BUR (Paddylands III)
(Irrigation Rehabilitation)

12 JUL 1983

Dear Jeremy:

BURMA - Paddylands III Project/Irrigation Rehabilitation Project

... I enclose my Aide Mémoire for the recent mission. From this, you will note that there is no evidence of land progressively being abandoned due to the siltation in Bassein Creek, that one cannot visualise under present technology the cultivation of diversified crops during the dry season, and that there is some potential for abstracting fresh water from Kungyangon, but the magnitude may not be anticipated. However, the salinity studies at Twante canal intake are such that with ponding of fresh water in the drainage creeks during the period of excessive salinity during February, and with the Kungyangon potential, significant irrigation potential still exists. This will be evaluated later.

The major hiccup in Paddy III is the most depressing site investigation results at both ends of Bassein Creek. I have suggested that ID carry out further tests in November after the monsoon to determine if the structures could be moved slightly yet not have excessive inlet/outlet channels. If this proves impracticable, then the alternative would be to abandon the two structures and the major closures, and to carry embankments up either side of the creek to a point where ID can close with their own resources. The drainage would then have to be taken to the Rangoon river and to Kungyangon, but the latter poses hazards for the town and marine craft. This would require a complete redesign of the drainage network.

U Thein Tun suggests that we should attempt to produce this alternative solution to have ready for appraisal, which he indicates should be in December 1983. We could of course do this, but I feel we should use the same methodology as before to be consistent, thus requiring several more weeks of consultant time for computer work. On the other hand, if you feel this would leave things too uncertain, it may be more appropriate to delay appraisal. My feeling is that the alternative solution would not significantly affect the economics as the drainage capacity must be the same regardless of outlet.

Mr. D.J.W. Berkoff
ASPAA
World Bank
1818 H Street N.W.
Washington, D.C. 20433
USA

These proposals were not included in the Aide Mémoire, as the site investigation results were not adequate when it was written to appreciate the seriousness of the situation.

As for Rehabilitation, there are further field records to be collected before we can make our final analysis, which will not be ready before October. U Thein Tun indicates that appraisal should not in any case occur before mid 1984, so we have adequate time. The first ERR trial for the 15,000 ac drainage only gave 13% with a large amount of machinery charged to that alone. This could be substantially improved with more economy of equipment. I thus feel we have a project, but no doubt trimmed to viability.

The workshop component discussion paper (copy en route) was well received by ID, who will advise us within a month of their requirements.

I hope these advance notes will give you the chance to programme any changes you feel appropriate, but would be grateful if you would continue to keep me advised so I know where to place the emphasis.

With best wishes.

Yours sincerely,

A.F.E. Zagni
FAO/World Bank Cooperative Programme

AIDE MEMOIRE

FAO/CP Mission June/July 1983

A. BURMA - Paddylands Development III Project.

FAO/CP has received various comments on its preparation report of November 1982 from IDA. In particular, IDA made observations on the following points:

(a) paddyland may be increasingly abandoned due to excessive flooding caused by progressive siltation of the Bassein Creek ,
(b) farmers would appear to be irrigating with water derived from the China Basin river, and
(c) oilseeds are being irrigated in the project area.

The implications of the above observations are that the future-without-project situation would show falling production; that fresh water may exist at Kungyangon to intake into the creek system for irrigation; and that diversified dry season cropping by irrigation may develop (rather than only chick peas as proposed by FAO/CP).

The mission, together with Irrigation Department Counterparts, collected additional data both in Rangoon and in the field. From the evidence presented, the following conclusions were drawn:

(a) there is no evidence of land becoming increasingly abandoned due to increased flooding;

(b) some fresh water exists in the Thongwa river at Kungyangon until late February and possibly after mid April, but the safe extraction limit may not be quantified without full scale checking,

(c) oil seed crops are being irrigated on very limited areas of lighter soils on the wash areas from the laterite hills to the west, and some 40 acres of trials on heavy clays and lighter soil (giving disappointing results).

The implications of these conclusions are that no declining production may be considered in economic analysis; that limited irrigation potential exists under controlled conditions at Kungyangon; and that under present technology oilseeds may not be considered as a dry season irrigated crop generally.

The mission examined the results of additional surveys carried out by ID, and comment as follows:

(a) The land form and creek surveys used to make preliminary designs are adequate for feasibility level;

(b) The site investigations at the major structure sites have been made, but full laboratory testing has not been completed;

(c) The tidal ganges have been correctly zeroed;

(d) The water levels/salinity patterns at the proposed Kanbe intake on the Twante Canal have been made;

(e) further site and materials investigations at the proposed closure sites on the Bassein Creek have not been made.

The mission requires the following additional information before the project preparation report can be updated;

(a) soil analysis results for the six structure sites, followed by redesign of structure foundations with costs by ID.

This should be forwarded to FAO Rome as soon as possible.

The mission recommends the following actions before appraisal:

(a) improved site and creek survey and materials survey at the two closure sites, based on criteria to be supplied by Mr. Jansen, consultant, early in the next dry season.

On its return to Rome and following receipt of the revised structure foundation designs and costings, the preparation report will be updated ready for IDA appraisal. This should be by end September 1983.

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

SAIC

Burma - Paddyland Dev. (3)

DATE June 24, 1983

TO Mr. K. Unhanand, ASPAA

FROM F.L. Hotes, Irrigation Adviser, AGR

EXTENSION 61762

SUBJECT BURMA - Lower Burma Paddylands Development III Project
Project Brief

1. This memo provides comments on the June 16, 1983 Project Brief on subject project.

2. The brief provides much useful information on the background for, and the present situation of the proposed project. The identified issues certainly are proper concerns. There are a few aspects which we would like to emphasize.

3. Appraisal Schedule. The p. 15 schedule appears to be premature. I question the ability to adequately complete the preparation of the project in the few months remaining before appraisal in October. A related question is whether detailed designs and tender documents could be ready by May 1984, for at least the first year of work.

4. Operation and Maintenance. Para 25 indicates that there is a question as to the capacity of ID to implement the project. Another question is whether or not the personnel, equipment, fuel and funds will be provided to adequately operate and maintain the project once completed. A thorough analysis of this should be made, with personnel staffing requirements, equipment and supply lists, and annual budget requirements clearly set forth. The sources of these also need to be fairly specific.

5. Will water user associations have a role to play? How? If not, why not?

cc: Messrs. Collins, Niaz, (AGR)

FLHotes:js

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

DATE: June 24, 1983

TO: Mr. K. Unhanand, ASPAA

FROM: F.L. Hotes, Irrigation Adviser, AGR

EXTENSION: 61762

SUBJECT: BURMA - Lower Burma Paddylands Development III Project
Project Brief

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5. Will water user associations have a role to play? How? If not, why not?

cc: Messrs. Collins, Niaz, (AGR)

FLHotes:js

BA-Paddyland (3)



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MR. YOON
MR. SHIBUSAWA

SAIC

IRICON SERVICE



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FAO/TXSWT/DDC /801/ 06.07.1983

NO. 145 FOR YOON BURMA PADDYLANDS III PROJECT.

ZAGNI MISSION JUST RETURNED FROM BURMA REPORT MAJOR TECHNICAL PROBLEM ARISING FROM SITE INVESTIGATIONS AT STRUCTURE SITES NORTH AND SOUTH BASSEIN CREEK. THESE SHOW VERY POOR FOUNDATION CONDITIONS WITH SANDS AND SILTS TO DEPTH. ZAGNI HAS REQUESTED ID TO MAKE ADDITIONAL TESTS TO SIDES OF PROPOSED SITES, BUT THIS NOT POSSIBLE UNTIL NOVEMBER. SHOULD IT PROVE THAT THE STRUCTURES WOULD HAVE TO BE MOVED AN EXCESSIVE DISTANCE FROM ORIGINAL INVOLVING LARGE ADDITIONAL CHANNEL CUTTING, THE ALTERNATIVE IS TO DISPENSE WITH THESE TWO STRUCTURES AND RUN EMBANKMENTS UP THE CREEKS TO POINTS WHERE SIMPLE CLOSURES COULD BE MADE. THIS WOULD MEAN COMPLETE REDESIGN OF CENTRAL AND SOUTHERN DRAINAGE NETWORK, USING OTHER STRUCTURES ON THE RANGOON RIVER AND AT KUNGYANGON. ID FAVOUR CARRYING OUT HTIS ALTERNATIVE DESIGN IN NEAR FUTURE TO HAVE READY IF SITE INVESTIGATIONS PROVE TO GIVE FURTHER POOR RESULTS. ZAGNI FEELS THAT THIS WOULD REQUIRE FURTHER SERVICES OF CONSULTANT AS COMPUTER WAS USED IN INITIAL DESIGN. GRATEFUL YOU CONSIDER

IF CP TIME JUSTIFIED IN THIS REDESIGN TO GIVE ALTERNATIVE SO APPRAISAL COULD TAKE PLACE IN DECEMBER 1983, OR IF YOU PREFER TO AWAIT OUTCOME OF NEW SITE INVESTIGATIONS IN NOVEMBER AND DELAY APPRAISAL UNTIL FEBRUARY-MARCH 1984. ZAGNI WILL BE AVAILABLE TO DISCUSS BY PHONE 12 THROUGH 15 JULY REGARDS

(FENN)

(FOODAGRI ROME TELEX 610181-610248)

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NNNN

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

BA - Paddyland Dev (3)

DATE: June 17, 1983

TO: Files

FROM: David Hatendi, ASADC

SUBJECT: BURMA - Paddy III

I have reviewed the Project Brief for the above project and have the following comments:

(i) To date there is no evidence that the absorptive capacity problem which ID faces is being resolved. Consequently, it would appear that proceeding with the proposed project will add to this problem. It is notable that both Paddy I and Paddy II experienced considerable delays due to staff shortages and Paddy III may well face similar problems, especially if it starts before Paddy I is completed.

(ii) Paddy I and II provided us with an excellent opportunity to evaluate fully the impact of the projects on trends in paddy production and management in general. Although the brief indicates that sufficient evidence exist from Paddy I to justify our proceeding with Paddy III it would seem premature to proceed with another substantial investment in the absence of a full and comprehensive evaluation of the impact of preceeding investments. I would therefore recommend that we delay appraisal of the project so that it phases in with the completion of Paddy I.

(iii) Most projects currently being undertaken in Burma, including Paddy I and Paddy II have suffered from a chronic shortage of necessary materials in particular cement and diesel. Present indications are that this situation is not likely to improve in the near future. Certain projects, for example, Kinda have been assigned greater priority from the point of view of allocating available materials and until these projects have been completed we can anticipate that the material supply situation will not improve.

(iv) Over recent months we have received conflicting views from within GOB regarding the desirability of this project. The Ministry of Agriculture appears to be willing to undertake the project in FY84. However, FERD is reluctant and would prefer to defer the project to possibly FY86. FERD's concerns are premised on the deteriorating domestic budgetary position and the depleted foreign reserves. These factors have prompted FERD to request that we delay the implementation of certain forthcoming projects, e.g. Wood Industries for fear of unavailability of local counterpart funds and the wish to avoid commitment charges on account of the deteriorating balance of payments situations.

(v) This appears to be a reasonable project and I believe that project preparation should be completed as proposed in the Brief. However, the appraisal of the project should be scheduled taking into account the above comments.

cc: Messrs. Shibusawa (o/r), Johri
Haynes, Yoon, Berkoff
Ms. Uchimura

DHatendi:cjn

BA - Paddyland Dev. (3)
June 17/83

Project brief

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

TO: Distribution List DATE: June 17, 1983

FROM: Tae-Hee Yoon, Chief, ASPAA

SUBJECT: BURMA - Lower Burma Paddylands Development III Project
Project Brief

BA - Paddyland Dev (3)

Comments on the attached project brief should be addressed to K. Unhanand (H-4171, ext. 32371) or D.J.W. Berkoff (H-4173, ext. 32373).

Attachment

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FORM NO. 1028 (PAGE 1)
(5–75)

WORLD BANK GROUP

# PROJECT BRIEF
# FOR AGRICULTURAL AND RURAL DEVELOPMENT PROJECTS

*(For explanation of items, see reverse side.)*

SECTION A

| COUNTRY: | PROJECT NO.: | DATE OF PROJECT BRIEF: |
|---|---|---|
| BURMA | 8-BUA-AD-03 | June 16, 1983 |
| **PROJECT NAME:** Lower Burma Paddylands Development III Project | **TOTAL PROJECT COST:** (U. S. $ Mil.) 38.6 | **BANK/IDA PARTICIPATION:** (U. S. $ Mil.) 25.0 |
| **PLANNED FOP BOARD PRESENTATION:** (Tentative) FY: 84 Month: May | **PROJECT DEPT./DIV.:** South Asia Projects/Irrigation I Division | |

1. PROJECT PREPARED BY:

FAO/IBRD Cooperative Program

2. STAGE OF PREPARATION:

Preparation report under review. Final surveys are to be completed by June 1983 and a Revised Project Analysis from FAO/IBRD CP is expected by July 1983.

3. PROJECT ORIGIN:

A successor project to the two on-going Paddy Projects (Credit Nos. 642-BA and 835-BA)

4. BRIEF DESCRIPTION OF MAJOR OBJECTIVES AND KEY COMPONENTS:

The project would aim to increase paddy production, and promote limited dry season cropping, through construction of flood protection and drainage facilities for one contiguous polder covering 96,150 ha (237,500 acres) to the south west of Rangoon. It would: (i) renovate and/or repair 49 miles of embankment, (ii) excavate 158 miles of major, and 566 miles of minor, drainage channels, (iii) close two major, and 29 minor, creeks, (iv) construct six major hydraulic structures, (v) construct 27 miles of feeder roads, and (vi) strengthen agricultural extension services. Subject to availability of fresh water resources, it would provide for limited dry season irrigation by low lift pumps from drainage channels.

5. KEY PROBLEMS IN PROJECT DESIGN: (a) project scheduling, given capacity of the Irrigation Department and availability of fuel and construction materials; (b) role of technical assistance in ensuring design standards; (c) finalization of project design and cost estimates, taking into account results of on-going surveys; (d) availability of fresh water during the dry season and role of a possible irrigation component; (e) availability and condition of used equipment; (f) the approach to agricultural extension to be adopted; and (g) cost recovery arrangements.

6. PROJECT BENEFICIARIES: Description of social and economic structure of population which would benefit from project.

About 14,500 existing farm families would benefit from the project, together with up to 400 new families to be settled on reclaimed land on 10 acre plots or in cooperatives. Present average farm size (15.4 acres) is relatively high, significant paddy surpluses are produced, and average incomes, although well below GDP per capita, are reasonable by the standards of rural Burma. Nevertheless, 25% of all farms fall below 10 acres; incomes are limited by flooding (which appears to be getting worse) and limited dry season opportunities; severe problems are created by lack of dry season drinking water and inadequate transport facilities; and there are significant numbers of landless in the project area, who will be provided with laboring opportunities. With the project, farm incomes are expected to rise to about the national average GDP per capita.

7. COUNTRY POVERTY LEVELS: (Data to be provided with assistance of country economist - see notes of explanation.)

| | |
|---|---|
| A. Total population of country (Mil.): | 34.5 M |
| B. Proportion living in rural areas: | 75% |
| C. Average family size in rural areas: | 6.0 |
| D. Poverty income level ($): | Urban 94 - Rural 68 |
| E. Proportion of rural population in Poverty Target Group: | Urban 40% - Rural 40% |

8. IS THE INTENTION THAT THE BENEFITS OF THE PROJECT WILL **DIRECTLY** AND PREDOMINANTLY ACCRUE TO THE RURAL TARGET POPULATION?

Yes ☐ No ☒

NOTES OF EXPLANATION FOR PROJECT BRIEF

(Section A)

Explanation for Specific Questions

Item 1: Indicate if project is being prepared by the Bank (Headquarters or Regional Offices); FAO/CP or other.

Item 2: Stage of Preparation. This item should contain a brief description of actions taken and proposed including, e.g., status of feasibility and/or preparation studies, when available, and possible changes and modifications expected in the design of the project resulting from additional preparatory work; also status of Government/Bank dialogue (agreement or problems).

Item 3: Project Origin. The purpose of this question is to find out how the project was identified and incorporated into the 5-Year Operations Lending Program. Typical answers would be: "identified by an Economic, a Sector Survey or Project Identification Mission", "identified by an FAO/IBRD Cooperative Program Mission", "submitted by the government and preparation assistance provided by the Development Advisory Service of the Resident Mission to Eastern Africa", etc.

Item 4: Brief Description of Major Objectives and Key Components. This question is designed to find out whether the main thrust of the project is to increase food production, raise exports, increase employment, improve the distribution of income and wealth, provide training or technical assistance, assist in institutional building, etc. Where more than one objective is important, some indication of relative importance should be provided. Key components are the intended investments by which these objectives are going to be reached. Give rationale for project in sectoral setting.

Item 5: Key Problems in Project Design. The purpose of this question is to indicate what might be the key policy, technical and organizational issues with respect to, e.g., land reform, cost recovery, subsidies (including interest subsidies), project management and inter-agency coordination, labor vs. capital intensive coordination methods, mechanization. Also questions which may be of general interest to CPS to follow up.

Item 6: Project Beneficiaries. The purpose of this question is to obtain general information in summary form on the type of target group (e.g., subsistence farmers, sharecroppers, landless, nomads, etc.), the income structure of the population which will benefit from the project as well as distribution of income and wealth. Social indicators on the target population when available, are also useful (e.g., nutritional status, employment, health, educational levels).

Item 7: Questions in this category are country specific and not directly related to the project. Data should in principle relate to the same year as the Project Brief. Item 7 D and E will require the assistance of country economists. A separate paper has been prepared to guide them in deriving target group information for their particular country. In general, the poverty income level as defined by the Rural Policy Paper is the highest of relative poverty, defined as - 1/3 of per capita total personal income or absolute poverty, defined as the income necessary to cover minimum needs. It is crucial that information relating to Part D be maintained on a current basis.

Item 8: "Directly and predominantly" means projects with more than half of the benefits directly accruing to the rural poor from increased incomes on small farms, increased employment and incomes from labor and from investments which substantially improve the level of social services to the target population (i.e., education, water supply, health care, etc.).

## SECTION B

9. BRIEF DESCRIPTION OF PROJECT ORGANIZATION:

The Irrigation Department would be responsible for project execution with the Agricultural Corporation responsible for the extension service component. A new project division under a superintending engineer would be established to undertake construction and a Project Implementing Committee would be formed to exercise policy direction and coordinate activities of the various government agencies concerned.

10. PROJECT COMPONENTS AND COST ESTIMATES:

| | $ Million |
|---|---|
| A. Administrative and Institutional Support | |
| B. Agricultural and Other Direct Production | |
| 1. Extension Services and Training | 0.3 |
| 2. Credit | |
| 3. Physical Inputs (fertilizer, seeds, etc.) | |
| 4. Irrigation | 0.8 |
| 5. Land Development | 27.8 |
| 6. Processing/Storage/Markets | |
| 7. Other | |
| C. Other Components | |
| 1. Roads | 1.9 |
| 2. Water Supply | |
| 3. Electrification | |
| 4. Housing (including Community Centers) | |
| 5. Education | |
| 6. Health | |
| 7. Other | |
| D. Contingencies | 7.8 |
| TOTAL | 38.6 |

11. INCREMENTAL ANNUAL PRODUCTION ESTIMATES (AT FULL DEVELOPMENT) AFTER 12 YEARS:

| Item | Volume (specify units) | Value $ Million |
|---|---|---|
| 1. Food Crops | 80,000 tons | 25.0 |
| 2. Non-food Crops | | |
| 3. Livestock | | |
| 4. Fisheries | | |
| 5. Forestry | | |
| 6. Other | | |
| TOTAL | | 25.0 |

12. ESTIMATED NUMBER OF BENEFICIARIES IN PROJECT:

| | Total | In Target Group |
|---|---|---|
| A. Number of farm families **directly** benefiting from project | 15,000 | 4,050 |
| B. Number of families **indirectly** benefiting from project (excluding families already counted under A) | N/A | N/A |

Item 11: Incremental Annual Output. Use average year of full development if various components have different development periods.

Item 12A: Number of Farm Families Directly Benefiting from Project. "Direct beneficiaries" is to be construed to include only those farm operator families (including single persons) whose incomes will be increased directly and permanently as a result of some part of the project.

Estimating the share of beneficiaries with income at or below the national boundary target-group income will inevitably involve a good deal of judgment as to what the income differentials are among the project beneficiaries. In principle, the procedure would be to take from the project beneficiary group as a whole the highest income receivers, continuing down the scale until the highest income among the residual group falls to the predetermined estimate of boundary income. In the case of farm operators, data may be available on the distribution of farms by size of holding in the project area and from these a rough distribution pattern to apply to the average income figure might be obtained. The main point to bear in mind about these estimates though is the intention to obtain a considered judgment in the light of the available evidence.

Item 12B: Numbers of Families Indirectly Benefiting from Project. Include all on-farm and off-farm hired labor which will receive substantial additional employment as a result of, and after full development of, the project. Exclude persons employed only in the construction phase of any building and construction works. Include other families which will receive significant consumption benefits from the project (e.g., improved water supply), and not otherwise included among farm beneficiaries or beneficiaries from employment.

## SECTION B (CONTINUED)

13. ECONOMIC BENEFITS TO FARM FAMILIES:

A. Estimated average annual per capita net income (from all sources) to farm families

| | Total | In Target Group |
|---|---|---|
| Without Project | $ 115 | $ 60 |
| At Full Development of Project | $ 170 | $ 100 |

B. Indicate (or specify) nearest proportion of incremental income accruing to beneficiaries in the target group:

Below 25% [X] 25 - 50% [ ] 51 - 75% [ ] over 75% [ ]

14. INCREMENTAL EMPLOYMENT IMPACT: (excluding farm family beneficiaries counted under 13)

A. Number of persons employed full-time (200 days per year or more) --

B. Part-time employment (man-days per year) 2.3 M

C. Proportion of Incremental income from employment accruing to target population:

Less than 25% [ ] 25 - 50% [ ] 51 - 75% [ ] over 75% [X]

15. SOCIAL BENEFITS:

Estimated number of farm and non-farm families which will benefit substantially from improved:

| | Estimated Beneficiaries (Number of Families) | % in Target Group | Capital Cost Per Family |
|---|---|---|---|
| 1. Water Supply | Not yet established | | $ |
| 2. Health Care | | | $ |
| 3. Education (individuals) | | | $ |
| 4. Nutrition (individuals) | | | $ |
| 5. Family Planning | | | $ |
| 6. Housing | | | $ |
| 7. Other | | | $ |

ESTIMATED ECONOMIC RATE OF RETURN OF PROJECT: 15–16 %

If no estimate can be made, indicate if the economic rate of return likely will be:

Less than 10% [ ] 10 - 20% [X] or over 20% [ ]

17. COMMENTS:

a. Final surveys and investigations are still under way. FAO/CP will revise project costs and the economic analysis in the light of the results of these surveys. The ERR is expected to be in the range 15-16%.

b. Incremental employment opportunities (Question 14) are estimated on the basis of FAO/CP farm budget analysis. Part of hired labor may also be provided by farm beneficiaries and the total man-day increment may be overstated.

c. If fresh water is available through the dry season drinking water supplies will be greatly improved throughout the project area (Question 15).

Item 13A: Average Annual Net Income for Farm Families. Income is to be defined before any tax payments but should include estimates for all sources of income - i.e., home consumption of farm production (valued at farm gate prices), off-farm family employment as casual labor, etc. Farm operator income would be net of purchased inputs - e.g., water charges, hired labor, etc.; it would also be net of rental payments for land. Income estimates of this type are already made in the form of model farm budgets for most agricultural projects. (Recall though that average not most common income is required - the latter is often considerably less than the former in situations of generally skewed income distribution.)

Incomes will usually relate to family rather than to per capita income. If information is available locally on family size, then adjustment to a per capita income basis is easily made. In absence of local information, the national average of family size for rural areas (7C) should be used.

Item 15: Social Benefits. Only beneficiaries from directly related project component should be counted under this item. The capital cost for social services should be computed for all beneficiaries on a per capita basis.

BURMA

# LOWER BURMA PADDYLANDS DEVELOPMENT III PROJECT

## PROJECT BRIEF

| | | |
|---|---|---|
| Sector | : | Agriculture and Rural Development |
| Project Code | : | 8-BUA-AD-03 |
| Appraisal Date | : | October 1983 (provisional) |
| Date of this Brief | : | June 1983 |
| Date of last Brief | : | July 1982 (Prepared by FAO/CP) |
| Project Officer | : | D.J.W. Berkoff |
| Programs Officer | : | D. Hatendi |
| Lead Adviser OPS | : | S. Niaz |

## A. SECTORAL CONTEXT

### The Agricultural Sector

1. Burma is richly endowed with natural resources, with population pressure on these resources low by Asian standards. Adult literacy is almost 70% and, in general, social indicators are favorable relative to other countries at its stage of development. Almost 75% of the population of 35 M lives in rural areas, with agriculture contributing approximately 45% of GDP, 65% of employment and 80% of export earnings. Some 27% of the land is considered arable, although only about 12% (21 M acres or 8.5 M ha) is cultivated in any one year. Rice is by far the most important crop, accounting for slightly more than 50% of the planted area, about 40-50% of total export earnings and contributing substantially to Government revenue. Other crops include oilseeds (18% of the planted area), pulses (7%), cotton, jute, sugar, tobacco and rubber.

2. Despite its considerable natural resource base, favorable man-land ratio and social progress, GNP per capita at about US$170 remains low. During the 1960s and early 1970s, value added in agriculture rose at only about 1.6% p.a., well below the prevailing 2.2% population growth rate. As a result, the rice export surplus declined to less than 200,000 tons compared to more than 3 million tons pre-war. This unsatisfactory performance can be attributed to a number of inter-related factors, including unsettling changes in land policy, inadequate farmer incentives and the initial failures of imported high yielding paddy varieties which proved ill-adapted to local conditions.

3. Faced with this situation, the Government responded in two principal ways. First, beginning in 1973/74, a series of policy reforms were

implemented designed to improve incentives and provide for greater flexibility in the farming sector: procurement prices were substantially increased, mandatory procurement quotas were reduced, certain commodities were decontrolled, there was a major tax and exchange reform, and Government greatly increased its willingness to accept foreign assistance. Secondly, HYVs were evolved that were adapted to local conditions, and their use was promoted, together with subsidized agricultural inputs, through a major new government program (the Whole Township Extension Program - WTEP). These policies have proved successful. Despite only limited further price increases, incentives have been sufficient to encourage the adoption of HYVs and between 1974/75 - 1981/82, paddy production increased from 8.4 million tons to 13.9 million tons, and agricultural value-added as a whole grew at no less than 7.2% per annum.

4. Further production increases are no doubt possible through intensification of areas already planted to HYVs and area expansion (e.g. through low cost rehabilitation and land reclamation programs). There is also considerable potential for crop diversification, and the WTEP has been extended to other crops, notably maize, wheat and oil seeds. However, further yield increases and crop diversification are likely to prove more difficult to achieve than the past introduction of the highly profitable HYV technologies. To sustain the momentum of recent years, therefore, GOB may well need to consider making policy adjustments. Its commitments to a strong public role in input supply, marketing and procurement and to supervision of the national cropping pattern through the People's Councils are likely to remain. Nevertheless, within this framework, changes in farm level incentives may well become necessary. Procurement prices, for instance, have remained virtually constant for a number of years and, while incentives have been sustained by free market sales and subsidized inputs, increases could well become necessary to achieve the more difficult tasks of paddy yield enhancement and crop diversification.

The Irrawaddy Delta

5. The Irrawaddy and Sittang deltas represent the major rice surplus area in Burma, comprising some 8-9 M acres (3.3 - 3.6 M ha) of heavy, fine-textured clay soils well suited to paddy cultivation. The climate is strongly monsoonal in character, averaging about 2,500 mm per year, with more than 80% concentrated in the period May through October. During this period, cropping is confined to rainfed paddy, limited only by flooding and inadequate drainage. In the upper and middle deltas, cultivation of winter crops (especially oilseeds and pulses) and pre-monsoon jute is possible based on irrigation from low lift pumps. In the lower delta this is precluded by the movement of the saline front, although limited dry season cropping takes place after paddy based on residual soil moisture.

6. Isolated dikes providing some local protection date back hundreds of years, but the first major embankments were constructed in the late nineteenth and early twentieth centuries. These and lesser works have transformed the delta from mangrove swamp to paddyland with the area under paddy in Lower Burma (including Arakan and Tenasserim) rising from about 1 M acres in the 1850s, to 7.0 M acres in 1900 and to almost 10 M acres by 1940. During and after the war years, extensive deterioration took place, with as much as 1.7 M acres of paddyland being abandoned. During the 1950s and 1960s, therefore, priority was given to rehabilitation and to the problems of accrued maintenance. Government also extended its responsibilities to many minor locally constructed works and by the early 1970s restoration had been essentially completed and up to 2.5 M acres had been directly brought within Government maintained systems.

7. The great embankments constructed pre-war were characteristically 'horseshoe' in type, containing the river flood and using the natural waterways system to evacuate rainfall. Horseshoe embankments provide only partial protection since the seaward end is open to inundation from backing up of the river or tidal inflows. They are therefore unsuited to the saucer-shaped islands of the lower delta, being successful only in the upper and, to a lesser extent, the middle delta where reasonable falls between the upstream and downstream ends of the development create conditions for good natural internal drainage. With the consolidation of the Irrawaddy East embankment in the 1950s, the potential for this type of reclamation was largely exhausted. Attention therefore shifted to the possibility of preventing flooding and saline water intrusion in the lower and middle delta through a process of full empoldering. The first major development of this type was initiated in the middle 1970s (the Paddylands I Project, Cr. 635-BA) and this was quickly followed by a second project. Together these projects will provide protection to a gross area of about 450,000 acres.

8. The continued development of flood control facilities and increased dry season pumping have raised fears that the Irrawaddy's natural regime would be affected, with possible adverse effects on the stability of the delta and the saline front. However, a Consultant's report, 1/ financed under Paddy I concluded that the delta is remarkably stable and that the risk of catastrophic change is slight; that overbank storage plays only a limited role in alleviating flood levels; and that substantial additional abstraction of dry season flows would be feasible. In other words, further large scale land reclamation, irrigation and drainage programs can be implemented without serious risk of aggravating flood levels or increasing saline intrusion. The Irrigation Department

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1/ Sir William Halcrow & Partners: "Irrawaddy Delta: Hydrological Investigations and Delta Survey" in five volumes, January 1982.

will continue to monitor the effect of large scale development and it is proposed, under Paddy I, that the hydrological model developed by the consultants should be extended and further refined to include a number of aspects of delta hydrology that were not adequately covered in the earlier studies.

Government Investment Policy and IDA Lending

9. The economic reforms of the mid-1970s gave higher priority to the agricultural sector and, in line with this, GOB has made progress in accelerating the pace of irrigation, flood protection and related development. A greater willingness to accept foreign assistance has increased considerably the resources available for such projects and a number of major new programs have been launched or are under consideration, notably: multi-purpose projects on major tributaries of the Irrawaddy, Sittang and Salween; tank and run-of-the-river diversion projects on lesser tributaries and rivers; groundwater development; and combined flood protection, land reclamation and pump irrigation projects in the delta.

10. IDA has supported GOB in the increased priority being given to agricultural development in general, and investment in irrigation and flood protection in particular. Between 1973-82, IDA credits totalling US$536 M were approved of which about 60% were for agriculture. The first project approved following the recommencement of borrowing from the Bank Group was a combined small scale embankment/low lift pump project (Irrigation I, Cr. 483-BA) which was successfully completed. This was followed by the two Paddylands projects (Cr. 642-BA and Cr. 835-BA) and by a major multi-purpose hydropower and irrigation development project in Central Burma (Cr. 1031-BA). A medium scale tank irrigation project (Cr. 1315-BA) was approved in 1982, while a first groundwater project was presented to the Board in June 1983. Taken as a whole, these projects will contribute substantially to increased paddy production and to the extent possible, to the diversification of field crop production. Other IDA credits have been extended in support of livestock, seed development, grain storage and rubber rehabilitation, and a further grain storage project is under preparation.

## B. PROJECT FORMULATION AND PREPARATION

Project Origin and Status of Preparation

11. The proposed project would be the fourth in a series of combined flood protection, land reclamation, irrigation and drainage projects in the delta (para 9), and the third in the 'Paddylands' series under which full empoldering of middle and lower delta islands is being undertaken. The completion report for the first delta project (Irrigation I - Cr. 483-BA) estimated an economic return of 29% for the pump irrigation

sub-project and 16% for the minor flood embankment subproject. These returns were somewhat lower than estimated at appraisal but nevertheless suggest that development in the delta has proved economically attractive, a conclusion supported by the Project Performance Audit Report. 1/ The two on-going paddylands projects have encountered delays (para 23), but preliminary evidence suggests that costs will remain within original estimates and that most agricultural production objectives will be achieved. This is illustrated in Annex 1 which shows that the increase in paddy production for four completed Paddy I polders averaged 130% compared to the year prior to initiating project works. Although part of this increase would no doubt have occurred even without the project, and dry season cropping in the lower delta is proving disappointing, nevertheless project impact on paddy output and middle delta dry season cropping seem to be exceeding SAR expectations. A systematic evaluation study of the two on-going Paddy projects should be available by appraisal, 2/ but it is felt that sufficient evidence is already available to justify proceeding with final preparation of the proposed project. Final scheduling of appraisal will, however, need to take into account issues raised below (see para 25).

12. To provide a systematic basis for selecting further projects, the delta hydrology consultants (para 7) were commissioned under Paddy I to carry out a reconnaisance study of investment opportunities in the delta. 3/ Some 48 possible development units were screened and the consultants concluded that the drainage and reclamation projects 4/ showing the highest prima facie economic return were in the Rangoon area with a combined gross extent of 280,000 ha. The area given the highest priority (flanking the Pahlaing River north-west of Rangoon) was rejected since the Rangoon port authorities feared adverse effects on the port's hydrological

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1/ Project Performance Audit Report: Burma Irrigation I Project (Cr. 483-BA): April 29, 1982.

2/ See the GOB Farm Survey Working Unit: "Farm Survey for Paddy I and Paddy II Projects: Interim Report", February 1983. The final report is due August 1983.

3/ Sir William Halcrow & Partners: "Irrawaddy Delta: Hydrological Investigations and Delta Survey: Volume 4, Reconnaiscance Survey", January 1982.

4/ In addition, recommendations were made for (i) a project to irrigate about 50,000 ha with low lift pumps along fresh water channels in the middle and upper delta, (ii) a drainage and land reclamation of 29,000 ha in the Bassein estuary and (iii) a pilot large scale irrigation project for 6,500 ha in the Natmaw Plains (Henzada).

regime. Consequently, following discussions in Rangoon in February 1982 between GOB, IDA and th FAO/World Bank Cooperative Program (FAO/CP), the area showing the next highest prima facie economic priority was selected. This comprises one large contiguous polder to the south-west of Rangoon with a gross area of 96,150 ha (237,500 acres). Unfortunately, during preparation, it was found that the present cropping intensity in this area is significantly higher than assumed by the consultants, with the result that the land reclamation benefits from the project are likely to be lower than initially expected. 1/

13. The Irrigation Department (ID) initiated the necessary surveys and investigations during the first FAO/CP preparation mission in March/April 1982. This was followed by two further missions (in May/June and September) and the preparation report 2/ was received on schedule in late 1982. During the preparation of the project, FAO/CP encountered a number of difficulties which led them to conclude that ".....the preparation (report) especially regarding engineering and hydrological aspects, is not of the standard of accuracy normally desired for pre-investment level." 3/ The major problems were due to shortages of qualified ID staff assigned to the project which resulted in particular in inadequate topographic surveys, poor water level and salinity records, and a lack of site investigations for the proposed major structures. To compensate for these shortcomings, FAO/CP provided for a high contingency in the cost estimates for the civil works, and laid out a program of further surveys and investigations to be completed by ID prior to appraisal (paras 23-24).

14. The FAO/CP preparation report was discussed with GOB in February/March 1983 during an IDA mission primarily devoted to the review of the two on-going Paddy projects. 4/ This Project Brief reflects the outcome of these discussions and the agreements reached with GOB. In particular, assurances were received that ID would complete the surveys

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1/ IDA first learnt of this in July 1982 in th FAO/CP Back-to-Office Report following their May/June mission. Given the then advanced state of preparation, it was decided that preparation should continue on schedule.

2/ FAO/IBRD Cooperative Programme: "Lower Burma Development III Project: Report of the Preparation Mission", November 24, 1982.

3/ See the memorandum to files by Mr. A.F.E. Zagni, dated November 3, 1982, and the letter from Mr. M. Fenn to Mr. M. Veraart, dated November 26, 1982.

4/ See the Aide Memoire, circulated in lieu of a Back-to-Office Report on April 5, 1983.

and investigations as laid down in the FAO/CP Report, as well as undertake certain additional studies. The results of these ongoing activities will need to be reviewed before appraisal can take place (see para 23-24).

The Project Area

15. The project area encompasses some 96,150 ha (237,500 acres) gross on an island to the south-west of Rangoon, covering parts of the Townships of Twante, Kawhmu and Kungyangon. Soils are predominantly heavy cracking clays (Gley soils) but there are small pockets of lighter soils. A major creek (the Bassein creek) runs SW-NE through the project area but is heavily silted in its central reach and impassable to river traffic. The internal creek network is also heavily silted resulting in deep flooding in the lower lying areas during the monsoon. Most creeks are tidal, and there is considerable saline contamination due to overtopping during the monsoon season. Fresh water is believed to be available from the Twante Canal at the northwest corner of the project area, and possibly also from the China Bakir river to the south west, at least until end-February, potentially allowing recharge of the creek system by gravity for subsequent pump irrigation and domestic use. Present population is estimated at about 183,000, being concentrated along the western margins, largely due to communications and fresh water constraints. Preliminary estimates suggest there are about 14,000 farm families in the area with an average farm size of about 15 acres (6 ha). Agricultural supporting services are relatively well developed, and all three townships are already covered by the Whole Township Rice Production Program (para 3).

Project Objectives and Description

16. The project would be similar in conception to the two earlier paddylands projects. It would aim to increase paddy production (in particular of HYVs) through the construction of flood protection and drainage facilities designed to: (i) exclude tidal and river flow surges, (ii) improve and extend natural internal drainage, and (iii) reclaim land that is currently deeply flooded or saline. Within the constraints of soils, climate and the availability of fresh water supplies, the project would also seek to promote irrigation of dry season crops using low lift pumps. To provide the necessary infrastructure to sustain increased agricultural production, the project would strengthen agricultural extension and applied research services, and improve project area communications. Finally, it would help strengthen the ID's capacity to investigate, prepare and implement further projects in the paddylands series. Specifically, the project would:

a. Renovate 24 miles of existing flood protection embankments, and construct 25 additional miles;

b. Excavate 158 miles of major, and 566 miles of minor, drainage channels;

c. Close two major,1/ and 29 minor, creeks;

d. Construct six major hydraulic regulator structures;

e. Construct 27 miles of feeder roads;

f. Strengthen the agricultural extension service with training centers, equipment, transport and personnel; and

g. Strengthen the ID with appropriate technical assistance.

Project Costs and Viability

17. Total project costs are estimated at about 300 M Kyat (US$38.6 M), broken down as in Table 1 and including 20% physical contingencies on civil works and 15% price contingencies. 2/ At the request of the GOB authorities, maximum use is to be made of equipment that is expected to be released from other projects, including Paddy I. The overall foreign exchange component is estimated at about 37%. It is expected that on IDA credit, amounting approximately to US$25 M, would finance the foreign exchange component of the equipment (including spare parts for existing equipment); 70% of the costs of civil works; and technical assistance. Allowing for contingencies, this would be equivalent to 100% of the FE content and about 45% of local costs. The balance would be met by GOB.

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1/ At each end of the Bassein Creek.

2/ Price contingencies are not provided for in the FAO/CP Report and have been estimated on the basis of other recent projects in Burma.

Table 1. Project Costs Estimates
Kyat Million

| | Local | F.E. | Total |
|---|---|---|---|
| Civil Works | 84.1 | 9.0 | 93.1 |
| Construction/O&M Equipment | 8.3 | 74.6 | 82.9 |
| Supervision & Engineering | 33.2 | 5.4 | 38.6 1/ |
| O&M of Civil Works during Const. | 19.5 | 3.2 | 22.7 |
| Extension Services | 1.7 | 0.7 | 2.4 |
| Technical Assistance | - | 0.7 | 0.7 |
| Sub-total | 146.8 | 93.6 | 240.4 |
| Physical Contingencies | 18.9 | 2.3 | 21.2 |
| Price Contingencies | 24.9 | 14.4 | 39.2 |
| Total Project Costs | 190.6 | 110.3 | 300.8 |
| US$ Equivalent | 24.4 | 14.1 | 38.6 |

1/ This estimate appears high and would need to be reviewed at appraisal.

18. The major benefits from the project would result from conversion of land currently under local varieties to that suitable for HYVs; reclamation of presently deeply-flooded fallow land; and avoidance of crop failures. Table 2 summarizes FAO/CP's estimates of present and future 'with project' land use. The present situation is assumed to continue in the 'without project' case although there is evidence that, due to siltation of the Bassein Creek, the drainage system is in fact deteriorating (see para 19).

Table 2. Land Use Estimates
'000 acres

| | Present/Future Without | Future With |
|---|---|---|
| Suitable for HYV | 126.8 | 222.2 |
| Suitable for LV | 71.5 | 5.5 |
| Average Area under Crop Failure | 13.0 | - |
| Deeply Flooded Fallow Land | 13.2 | - |
| Saline Scrubland | 4.0 | - |
| Area Lost to Project Works | - | 0.8 |
| Other Uses | 9.0 | 9.0 |
| Gross Area | 237.5 | 237.5 |

19. Incremental paddy production over and above the 'without' case is estimated at 71,600 tons per year at full development (out of a total of 349,300 tons). In addition, it is assumed that 22,000 acres of irrigated chick peas will be cultivated during the winter months. On this basis, the Preparation Report estimates an overall economic return of 19% and on the basis of incremental paddy production alone a return of 12%. There are, however, a number of doubts concerning this analysis, in particular:

a. There is evidence that the progressive siltation of the Bassein Creek is aggravating flooding in the project area and that perhaps as much as 10,000 acres has been abandoned over the last two years. 1/ Projecting this into the future is difficult but suggests the 'without project' case could be less productive than suggested in Table 2.

b. Evidence from Paddy I suggests farmers are adopting HYVs on almost all suitable land and that they do not reserve land for LV cultivation for their own consumption (see Annex 1, Zinbaung and Letpanbin polders). On this basis incremental

1/ This evidence was collected during the IDA review mission in February/March 1983. ID have been requested to investigate this further (see para 26).

paddy production would be increased by 20,900 tons, or almost 30% over the estimates of the Preparation Report.

c. The import parity price for chick peas assumed appears to be incorrect and to overstate the returns from dry season cropping.

20. These factors suggest that the returns from incremental paddy production have been underestimated, and those from the irrigation component overestimated. FAO/CP are to revise their analysis but, based on a tentative reassessment, the project appears to remain viable, probably achieving an ERR of about 15-16%.

Project Organization and Management

21. Project implementation is expected to follow the pattern established under Paddy I and Paddy II. A separate project organization (circle) would be created within the ID under the direction of a superintending engineer. He would be supported at headquarters by a Planning and Design Division and a Mechanical Division, each headed by an assistant engineer and, in the field, by two Construction Divisions and a Mechanical Sub-division which would operate a field workshop and plant depot. The extension services would be the responsibility of the Agricultural Corporation (AC), suitably strengthened. A Project Steering Committee (PSC), with representatives not only from ID and AC but also from other concerned departments and three Township People's Councils, would meet regularly to take policy decisions and monitor progress. With the completion of construction, responsibility for maintenance of physical facilities would revert to the ID's Maintenance Circle, while agricultural extension, input supply and credit would remain the responsibility of the relevant line organizations.

The Status of Preparation

22. To complete preparation, FAO/CP recommended that ID should undertake: (i) site surveys and investigations for the six major hydraulic structures, (ii) monitoring of the water levels and salinity at the proposed irrigation intake site, (iii) topographic surveys of land form, and creek-cross section, to check those used in the report, (iv) topographic and site investigation surveys for the two major closure sites, and (v) tidal measurements at all major structure sites. During the March IDA Review Mission, assurances were received that these surveys and monitoring exercises were being undertaken, and that the surveys and site investigations would be completed before the 1983 monsoon season. ID also agreed to monitor water levels and salinity at a possible alternative irrigation intake site on the China Bakir river, and to investigate the extent to which land is being abandoned due to aggravated flooding caused by the siltation of the Bassein Creek (see para 19). Various aspects of

the Preparation Report will need to be reviewed in the light of the results of these studies and investigations, notably:

a. The design criteria and capacities for the drainage system (these may be inadequate, and will need to be reviewed in the light of experience under Paddy I and II).

b. The cost estimates of the major hydraulic structures and closures.

c. The potential for irrigation and its implications for the design of the drainage system.

d. The economic analysis.

23. A mission from FAO/CP is currently visiting Burma on another project 1/ but will investigate the current position and, on its return, will make any revisions thought appropriate to the proposals and analysis contained in the Preparation Report. A final decision to schedule an appraisal mission would be taken following receipt of such revised proposals. Completion of the designs for the first year's program of construction would be made a condition of effectiveness.

## C. PROJECT ISSUES

24. The main issues which will affect further project processing include: (i) the capacity of the ID to undertake additional projects and the availability of materials, (ii) technical issues and the technical assistance required, (iii) the availability of existing equipment, (iv) the role of the irrigation component, (v) the approach to agricultural extension, and (vi) agricultural pricing and cost recovery policies.

### The Capacity of the ID and Availability of Materials

25. The operations of the ID have in recent years expanded rapidly, creating strains in the organization and placing pressure on technical staff. The problems of rapid expansion have been aggravated by shortages of fuel and other construction materials which have led to delays in on-going projects, thus further tying up staff and resources. While these constraints could in theory be moderated through imports, GOB has been unwilling to arrange this, and recent balance of payments problems make it unlikely it will change its position. As a result, Paddy I and Paddy II are now unlikely to be completed before 1984/85 and 1986/87 respectively,

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1/ The proposed Irrigation Rehabilitation (Mu (Kabo)) Project.

two years behind schedule. To ensure that a third project does not adversely affect completion of the two earlier projects, and so as to permit transfer of experienced staff and equipment to the new project, it is recommended that major construction work for Paddy III should be scheduled to follow completion of Paddy I. In implementing the project, assurances will be required that adequate technical staff, fuel and construction materials will be allocated to the project so that delays similar to those encountered for the earlier projects are as far as possible avoided.

Technical Issues and Assistance

26. Some concern has been expressed in the past in connection with the standards of design and construction adopted under Paddy I and II. To help strengthen ID's capabilities in this field, a modest TA component has been included in the recently approved Medium Tank Irrigation Project (Cr. 1315-BA) as part of a general consultancy in support of the ID's Planning and Design Circle. Technical assistance will also be required in connection with the two closure dams proposed for the Bassein Creek. Although these are not expected to involve any unusual technologies, they will be on a scale larger than any so far constructed in Burma and it will be essential to ensure that appropriate techniques are adopted in their design and construction.

Availability of Used Equipment

27. ID have been requested to survey all items of used equipment likely to be transferred to the project, and to list what spare parts will be required to ensure that such equipment is fully operational. An FAO/CP consultant is currently in Burma to review ID's workshops and equipment holdings 1/ and his report should be used to cross check the information provided by GOB. While the use of used equipment will reduce project costs, it will be essential to review the position carefully to ensure that no undue risks to the successful implementation of the project are taken and that adequate provision is made in the credit for spare parts.

The Irrigation Component

28. Irrigation will only be possible if it can be demonstrated conclusively that fresh water is available at either or both of the two potential intake sites 2/ at least until end-February. Provided this can be demonstrated, the inclusion of an irrigation component would require: (i) modification at limited cost of the drainage structure(s) at the

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1/ In the context of the proposed Irrigation Rehabilitation Project.

2/ On the Twante canal and China Bakir river respectively.

intake site(s), and (ii) construction at a cost of about US$0.8 M of the interconnector channels and related structures to convey irrigation supplies through the drainage system. No provision is made for pumps which it is assumed will be available through the normal Agricultural Mechanization Department (AMD) program. Given the heavy soils and their general unsuitability for diversified winter cropping, the spread of irrigaton is likely to be fairly slow and the returns limited (see para 20). Nevertheless, (i) the incremental costs associated with providing an irrigation capability would be relatively small, (ii) it is difficult to foresee with certainty how farmers will respond to the opportunities provided, and (iii) there would be important benefits from the provision of fresh water for drinking and related purposes during the dry season. Provided the project as a whole proves viable on the basis of incremental paddy production, the inclusion of an irrigation component would therefore probably be justified. Promotion of dry season cropping, whether of chickpeas or other alternative crops, could be supported by the extension services and an applied research program, and pump sales could proceed at a pace reflecting farmer acceptance of these new opportunities.

The Approach to Agricultural Extension

29. A pilot training and visit (T&V) extension program is being implemented in the context of the two on-going Paddy projects. Although this program has been modified in certain respects to reflect local Burmese conditions, it nevertheless differs from the WTEP in two principal ways: (i) regular fortnightly, rather than simply pre-season, training is provided to field level extension workers by subject matter specialists and (ii) extension workers visit contact farmers according to a regular schedule, rather than arranging for periodic campaign-type farmer meetings. The WTEP has been successful in introducing HYVs on a wide scale and GOB has resisted adoption of the T&V system on a national basis. Nevertheless, while the WTEP maybe well suited to the introduction of a once-and-for-all technological advance, the T&V system may be better adapted in the longer term for the steady transfusion of improved agricultural practices. To be successful, such a program would need to have a much firmer basis for applied research than is at present available in Burma. Nevertheless, the results of the on-going pilot program should be assessed as a basis for agreeing the specific extension component for Paddy III and, to the extent possible, discussions with GOB should be held to establish the implications of the pilot program for the long term evolution of the national extension service. This could contribute to the evolution of national Extension and Adaptive Research Project which it is understood is tentatively scheduled for IDA's FY86 lending program.

Agricultural Pricing and Cost Recovery

30. In 1982, the irrigation/land reclamation component of the land revenue charge was separated out as a specific water charge, being set at

10 kyats/acre in irrigated areas and 5 kyats/acre in areas served by Government flood protection facilities. It is collected along with land revenue and, although it has been set at a very low rate, establishes the principle of a separate irrigation charge. Despite this development, the major source of cost recovery would continue, as in the past, to be via indirect agricultural taxation represented by the difference between the export price and Government procurement costs. This compulsory system imposes an implicit tax on paddy growers that increases progressively with farm size and yields and which, in recent projects, has been sufficient to ensure relatively high cost recovery rates. These have, however, declined with the recent reductions in world rice prices and would be further eroded if adjustments to procurement prices prove necessary to maintain farmer incentives (para 4). IDA has to date accepted that indirect taxation provides a sufficient cost recovery basis, while the success of the WTEP indicates that incentives have so far been adequate to encourage farmer adoption of HYVs. Any adjustments to the procurement price, however, would need to be accompanied by corresponding increases in the land and water charge and/or reductions in the fertilizer subsidy if the cost recovery rates are to be maintained.

## D. FURTHER PROJECT PROCESSING

31. Subject to the results of the on-going preparation activities (paras 25-26), the following schedule could be followed in the further processing of the project:

| | |
|---|---|
| Completion of on-going Preparation Surveys | June 1983 |
| Receipt of FAO/CP's Revised Project Analysis | July 1983 |
| Departure of Appraisal Mission | October 1983 |
| Return Appraisal Mission | October 1983 |
| Issues Paper | November 1983 |
| Decision Memorandum | December 1983 |
| Yellow Cover | February 1984 |
| Documents to Loan Committee | April 1984 |
| Begin Negotiations | April 1984 |
| Board Presentation | May 1984 |

32. A decision whether to schedule appraisal this year will need to take into account the issues discussed under para 25, that is the availability of materials and counter part funds and the capacity of the ID given the on-going commitent to the completion of Paddy I and II. GOB has given mixed signals as to whether it would welcome an appraisal this year. A decision is expected following receipt of the revised preparation estimates.

Project Brief Prepared by D.J.W. Berkoff (ASPAA)
Project Brief Reviewed by D. Hatendi (ASADC)

THE WORLD BANK/INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

BA - Paddyland (3)

TO: Mr. Tae-Hee Yoon, Chief, ASPAA Date: May 12, 1983

FROM: D.J.W. Berkoff, ASPAA

SUBJECT: BURMA - Proposed Paddylands Development III Project
Review of Preparation Report 1/

1. This memorandum reviews the FAO/IBRD Cooperative Program (FAO/CP) Preparation Report for the proposed Paddylands III Project, taking into account the results of a recent mission to Burma during which the proposed project was discussed with the Burmese Authorities. 2/ In the light of these discussions, as well as those more recently held in Washington with GOB officials and Mr. Fenn of FAO/CP, it recommends how we should proceed with further project processing. In particular, it recommends that: (i) GOB should be requested to finalize ongoing surveys and to continue monitoring conditions in the project area, and (ii) FAO/CP should be requested to revise the economic and related analyses contained in their report, taking into account the conclusions of GOB's studies and this memo. Attached are draft letters to both FAO/CP and GOB covering these issues. A revised Project Brief is being circulated separately which raises a number of issues not covered in this memo.

## The Proposed Project

2. The project would be the fourth 3/ in a series of combination irrigation, flood protection, land reclamation and drainage projects in the Irrawaddy Delta. The project area was selected on the basis of a Reconnaissance Study 4/ undertaken by a firm of consultants in the context of hydrological investigations for the delta financed under Paddy I. This

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1/ FAO/World Bank Cooperative Program: Burma - Lower Paddylands Development III Project, Preparation Mission Report, November 24, 1982.

2/ See the mission's Back-to-Office Report, April 5, 1983, to which is attached the Aide Memoire left with GOB.

3/ The earlier projects were Irrigation I (Cr. 483-BA: completed); Lower Burma Paddylands Development I Project (Cr. 642-BA: ongoing); and Lower Burma Paddylands Development II Project (Cr. 835-BA: ongoing).

4/ Sir William Halcrow & Partners: "Irrawaddy Delta: Hydrological Investigations and Delta Survey: Volume 4, Reconnaissance Survey," January 1982.

study reviewed alternative possibilities 1/ in the delta, and concluded that the highest priority drainage and land reclamation projects were in the Rangoon area, flanking the Pahlaing and Rangoon rivers, covering a total of about 281,000 ha gross. The highest priority area was rejected after consultation with the Rangoon Port authorities (who feared adverse effects on the Port's hydrological regime) and therefore, following discussions in Rangoon between GOB, IDA and FAO/CP in February 1982, the next highest priority area was selected. This comprises one large contiguous polder in the lower delta, close to Rangoon, with a gross area of 96,150 ha (237,500 acres). 2/ The project as proposed by FAO/CP would:

a. Renovate 24 miles of existing, and construct 25 miles of new, embankments;

b. Excavate 158 miles of major, and 566 miles of minor, drainage channels;

c. Close two major, and 29 minor, creeks;

d. Construct six major hydraulic regulator structures;

e. Construct 27 miles of feeder roads; and

f. Strengthen the agricultural extension service with training centers, equipment, transport and additional personnel.

3. Total project costs at 1982 financial prices are estimated by FAO/CP at $33.5 M including physical, but excluding price, contingencies. The benefits attributable to the project are assessed to be: (i) reclamation of 16,000 acres of currently unusable land for paddy production, (ii) conversion of 95,000 acres of land currently under local paddy to land suitable for HYVs, and (iii) cultivation of 22,000 acres of irrigated chick peas during the winter months. Incremental paddy production over and above the 'without' project case is estimated at 71,600 long tons per year at full production (out of a total of 349,300 tons), and production of chick peas at 6,800 tons. The FAO/CP Report estimates an overall economic return of 19% but their estimate falls to 12% on the basis of incremental paddy alone.

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1/ In addition, recommendations were made for projects: (i) to irrigate about 50,000 ha with low lift pumps along fresh water channels in the middle and upper delta, (ii) drainage and land reclamation of 29,000 ha in the Bassein estuary, and (iii) a pilot large scale irrigation project for 6,500 ha in the Natmaw Plains.

2/ In contrast to Paddy I (eleven widely dispersed polders covering a gross area of 247,000 acres, ten in the lower delta and one in the middle delta), and Paddy II (four widely dispersed polders covering a gross area of 216,000 acres, three in the lower delta and one in the middle delta).

Comparison with Paddy I and II

4. There are several characteristics of the proposed project which differ from those of the earlier two paddy projects:

a. The project as proposed by FAO/CP is less complex, there are fewer agencies involved and, apart from strengthening the extension services, it would be limited to implementation by the Irrigation Department (ID).

b. The civil works are in real terms less costly than in the earlier projects since there is significantly less earthwork involved, in part due to existing embankments, and fewer structures. On the other hand, individual sluice structures would be larger than those built under Paddy I and II; the project requires two major creek closures, larger than any so far constructed in Burma; and a significant feeder road component is included which was absent in the earlier projects.

c. Equipment costs are also in real terms considerably lower, due to the exclusion of farm and land clearing equipment; the utilization of existing construction equipment; 1/ and lower requirements due to the reduced civil works;

d. The extent of land to be reclaimed under the project is stated to be considerably lower than in the two earlier projects, accounting for only 16,000 acres or 7% of the ´with

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1/ According to FAO/CP, this results in some financial savings but has minimal economic benefits. This latter conclusion appears, however, to be incorrect. In making the comparison between new and existing equipment, the new equipment is assumed to have a residual value and therefore the economic costs to the project are by definition the same. To the nation, however, it is still clearly less economic to purchase new equipment and leave used equipment idle than to make use of the latter. If this in fact turned out to be the practice, then new equipment would have to be fully depreciated during the project for which it is bought (i.e. no residual value), in which case it would clearly be more expensive than making use of available partly depreciated machinery. Of course, without affecting the underlying economic rationale, it might be argued that IDA projects should use new machinery because there are always non-IDA projects which can use second-hand machinery, but this appears rather hard on these other projects and seems to contradict the arguments by the Irrigation Department that there is surplus existing equipment which would be underutilized if not used for the Paddy III Project. A careful review at appraisal will, however, be required to ensure that used equipment transferred to the project is dependable throughout the implementation period.

project' net cropped area, compared to an expected 57,000 acres or 31% under Paddy I and 44,000 acres or 25% under Paddy II. The extent of reclaimable land is also very much lower than the 50,000 - 60,000 acres implied by the Halcrow Reconnaissance Study. This has adverse implications for the economic viability of the proposed project, though it seems probable that FAO/CP has been over-conservative in their assumptions (see below).

e. The project area is located entirely in the lower delta whereas the two earlier projects were also partly in the middle delta. The potential for dry season cropping is therefore more limited (although there may be access to fresh water for part of the year - see para 12 below).

Economic Analysis

5. As a result of these various factors, both the costs and the benefits appear to be lower for Paddy III than for the previous projects, with the benefits further reduced by a much lower projected rice price. No attempt has been made to recalculate the relative economic returns of the three projects, which for the earlier projects would in any case require a reassessment of the SAR assumptions. However, the comparisons presented in Table 1 show that, while the SAR rates of return estimated for Paddy I and II (EIRRs of 30% and 24% respectively) will almost certainly prove to have been too optimistic, 1/ it seems very probable that the earlier projects will still remain more economically attractive than the proposed Paddy III project.

6. There are, however, a number of doubts concerning the economic analysis provided by the FAO/CP report These doubts suggest that FAO/CP may have underestimated the returns from incremental paddy production but overestimated those from irrigated chick peas. The main issues relate to: (i) the 'without' situation and the area to be reclaimed as a result of the project, (ii) the adoption of HYVs, (iii) the irrigation component, and (iv) the cost assumptions. These are discussed in turn below.

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1/ If for no other reason than lower projected rice prices, the 1985 fob Rangoon price at 1982 prices assumed in the Paddy I SAR was $409 per long ton, in the Paddy II SAR was $371 per long ton and in the Paddy III FAO/CP report was $314 per long ton. The effects of the earlier projects on crop production are still uncertain although preliminary evidence suggests that the Paddy I and II SARs overstated likely dry season cropping but may have understated the impact on paddy production.

Table I

Comparison of Paddy I and II SAR Assumptions with Those of the Paddy III FAO/CP Report

| | Paddy I | Paddy II | Paddy III |
|---|---|---|---|
| Total Project Base Costs | $38.9 M at 1976 Prices | $46.0 M at 1978 Prices | $33.5 M at 1982 Prices |
| Est. Civil Works & Const. Equip. Costs at 1982 Prices 1/ | | | |
| Total | $ 39 M | $ 37 M | $ 33 M |
| Per acre of net cropped land | $215 | $210 | $150 |
| Change in Areas: 2/ Acres | | | |
| Net Cropped Area | + 57,000 | + 44,000 | + 16,000 |
| HYV Paddy | + 73,000 | + 79,000 | + 92,000 |
| Local Paddy | - 5,000 | - 25,000 | - 78,000 |
| Pulses | + 45,000 | + 37,000 | + 22,000 |
| Other | + 11,000 | + 20,000 | - |
| Change in Production: Long Tons | | | |
| Paddy | +150,000 | +137,000 | + 71,000 |
| Pulses | + 18,000 | + 6,800 | + 6,800 |

1/ These estimates represent a rough attempt to obtain comparable Irrigation Department costs for the three projects by: (i) excluding non-ID costs, (ii) excluding the allocation for the ID's central workshop under Paddy II, (iii) including an allowance for equivalent new equipment under the proposed Paddy III, and (iv) allowing for inflation based on the GDP deflator for local costs and the world manufacturing unit value index for foreign costs as follows:

| | 1976 - 82 | 1978 - 82 |
|---|---|---|
| Local Costs | +15% | + 5% |
| Foreign Costs | +60% | +30% |

2/ While the estimate for the area to be reclaimed under Paddy III is substantially lower than for the earlier projects and dry season cropping will be less significant, FAO/CP are more optimistic concerning the conversion of existing areas to HYVs. This reflects experience with the on-going projects (see para 11).

The 'Without' Situation in the Project Area

7. As stated above, the project area was selected on the basis of a reconnaisance study by consultants. In making the selection, a major assumption was that the present cropping intensity amounted to a (relatively low) 74.3% and that therefore the benefits from reclamation of currently unused land would be substantial. On closer study by the FAO/CP preparation team, however, it was found that the current cropping intensity is substantially higher at an estimated 92%. 1/ Assuming that the 'future without project' land use pattern remains the same as the 'present' case, this suggests that the project's benefits will be substantially lower than originally anticipated.

8. There are, however, reasons for suspecting that conditions in the project area are, or at least will become without the project, less favorable than assumed by FAO/CP. The Report estimates a present net cropped area of 211,300 acres which is assumed to be 100% harvested. Although this is somewhat below the area sown in 1980/81 (218,600 acres) and 1981/82 2/ (216,800 acres), it is somewhat above the respective areas harvested (209,300 and 191,800 acres). Presumably an allowance should have been made in the economic analyses for the average paddy damaged in the 'without' situation (and hence for the seed and related costs incurred).3/ At the very least the benefits should have been applied to the net area harvested and, although no doubt crop losses vary considerably from year to year, the limited evidence quoted in the report suggests that the area harvested is somewhat below 211,300 acres.

9. Perhaps more significant than the absolute area assumptions, however, is the fact that the situation in the project area may be deteriorating. For instance, the cultivated paddyland in 1971 is estimated to have been 221,010 acres based on aerial photo interpretation (Annex 3, Table 3.2 of the Report), some 5% greater than the 1981/82 area assumed in the Report. Furthermore, and more significantly, during a recent field visit, an IDA mission was informed by local officials and farmers that during the past five years or so, flooding had been aggravated by the progressive siltation of the Bassein Creek and that, as a result, land has had increasingly to be abandoned. Figures quoted to the mission were "5,000 acres per year" in Twante Township, and 1,200 acres in 1981/82 and 3,000 acres in 1982/83 in Kunyangon Township. The

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1/ The discrepancy appears to have arisen because the Consultant's used average township-wide data to approximate conditions in the project area, whereas FAO/CP collected detailed village tract data specific to the project area.

2/ The only years for which data is provided in the Report.

3/ Presumably this should apply not only to the area completely lost but also to those areas which had to be replanted. Together these have averaged about 20% of the sown area over the last five years.

mission had no means of checking on these figures but there is a prima facie case that this is likely, given that the Bassein creek is the major drainage line in the area. 1/ Indeed, the FAO/CP report provides some corroborating evidence of the effects of such a deterioration in terms of a general increase in the paddy areas affected and damaged by floods. This evidence is summarized in Table 2.

Table 2

Flood Affected and Destroyed
Paddy in the Paddy III Project Area

| | Paddy Area | | % of Net Cropped Area 3/ | |
|---|---|---|---|---|
| | Replanted | Destroyed | Replanted | Destroyed |
| | ----- ' 000 acres ----- | | ---------- % ---------- | |
| 1977/78 | 29.9 | 9.0 | 14.1 | 4.3 |
| 1978/79 | 32.8 | 9.8 | 15.5 | 4.6 |
| 1979/80 | 18.9 | 9.0 | 8.9 | 4.3 |
| 1980/81 | 34.0 | 14.4 | 16.1 | 6.8 |
| 1981/82 | 36.5 | 21.4 | 17.3 | 10.1 |

1/ Area destroyed by flood and replanted one or more time.
2/ Area destroyed by flood and not replanted (total crop loss).
3/ Based on FAO/CP estimate of current net cropped area of 211,300 acres.

Source: FAO/CP Preparation Report Annex 6, Table 6.7.

10. Assuming 10,000 acres were to be abandoned in the future (a not unreasonable assumption given the above evidence), this alone would increase the incremental paddy production as a result of the project by as much as 20% above the FAO/CP estimate. ID has been requested to investigate past trends in more detail, monitor conditions in 1982/83, and make an evaluation of future prospects without the project. On the basis of their findings, FAO/CP should be asked to revise their economic analysis, at least to indicate the effects on the project's ERR of a modest deterioration in the 'without' case.

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1/ There seems no doubt that this creek has silted up rapidly over the recent past. Before the Twante canal was constructed in the late 1800s, this was the main route to Bassein but it is now possible to drive across it in its middle.

The Adoption of HYVs

11. The FAO/CP Report assumes that, despite large scale conversion of existing areas to HYVs, farmers will continue to grow significant areas of low yielding local varieties for their own consumption (2 acres out of a 15 acre holding), even where conditions would permit cultivation of HYVs. Evidence from Paddy I, however, suggests that this need not necessarily be the case. Table 3 summarizes data for four completed Paddy I polders (see Annex 1 for more details). HYVs accounted for 99% of the planted area in 1982/83 in Zinbaung polder, the first to be completed, with an average yield exceeding that projected by FAO/CP for the Paddy III area at full development. The shares of HYVs in Kyetphamwezaung and Dedalu are significantly lower, but these have only recently been completed, and for the former in particular the adoption of HYVs has been constrained by continued flooding in low lying areas rather than farmer taste preference. Although no doubt some local varieties will continue to be grown, GOB officials argue that recent HYV releases are fully accepted by the farmers and that, in any case, detailed planning and control by the Township authorities will preclude extensive areas of local varieties where HYVs are technically feasible. If all the latter areas were planted to HYV, incremental paddy production would increase by almost 30% above the FAO/CP estimate. FAO/CP should therefore be requested to show the effect on the project's ERR of relaxing their assumption that farmers will continue to grow local varieties for their own consumption.

Table 3

Paddy I (Credit 642-BA)

Share of HYVs: Completed Polders

| | First Year Project Works Fully Operational | ---% HYVs in Total--- 1981/82 | 1982/83 |
|---|---|---|---|
| Zinbaung | 1980/81 | 95 | 99 |
| Letpanbin | 1980/81 | 79 | 92 |
| Kyetphamwezaung | 1982/83 | 25 | 33 |
| Dedalu | 1982/83 | 40 | 46 |

Source: Annex 1.

The Irrigation Component

12. Irrigation from surface water will only be possible if fresh water is available at least until end-February, at one or both of the two potential intake sites, so that short season winter crops can be guaranteed. 1/ Provided this can be demonstrated, the inclusion of an irrigation component would require: (i) modification of the drainage structure(s) at the intake site(s), and (ii) construction at a cost of about US$ 0.8 M of the interconnector drainage channels to allow gravity supply of freshwater throughout the drainage system. Irrigation would then be by low lift pumps which would not be provided by the project but would be available through the normal Agricultural Mechanization Department (AMD) program.

13. Given the heavy soils and their general unsuitability for diversified winter cropping, the spread of irrigation is likely to be fairly slow and the returns limited. FAO/CP argue than up to 20,000 acres of irrigated chick peas could be envisaged and rule out the cultivation of oil seeds. However, on the basis of limited evidence available elsewhere in the delta, it seems more probable that there will be a slow development of mixed winter cropping depending on such factors as: (i) local soil differences, (ii) the timing of the paddy crop, (iii) the availability of tillage equipment and farm laborers, (iv) the financial resources available to farmers, (v) the relative movements of crop prices, (vi) the plans of the Township councils etc. Relatively little adaptive research has been undertaken on the heavy delta soils but, provided sufficient tillage is undertaken (at of course a relatively high cost), and provided fresh water is available, it seems some dry season cropping is possible including pulses, oilseeds and perhaps some other crops.

14. The question is therefore whether it is worth providing the facilities for irrigation, given a fairly pessimistic outlook for dry season irrigation. The FAO/CP report implies that the returns from irrigated chick peas are very high, but this is an error due almost entirely to an exceptionally high import parity price assumption. A recent SAR for a groundwater project assumed an economic price for chick pea of Kyats 1,614 2/ per ton, compared to the FAO/CP assumptions of Kyats 10,089 per ton. On this basis, the economic returns from irrigated chick pea would be questionnable. Even so, the incremental costs associated with providing an irrigation capability would be relatively small and there would be important benefits to be derived from the provision of fresh drinking water during the dry season. Furthermore, for the reasons

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1/ FAO/CP only mention the Twante intake site, but during the IDA mission the possibilities of supply from the China Bakir river even until as late as April was identified. ID are monitoring salinity levels at both sites.

2/ This appears to be consistent with an actual average export unit price for pulses in 1981 of Kyats 2,175 per ton.

given above it is difficult to foresee exactly how farmers will respond to the opportunities provided.

15. It is recommended therefore that FAO/CP be requested to undertake an incremental analysis of the costs and benefits of providing irrigation. This analysis could be expressed in terms of the minimum dry season area required to justify the additional costs. Chick pea or an appropriate mixture of pulses and oilseeds could be taken to represent the possible cropping pattern, but it would be accepted that in practice farmers would respond to the economic and technical opportunities available to them in a way which is difficult to foresee. Provided the project as a whole proves viable based on incremental paddy production, and provided fresh water is shown to be available, it seems likely that inclusion of an irrigation component would prove justified given the limited costs, the provision of drinking water and the Government's overall diversification strategy. Promotion of dry season cropping, whether of chick peas or other alternative crops, could be supported by the extension services and an applied research program, while the sale of pumps would be expected to move at a pace reflecting farmer acceptance of irrigation opportunities.

Project Cost Estimates

16. For a number of reasons, the estimates of project costs are less certain than is normal for a feasibility study. To allow for this, FAO/CP have provided for 20% physical contingencies on all civil works in particular: (i) for earthworks, to protect against increased costs due to possible changes due to low accuracy topograhic surveys, (ii) for roads, to permit adjustment to alignment and total length, and (iii) for structures, to account for more complex piling in the event that site investigations indicate this. To complete preparation, and to establish a basis for more accurate cost estimates, FAO/CP recommended that ID should undertake: (i) site surveys and investigations for the six major hydraulic structures, (ii) topographic surveys of land form, and creek cross section, to check those used in the report, (iii) topographic and site investigation surveys for the two major closure sites, and (iv) tidal measurements at all major structure sites (and salinity measuremens at the proposed irrigation intake sites - see para 11).

17. During the March IDA Review Mission, assurances were received from ID that these surveys and monitoring exercises were being undertaken, and that the surveys and site investigations would be completed before the 1983 monsoon season. ID should be reminded of this and, together with FAO/CP, should be requested to revise the estimates of costs to take into account the results of such surveys. Furthermore, it is possible that other aspects of FAO/CP's estimates will need to be revised. In particular, GOB should be requested to comment on (i) the drainage modules and spacing of drains assumed in the report, and (ii) the method of construction assumed for the Bassein Creek closures. If, in the light of their views, modifications to the cost estimates prove necessary, these should also be agreed with FAO/CP.

18. While FAO/CP may have underestimated drainage costs, this may have been offset by the high physical contingency allowance with a consequent adverse effect on the project's ERR. Furthermore, a substantial roads component is included which, while contributing to the marketing of project output, will be primarily concerned with improving general communications in the project area. As for the drinking water contribution of the interconnector drains (para 14), this could have important indirect benefits (in particular in a sparsely populated area so close to Rangoon) but should be excluded in the evaluation of the agricultural returns of the project. This should be in addition to the analysis excluding the incremental costs and benefits of the irrigation component so that a clear picture of the likely project ERRs for (i) paddy alone and (ii) paddy plus dry season cropping are obtained.

Conclusions

19. Mr. Zagni (FAO/CP) is leading a preparation mission for the proposed Irrigation Rehabilitation (Mu (Kabo) Project), arriving in Burma in June for a period of four weeks. It is recommended that, while in Burma, he should also review with ID the status of preparation of Paddy III and discuss the implications of on-going surveys and investigations for the estimates of the projects costs and benefits, as well as obtain any other ID comments. On his return to Rome, he should report to IDA and GOB on any outstanding issues and assess a possible schedule for appraising the project in the second half of this year. Proposed letters to both FAO/CP and GOB are attached, setting out these suggestions and, if you agree, it is suggested that copies of this memorandum should also be provided to them. Finally, there would be some advantages in scheduling a mission by an IDA staff member to coincide with that of FAO/CP to review the position on Paddy III as well as participate in activities related to other projects (notably the proposed Irrigation Rehabilitation and Henzada Pump projects).

Cleared with & cc: Messrs. Unhanand (ASPAA)
Tamboli (ASPAA)

cc: Messrs. Haynes (ASPDR)
Shibusawa (ASADC)
Hatendi (ASADC)
Niaz (AGR)
Collins (AGR)
Azumi (ASPAA)

DJWBerkoff/jcj

## AGRICULTURAL IMPACT OF COMPLETED POLDERS

| | % Completed | | | PADDY | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Embank | Drainage | Structures | Sown Area | Harvested Area | Yield | Production | Production Over Previous Year | Area Under HYVs | Area Under Other Crops |
| | % | | | Acres | Acres | Bkts/ac | '000 Bkts | % | | Acres |
| **Zinbaung** | | | | | | | | | | |
| 1977/78 | 0 | 0 | 0 | 4,330 | 4,285 | 41.2 | 176.7 | + 4.9 | n.a | n.a |
| 1978/79 | 98 | 58 | 75 | 4,729 | 4,664 | 47.1 | 219.5 | +24.2 | n.a | n.a |
| 1979/80 | 100 | 100 | 95 | 6,465 | 6,361 | 57.2 | 363.5 | +65.6 | n.a | n.a |
| 1980/81 | 100 | 100 | 100 | 6,658 | 6,607 | 67.2 | 443.9 | +22.1 | n.a | n.a |
| 1981/82 | 100 | 100 | 100 | 6,612 | 5,897 | 75.8 | 446.8 | + 0.6 | 95 | 321 |
| 1982/83 | 100 | 100 | 100 | 6,583 | 6,220 | 80.5 | 500.4 | +12.0 | 99 | 550 |
| % Increase: 77/78 - 82/83 | | | | +52 | +45 | +95 | +183 | | | |
| **Letpanbin** | | | | | | | | | | |
| 1976/77 | | | | 4,597 | 4,536 | 38.4 | 174.2 | +13.2 | n.a | n.a |
| 1977/78 | 0 | 0 | 0 | 4,594 | 4,506 | 43.8 | 197.2 | + 0.7 | n.a | n.a |
| 1978/79 | 18 | 13 | 12 | 4,603 | 4,591 | 44.0 | 198.5 | + 7.3 | n.a | n.a |
| 1979/80 | 100 | 100 | 95 | 4,554 | 4,391 | 48.5 | 212.9 | +72.9 | n.a | n.a |
| 1980/81 | 100 | 100 | 100 | 5,818 | 5,712 | 64.4 | 368.0 | +53.3 | 79 | 86 |
| 1981/82 | 100 | 100 | 100 | 7,807 | 7,781 | 72.5 | 564.0 | - 2.5 | 92 | 370 |
| 1982/83 | 100 | 100 | 100 | 7,627 | 7,403 | 74.0 | 547.4 | | | |
| % Increase 77/78 - 82/83 | | | | +66 | +63 | +93 | +214 | | | |
| **Kyetphamwezaung** | | | | | | | | | | |
| 1977/78 | 0 | 0 | 0 | 19,778 | 18,114 | 39.7 | 718.6 | n.a | n.a | n.a |
| 1978/79 | 0 | 0 | 0 | n.a | n.a | n.a | n.a | n.a | n.a | n.a |
| 1979/80 | 50 | 28 | 40 | 19,346 | 18,442 | 43.0 | 792.8 | +10.3 | n.a | n.a |
| 1980/81 | 98 | 58 | 70 | 19,766 | 13,946 | 47.2 | 658.1 | +17.0 | n.a | n.a |
| 1981/82 | 100 | 80 | 100 | 20,959 | 20,136 | 48.3 | 972.4 | +47.8 | 25 | 106 |
| 1982/83 | 100 | 100 | 100 | 22,398 | 21,674 | 61.4 | 1,336.8 | +37.5 | 33 | 520 |
| % Increase: 77/78 - 82/83 | | | | +13 | +20 | +55 | +86 | | | |
| **Dedalu** | | | | | | | | | | |
| 1977/78 | 0 | 0 | 0 | 1,300 | 1,175 | 37.3 | 43.7 | n.a | n.a | n.a |
| 1978/79 | 0 | 0 | 0 | 1,333 | 1,266 | 39.0 | 49.4 | +13.0 | n.a | n.a |
| 1979/80 | 0 | 0 | 0 | 1,202 | 1,217 | 43.4 | 52.8 | + 6.9 | n.a | n.a |
| 1980/81 | 53 | 4 | 42 | 1,303 | 1,264 | 56.5 | 71.4 | +35.2 | n.a | n.a |
| 1981/82 | 100 | 82 | 100 | 1,059 | 1,049 | 53.2 | 55.8 | +21.8 | 40 | n.a |
| 1982/83 | 100 | 100 | 100 | 1,749 | 1,582 | 65.5 | 103.6 | +85.7 | 46 | n.a |
| % Increase: 77/78 - 82/83 | | | | +35 | +35 | +76 | +137 | | | |

Annex 1

BA - Paddyland (3)

BY FAO POUCH

May 12, 1983

Mr. Maurice Fenn
FAO/World Bank Cooperative Program
Investment Centre
Via delle Terme di Caracalla
00100 Rome, ITALY

Dear Maurice,

BURMA - Lower Paddylands Development III Project

May 12, 83

1. As promised, I attach a memorandum setting out a review of certain aspects of the Preparation Report for the above project, together with a letter addressed to the Director General of Irrigation. These reflect the discussions that the IDA Review Mission for Paddy I and II held in Burma in March, as well as those held with both a GOB delegation and yourself in Washington in April. I apologize for the delay in sending these documents to you but hope they will arrive before Tony Zagni and his team leave for the preparation of the proposed Irrigation Rehabilitation Project in early June.

2. As discussed, we would be grateful if Tony and his team could:

   a. Review the status of preparation for the Paddy III Project, in particular that of the on-going surveys and investigations being undertaken by the ID, and establish together the ID what further work - if any - is required before appraisal.

   b. Review the implications of these on-going surveys and investigations, as well as any other comments made by the ID, for the assumptions and estimates contained in the Preparation Report; and

   c. On return to Rome, revise the economic analysis contained in the report to take into account (b) above, as well as the comments included in the attached memorandum.

3. As far as the revision to the economic analysis is concerned, we have suggested that:

a. The 'without project' assumptions concerning land use and cropping intensities should be reviewed to take into account the possibility that conditions in the project area are deteriorating (paras 7-10);

b. The assumption that all farmers will retain a part of their land for local varieties should be reviewed in the light of the evidence from Paddy I (para 11);

c. The economic viability of the irrigation component should be established in terms of its incremental costs and benefits, demonstrating the minimum dry season cropped area required to justify the additional costs incurred. In estimating dry season benefits, the economic price of chick peas should be revised and the possiblity of a slow buildup in diversified winter cropping rather than chick pea monoculture should be assessed (paras 12-15);

d. Project costs should be revised to take into account the results of on-going ID surveys and site investigations, as well as any comments ID may have on the design criteria adopted in the Report (para 16-17); and

e. In evaluating the agricultural returns, the roads component should be excluded in order to provide the ERR for: (i) a pure paddy production project, and (ii) a project also including a dry season irrigation component (para 18).

4. We realize that this will not be Tony Zagni's primary purpose in going to Burma but we attach importance to finalizing the preparation of Paddy III and hope that we can expect a memorandum from you covering the above sometime in July. We are also considering the possibility of sending an IDA staff member to Burma to coincide with Tony Zagni's mission. This would have many advantages and we will let you know what is decided as soon as possible.

5. GOB informed the IDA Review Mission in March that they would like to delay appraisal until mid-1984. This would allow initial project works to be phased in following completion of the (delayed) Paddy I project, now rescheduled for 1984/85. However, during the GOB mission in April to negotiate the first Groundwater Project, the possibility was raised that appraisal of the project should be brought forward to this year, presumably in October/November after the monsoon season. Subject to

finalization of our FY84 budget, we would like to be in a position to arrange such a mission and would therefore be grateful if the preparation activities described above could be completed as soon as possible.

With warm regards,

Yours sincerely,

Tae-Hee Yoon
Division Chief
Irrigation I Division
South Asia Projects Departments

bcc: Messrs. U Khin Maung Latt
Director General
Planning and Statistics Department
Ministry of Agriculture and Forests
Rangoon, Burma

U Thein Myint
Director General
Foreign Economic Relations Department
Rangoon, Burma

U Maung Maung Kyi
Director General
Department of Irrigation
Rangoon, Burma

Cleared with & bcc: Messrs. Unhanand
Tamboli

bcc: Messrs. Messrs. Haynes, Shibusawa, Hatendi, Azumi

DJWBerkoff/jcj

BA-Paddyland (3)

May 12, 1983

U Maung Maung Kyi
Director General
Irrigation Department
9/21 Strand Road
Rangoon, Burma

Dear U Maung Maung Kyi:

BURMA - Lower Paddylands Development III Project

1. As promised, I attach a memorandum (May 12, 83) reviewing certain aspects of the Preparation Report for the proposed Paddy III Project, together with a copy of a letter we have sent to the FAO/World Bank Cooperative Program in Rome. The main issues covered in the memorandum were discussed by the IDA Review Mission for Paddy I and II when they visited Rangoon in March, and again during your recent visit to Washington. This letter therefore simply highlights our understanding of the present status of the preparation of this project and what is necessary for further project processing to proceed.

2. In the Report, FAO/CP set out a number of surveys and investigations which will need to be completed before the project can be appraised, specifically (para 11.2):

a. Site investigations at the six major hydraulic structure sites using standard procedures and laboratory testing to establish the necessary parameters for foundation design;

b. Site surveys at the major hydraulic structure sites and guage zero checks on adjacent tide boards using accurate datums;

c. Topographic and site investigation surveys of the two major closure sites;

d. Monitoring of the water levels and salinity concentrations at the proposed Twante inlet structure site, and tidal readings at the five other major structure and two major closure sites;

e. Topographic surveys of land form and creek cross sections to check those used in the FAO/CP report, with corrections as appropriate;

f. Completion of soil survey chemical test results and their interpretation, with special emphasis on the likely development of alkali soils following project execution; and

g. Survey of all items of equipment likely to be transferred to the project, listing of spare part lists that are required, and preparation of draft tender documents for the new equipment required.

3. We understand that the Irrigation Department has these various surveys and investigation in hand and that, to the extent possible, they will be finalized before the onset of the monsoon season. In addition, it was agreed during the March mission that the Irrigation Department would: (i) investigate a possible irrigation intake site which would receive supplies from the China Bakir River, and monitor water levels and salinity concentrations at this site during 1983, and (ii) investigate trends in the project area, specifically with the intention of establishing whether or not flooding has been aggravated in recent years by the progressive siltation of the Bassein Creek (see the Mission's Aide Memoire, para 16).

4. We suggest that Mr. Zagni and his team should review progress of these surveys and investigations during his forthcoming mission to prepare the proposed Irrigation Rehabilitation (Mu (Kabo)) Project and that, together with your staff, he should establish what additional work - if any - is still required before appraisal. He should also review with your staff the implications of the results of these surveys for the assumptions and estimates contained in the Preparation Report and make any revisions necessary. If you have any other comments on the report, or on the project design (for instance the criteria used to determine drainage requirements), these should also be discussed wih Mr. Zagni, and if necessary, the project cost estimates should be adjusted. Following his return to Rome, we have suggested FAO/CP should revise the economic analysis contained in the Report, to take into account such revisions as well as certain suggestions contained in the attached memorandum and letter.

5. Provided these activities are completed satisfactorily, we would hope to be in a position to appraise the project later this year, following the end of the monsoon. In general, we believe that construction of Paddy III should be phased so as to follow on from the completion of Paddy I (see my letter dated May 3, 1983). However, we would do our best to arrange an appraisal mission in accordance with the preferences of the Government of Burma, leaving the specific scheduling of project activities to be agreed between you and the appraisal mission.

6. We would be grateful for any comments you may have on the above or on the attached memorandum and hope the proposed arrangements meet with your agreement.

With warm regards,

Yours sincerely,

Tae-Hee Yoon
Division Chief
Irrigation I Division
South Asia Projects Department

cc: U Khin Maung Latt
Director General
Planning & Statistics Department
Ministry of Agriculture and Forests
Rangoon, Burma

U Thein Myint
Director General
Foreign Economic Relations Department
Rangoon, Burma

Mr. Maurice Fenn
FAO/IBRD Cooperative Program
Rome, Italy

Cleared with & bcc: Messrs. Unhanand
Tamboli

bcc: Messrs. Haynes, Shibusawa, Hatendi, Azumi

DJWBerkoff/jcj

Back to office report

10. According to IDA's records, approximately US$ 7 million remains undisbursed under the Paddy I credit. The mission understands that project costs are likely to remain within original estimates despite the delay in completing the project. If so, it appears that under present arrangements the credit would not be fully disbursed. The mission recommends that GOB requests IDA to increase the reimbursement percentage for civil works, from the current 50%, to 70% to ensure that GOB receives the full benefits from the IDA credit.

Reporting

11. IDA has regularly received quarterly and annual reports prepared by the Irrigation Department for Paddy I. It has only occasionally received such reports for Paddy II while similar reports prepared by the Agriculture Corporation and the Agricultural Mechanisation Department have seldom been received. The mission urges that all reports on project progress should be regularly sent to IDA in Washington.

12. Audit reports for Paddy I for the years 1977/78, 1978/79 and 1979/80 have been received by IDA and for Paddy II for one year only. Under the credit agreements, such reports should be provided within nine months of the end of the fiscal year and the mission recommends that this schedule be followed.

Hydrological Investigations

13. The mission understands that GOB has requested a proposal from the Hydrological Research Station, Wallingford, UK, for the extension of the Delta modelling exercise to encompass the apex of the delta. Once agreement has been reached on this proposal between HRS and GOB, the mission suggests that it should be submitted to IDA for review and for possible financing under the credit.

## B. The Proposed Paddy III Project

14. The mission has reviewed the FAO/IBRD CP Preparation Report with GOB officials and has made a short visit to the proposed project area. On the basis of its discussions, it has tentatively concluded that the project appears to have an acceptable economic return and to be technically viable. Nevertheless, it believes that it will be necessary to review certain assumptions contained in the report, notably in relation to the irrigation component: the estimate of costs and allowance for physical contingencies: the justification and benefits of the road component: and the expectation that farmers will grow local paddy varieties for their own consumption even where HYVs are technically feasible. Any communications with FAO/IBRD CP, and any reworking of the Report's analyses that may result, will be sent to GOB for information and review.

15. Apart from this review, there are a number of surveys recommended by the Preparation Report as being necessary to finalise preparation of the project. These are set out in para 11.2 of the Report. The mission understands that the Irrigation Department has several of these in hand and recommends that all should be completed as soon as possible.

16. As a result of its field visits, the mission suggests that in two other respects further investigations may also be justified. First, it learnt that, in the view of certain local officials and farmer representatives, flooding in the project area has been aggravated in recent years by the rapid siltation of the BASSEIN Creek. As a result, crop losses appear to have increased and areas of agricultural land are being abandoned each year. In the short time available, the mission was unable to establish the significance of these trends,

but if these impressions are confirmed, this suggests that the benefits from the project should be correspondingly increased to take into account the avoidance of further deterioration in agricultural conditions. The mission recommends that this should be further investigated. Secondly, the mission also learnt that farmers irrigate with water from creeks served near KUNGYANGON from the CHINA BAKIR River as late as March. If so, the proposed hydraulic structure at KUNGYANGON might serve as an alternative or supplementary intake for irrigation to that proposed on the TWANTE canal by the Preparation Report. The mission recommends that salinity levels should be monitored and the impact of large scale water extraction on the progress of the saline front evaluated, to establish the relative potential for irrigation based on water intake at both these sites.

17. In discussions with the Ministry of Agriculture, the mission learnt that the Paddy III project is included under the Fourth Four Year Plan but that the Ministry does not envisage early appraisal of the proposed project. It was provisionally agreed with the Ministry representative therefore that appraisal would take place in Burmese fiscal year 1984/85 (April 1984 - March 1985) to allow presentation to IDA's Board during IDA's fiscal year 1984/85 (July 1984 - June 1985). This timetable would have the major advantage that initiation of construction under Paddy III would phase in following the proposed completion of Paddy I in the 1984/85 construction season, thus allowing for the orderly transfer of staff, equipment and other facilities to the new project.

18. This timetable would provide more than adequate time for the completion of all the necessary surveys and investigations required before appraisal can be envisaged. Indeed, it would provide sufficient time for the investigation

of possible alternative project areas to establish whether or not that investigated by the FAO/IBRD CP has in fact the most acceptable economic potential. Given the time necessary for the adequate preparation of such an alternative project, the mission recommends that GOB request IDA for the initiation of the necessary studies. Such studies should not, however, be at the expense of completion of the necessary surveys and investigations for the KAWMHU area, and under all eventualities the mission recommends that these should be completed expeditiously.

SAIC

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

TO: Messrs. K. Unhanand, P.M. Tamboli, D.J.W. Berkoff, ASPAA and A. Youssef, Resident Mission (PAK)

DATE: February 23, 1983

642-BA
835-BA
BA Paddyland 3
754-PAK

FROM: Tae-Hee Yoon, Chief, ASPAA

SUBJECT: BURMA - Supervision - Paddyland I Project Cr. 642-BA
- Paddyland II Project Cr. 835-BA
Preparation - Paddyland III Project
PAKISTAN- Supervision - SCARP VI Project Cr. 754-PAK
Terms of Reference

BURMA

1. Messrs. Unhanand, Tamboli and Berkoff will arrive in Rangoon on or about February 28, 1983 for the supervision and review the preparation of the projects listed above. For Paddyland I and II Projects particular attention should be given to:

(a) the progress of civil works;
(b) implementation schedule;
(c) design criteria concerning drainage capability of structures;
(d) procurement progress;
(e) land clearing and settlement;
(f) agricultural extension services program;
(g) distribution of agricultural equipment;
(h) economic evaluation study;
(i) revised project cost estimates; and
(j) budget allocation for 1983-84.

2. For Paddyland III Project the mission should discuss with GOB the project as presented in the preparation report dated November 24, 1982. The mission should discuss with GOB as to how to make use of the technical assistance provided for under the Tank Irrigation I Project in case there is a delay in the implementation of Paddyland III Project.

3. Mr. Unhanand will have overall responsibility for the mission, and in particular, engineering aspects of the project. Mr. Tamboli will be responsible for the agricultural aspect of all projects including the agricultural extension services, land clearing and settlement, and distribution of agricultural equipment. Mr. Berkoff will be responsible for the economic aspects of the projects with particular emphasis on the economic evaluation study, cost estimates and budget allocation. He will pay special attention in following up the progress of the preparation of the Irrigation Rehabilitation Project and in the discussion in detail Paddyland III Project Preparation Report with GOB and Mr. Zagni (FAO/CP) who will be in Rangoon at that time.

4. The mission should complete its works on or about March 12 at which time Mr. Unhanand will proceed to Lahore, Pakistan for the supervision of SCARP VI Project, Mr. Tamboli will travel to Dhaka, Bangladesh for the supervision of Hand Tubewells Project and preparation of Hand Tubewells II Project (separate TOR), and Mr. Berkoff will proceed to Colombo, Sri Lanka to follow up the sector study (separate TOR).

5. Upon return to Washington, the mission should prepare full supervision reports for Paddyland I and II projects and back-to-office report for Paddyland III project.

PAKISTAN

6. Mr. Unhanand will arrive in Lahore on or about March 13 to supervise SCARP VI Project. He will be joined by Mr. Anis Youssef of the Resident Mission, a KFW engineer, and an ODA team consisting of Messrs. M. Watson, Agricultural Adviser; G. Gwyer, Agricultural Economics Adviser; B. Jackson, Engineering Adviser; and I. Johnson, Agricultural Engineering Adviser. The mission should pay particular attention to:

(a) project progress;
(b) FY84 work program;
(c) updated planning report;
(d) procurement of 11KV distribution lines;
(e) consultants activities;
(f) monitoring and evaluation;
(g) audit reports and compliance with major covenants; and
(h) project related activities including credit for private tubewells, land levelling and reclamation and status of the amendments to the Development Credit Agreement.

7. You should complete the mission on or about March 22 and leave an aide memoire with the Resident Mission before departure from Pakistan. Upon your return to Washington you will prepare a back-to-office and full report for the project.

Cleared w/& cc: Messrs. Artaza, Hatendi

Distribution:

Messrs. Thalwitz, Haynes, Saeed (ASPDR)
Holsen, West (ASNVP)
Wiehen, Pilvin (ASADR)
Sibusawa (ASADC)(3)
Clements (ASADA)
Rajagopalan (PAS)(3), Dickerson (PAS)
Yudelman (AGR)(3)
Swahn (EDC)
Toft, Mead (LEG)
Ms. Gunnarsdottir, Williams (LOA)
Resident Mission (Islamabad)(4)
SAIC

KUnhanand:df

SAIC


# SIR WILLIAM HALCROW & PARTNERS CONSULTING ENGINEERS

BURDEROP PARK SWINDON WILTSHIRE SN4 0QD HEAD OFFICE: SHORTLANDS LONDON W6 8BT

TELEPHONE: 0793 812479 CABLES PROPULSION SWINDON WILTS

TELEX: 44844 (A/B HALWIL G)


BA - paddyland dev. (3)

OUR REF: WW/IDS/61 YOUR REF:

10 December 1982

K Unhanand Esq
Room 4171
H Building
World Bank
WASHINGTON

Dear Mr Unhanand

DESIGN OF PADDY III

As promised in our telephone call of 6 December, I enclose some notes on the preliminary design of Paddy III which I carried out as a member of the FAO team led by Mr A Zagni. A full description may be obtained from a perusal of the report of that team.

The analysis of tidal drainage in branched or looped networks is an extremely time consuming and difficult task, and it is not surprising that the Irrigation Department should have had problems with Paddy I and Paddy II, as they did not have a computer to aid the design office. In the middle delta areas, such as Shwelanng and Thongwa, the problem is further complicated by the fact that the system response time is in the order of 2-3 months rather than 4-6 days in the coastal areas, due to the effect of the annual hydrograph of the Irrawaddy on the middle delta tides.

If we can be of any further help in the provision of advice or analysis, please do not hesitate to contact us. Mr J S Colombi, Mr R F Camacho or Mr E M Gosschalk, all or whom were involved in the project at various stages, may be contacted for further discussion.

Yours sincerely

J S Colombi

Encls

## Design of Paddy III Polders

### Design Method

1. The project area was subdivided into six basins on the basis of the existing creek drainage pattern, those basins having significant storage being made larger than the others, and those with run-off from adjacent hilly areas being made smaller.

2. Sluice sites were selected at the mouths of the major creeks, one sluice site per basin, and the tidal records at each site analysed to find mean spring tide range and mean neap tide range.

3. A drainage layout was superimposed on each basin, the alignments being chosen to follow major creeks where it was economical to do so. For small, winding creeks, the economies in excavated section gained by following the creek were outweighted by the increased length required, and a straight alignment adopted. The main drains were extended to reduce the area drained by secondary drains to, typically, 750ha, in an area 2500m x 3000m, and generally followed low lying areas.

4. A drainage module for the paddyland area was calculated by a study of the rainfall depth-duration-frequency curves produced by the Irrawaddy Delta Survey (IDS) for the adjacent stations of Rangoonand Dedaye, coupled with the permitted water level rise on young rice crops. For the higher areas, the drainage was based on a fixed percentage of design rainfall.

5. The design of the secondary drains was based on a detailed study of a 4000ha block, using steady state conditions at the head of the main drain, taken to be 30cm below ground level at the head of the drain.

6. The main drains were divided up into sections generally 1000m apart, and the inflow from the catchment area draining into each section calculated assuming a constant run-off as determined from the drainage module and the area drained.

7. The mean 24 hour flow for each reach of drain was then calculated, and increased in the ratio of 24 hours/tide locked period per day to estimate the nominal design flow.

   An estimate was then made of the maximum and minimum levels in the drainage system during the tidal cycle, and the channel storage and storage in depressions calculated for this range of levels. The storage was converted into an estimate of flow into and out of storage by dividing by a proportion of the estimated tide locked period.

8. The design flow for each reach was then calculated as the sum of nominal design flow plus storage flow.

9. A preliminary design of the main canals was then made by calculating the capacity of the drain required to excavate the nominal design flow. Slopes were assumed so that water surface levels were kept 30cm below ground level, or below maximum pondage level, and a design section calculated.

10. The preliminary design was then entered into a mathematical model of the system which calculates the flow and level at each section using an implicit representation of the St Venant equations. Boundary conditions were taken as the tidal fluctuation at the sluice, and the steady 24 hour inflows calculated as 6 above. The model included a representation of storage in depressions, and the sluice operating under various conditions of drowned or modular flow, depending on the head. Runs were repeated for spring tide and neap tide conditions.

11. The preliminary design was modified where required to reduce maximum flood levels to an acceptable proportion of empoldered area, either by varying the number of sluices or varying channel sections.

12. The gross earthworks required were calculated from ground levels along the lines of the canal. Net earthworks were calculated by subtracting the volume accounted for by the existing creeks, where these were suitable for inclusion.

Assumptions

(1) Drainage module, paddyland areas 35mm/day based on 1 in 5 year July rainfall and a maximum rise of 56m on the pre-storm depths of 50mm.

(2) Drainage module, upland areas 28mm/day based on 30% run-off of storm rainfall.

(3) Channel roughness (mannings 'n' value) 0.025.

(4) Tidal range - as measured over 6 spring/neep tide cycles in April/May 1982.

(5) Design water depth/bed width ratio of 2.00 channels (at notional discharge, since actual discharge varies continuously).

(6) System storage calculated from storage area curves of depressions, plus geometry of natural and excavated drains.

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ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION

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NOV 26/82

Ref. BK 103/2.9 BUR

Burma - Paddy Develop (3)

Letter No. 001119

Dear Marius,

26 NOV 1982

BURMA: Paddylands Development III Project
Preparation Report

DOL 241.587 (A.)

I enclose eight copies of our preparation report on the Burma Paddylands Development III project. This is based on the work of our team under the leadership of A. Zagni which visited Burma in February/March, May/June and September 1982.

The preparation of this project has been an exceptionally difficult exercise for several reasons. No suitable maps were available, and the mission had no alternative but to produce a large-scale map from aerial photographs which was subsequently made into a base map in Rome. We have had less than wholehearted support and help from the Burmese authorities in the assembly of data, in the resolution of technical problems and in the design of the engineering structures. There has evidently been some hesitation on the part of the Burmese in going into another project of this kind at this time. There has also been a rather disappointing contribution from the Department of Irrigation in the investigation, planning, and design of the main engineering structures involved, so that our team have had to take on an abnormal amount of engineering work. This included the special recruitment of Mr. Jansen as a consultant specialising in large creek closures, and Dr. Smith to review hydraulic structures.

Further problems arose from the Government's choice of project area, based on data derived from consultants' studies. As already reported to you in copies of the mission's back-to-office reports, the selected project area turned out on closer investigation to have less development potential than previously believed.

Mr. Marius Veraart
FAO & IFAD Coordinator
Agriculture & Rural Development
Department, OPS
The World Bank
1818 H Street, N.W.
Washington, D.C. 20433
U.S.A.

RECEIVED
DEC 07 1982

cc: Messrs. Yoon (4)
Shibasawa (1)
Niaz (1)

You will recall that in discussions between the Bank and GOB at the identification stage, it was asked that the project give as much prominence as possible to oilseeds development as a second crop to paddy. It later became clear that, largely because of soil conditions, there was little or no scope for increasing sunflower or other oilseeds production in the chosen project area.

It now appears that chick-peas are the crop that would make best use of the irrigation water that could be made available until late February, and possibly for the whole dry season. Growing conditions appear to be favourable and the crop should prove profitable. It would however be a new development in the project area and we recognise it as a weakness of the project that a significant part of the project benefits depends on this unproven activity.

Finally, it has been necessary to make a rather unusual choice over the provision of construction equipment. The Director General, Irrigation Department, asked that, where possible, equipment formerly used on Paddylands I (IDA) and other projects should be taken over by the project. This has been done wherever it appeared economically advantageous.

I am enclosing for your information a copy of a file note which Mr. Zagni has written on the project preparation work. A copy has also been sent direct to Mr. Yoon.

Mr. Zagni left for Bangladesh last weekend and has taken with him an advance copy of the report to give to the Director of Irrigation when he visits Rangoon in connection with the proposed irrigation rehabilitation project in two weeks' time. We are also transmitting copies officially through the FAO Representative in Burma.

With best regards,

Yours sincerely,

Maurice Fenn
Chief, Service II
FAO/World Bank Cooperative Programme
Investment Centre

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

April 5, 1983

TO: Mr. Tae-Hee Yoon, Division Chief, ASPAA

FROM: K. Unhanand, P.M. Tamboli and D.J.W. Berkoff, ASPAA

SUBJECT: BURMA: Supervision - Paddyland I Project Cr. 642-BA
- Paddyland II Project Cr. 835-BA
Preparation - Paddyland III Project
Back-to-Office Report

1. In accordance with terms of reference dated February 23, 1983, we visited Burma from March 2 through 12, 1983 to review progress of the implementation of Paddy I and II projects, and status of Paddy III project. The findings and recommendations of the mission are summarized in Aide-Memoire (copy attached) which was discussed with concerned implementing agencies.

2. A full supervision report is under preparation.

Attachment

Distribution:
Messrs: Thalwitz, Haynes, Saeed (ASPDR)
Holsen, West (ASNVP)
Wiehen, Pilvin )ASADR)
Sibushawa (ASADC) (3)
Clements (ASADA)
Rajagopalan (PAS) (3), Dickerson (PAS)
Yudelman (AGR) (3)
Swahn (EDC)
Toft, Mead (LEG)
Ms. Gunnarsdottir, Williams (LOA)
SAIC

KUnhanand:ala

AIDE MEMOIRE

REVIEW MISSION : MARCH 1983

Paddylands I Project : Credit 642-BA

Paddylands II Project : Credit 835-BA

Paddylands III : Preparation

1. An IDA Review Mission comprising Messrs. Unhanand (Engineer), Tamboli (Agriculturalist) and Berkoff (Economist) visited Burma from March 2 to 12 to review progress under the Paddy I (Cr 642-BA) and Paddy II (Cr 835-BA) projects, and to hold preliminary discussions with GOB officials on a possible Paddy III project. The latter discussions were based on the Preparation Report recently completed by FAO/IBRD Cooperative Program for the Kawmhu area. This Aide Memoire briefly summarises the mission's findings and recommendations which are subject to approval by IDA's Management in Washington. The mission would like to thank the Irrigation Department and the Agriculture Corporation for the excellent arrangements made for the field trip as well as for the generous hospitality extended to the mission at all times.

## A. PADDY I AND PADDY II

### The Construction Program

2. The two projects continue to make good progress, although shortages of diesel fuel have led to some delays and have necessitated changes in the methods of construction. In particular, manual labor is now being used for the construction of embankments and internal drainage channels. Machine operations have been concentrated on site excavation and access channels for the major structures where it is difficult or impossible to use manual labor: on major internal drainage channels; and on embankments in specific polder

areas to the extent allowed by fuel availability. Since only about 50% of estimated fuel requirements is being made available, machinery is inevitably remaining idle and average unit costs have risen. The mission recognises that shortages of fuel, as well as of cement and other materials, are a national problem. Nevertheless, the mission recommends that allocations to these two high return projects be increased to permit their completion according to the revised implementation schedule.

3. For Paddy I, out of a revised total of 16 polders, six are now completed (ZINBAUNG, LETPANBIN, KYETPHAMWEZAUNG, DEDALU, DAWNYEIN and BETUT II). The mission supports the decision by the Project Director to concentrate work on completing individual polders before moving on to those for which significant work has yet to start. This should permit the completion of four more polders during the present construction season (MYOGON, BANTBWEZU, ALEGYUN I and SHWELAUNG). The Project Director estimates that two further construction seasons will be required to complete the civil works for the remaining six polders, the delay largely a consequence of the initial delays resulting from procurement problems. Since the closing date of the IDA credit is June 30, 1983, the mission recommends that an official request be sent to IDA as soon as possible so that appropriate action can be taken to extend the closing date.

4. For Paddy II, the mission understands that work is proceeding on all four polders. According to the information given to the mission overall completion rates appear to have fallen behind the original appraisal targets, again largely due to fuel constraints. The mission recommends that implementation schedules for the project should be reviewed to ensure that completion of the project can be achieved by the original target date.

Land Reclamation and Allocation

5. Information provided to the mission suggests that land reclamation is proceeding at a fair rate as the Paddy I polders are completed and that the total to be reclaimed would probably exceed appraisal estimates. In some polders, temporary land utilisation rights have been given to local farmers prior to a final allocation of the reclaimed land to cooperatives or other users. While the mission supports this practice, it recommends that emphasis should be given to timely reclamation and final land allocation to ensure that maximum benefits are achieved as early as possible. In Paddy II, only limited land reclamation has so far taken place since no polders have yet been completed. Again the mission recommends that reclamation and land allocation be expedited to the extent possible to ensure benefits are obtained as land is protected.

Agricultural Impact and the Evaluation Study

6. It is still too early to establish the overall agricultural impact of the two projects. Nevertheless, evidence from the completed Paddy I polders, suggests that substantial production benefits are being obtained both through increases in the sown area under paddy and through the widespread adoption of HYVs. For ZINBAUNG and LETPANBIN polders, the share of HYVs exceeds 90% and although it is lower in other completed polders, it should rise as initial problems are overcome. The extent of winter cropping on residual moisture in the lower delta appears, however, to be falling below appraisal estimates. With the completion of SHWELAUNG polder in the middle delta, and BANTBWEZU polder which has access to sweet water in the winter season, the project's impact on double cropping should be much increased. The mission recommends that the Agricultural Mechanisation Department should encourage sales of pumps and power tillers in these areas to ensure maximum irrigation benefits.

7. The extension service, which is essentially based on an amalgamation of the Special High Yielding (SHY) Whole Township Program and the Training and Visit (T & V) systems, appears to be working well and has contributed substantially to the rice production benefits already obtained. To support its efforts, the mission recommends that the Applied Research Department should extend its adaptive research trials, both in the middle and the lower delta, to provide location specific recommendations, in particular for the promotion of double cropping based both on irrigation and on residual moisture.

8. The first stage of the evaluation study being undertaken by the Farm Survey Working Unit of the Project Benefit Monitoring Unit has been successfully completed and an interim report has been received. The mission understands that this study would assemble comprehensive village tract data as well as undertaking a systematic stratified sample survey of farmers both inside and outside the project areas. It should therefore provide both base line evidence for the two projects as well as systematic, if preliminary, evidence on their agricultural impact in completed polders. IDA looks forward to receiving the final report, scheduled for August 1983.

Financial and Disbursement Matters

9. IDA has yet to receive reimbursement applications for civil works already completed by the Irrigation Department under Paddy II, and similarly for civil works and foreign training undertaken by the Agriculture Corporation under both the projects. The mission recommends that action be taken as soon as possible to correct this situation.

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| November 3, 1982 | Memorandum | |

**Correspondents / Participants**
To: File BK 103/2.9 BUR
From: A. F. E. Zagni, Irrigation Engineer, DDC

**Subject / Title**
Burma - Lower Burma Paddylands Development III Project Preparation

**Exception(s)**
Information Provided by Member Countries or Third Parties in Confidence

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BA - Paddyland (3)

Oct. 4, 82

FAO
Back to office
report

BA - Paddyland (3)

BD - Irrig. - B./Patuakh.

# OFFICE MEMORANDUM

TO: Mr. Marius Veraart
FAO and IFAD Coordinator
Agriculture and Rural Development
Department, CPS
World Bank, Washington, D.C.

DATE: 4 October 1982

FROM: Maurice Fenn
Chief, Service II, FAO/WB CP

SUBJECT: BURMA: Paddylands Development III Project
BANGLADESH: Barisal/Patuakhali Project
Back-to-Office Reports

... ✓ Please find enclosed herewith 8 copies of the Back-to-Office Reports on the above mission.

OCT 13 198[illegible]

BK 103/2.9 BUR
BK 103/2.9 BGD

cc: Fenn (2)
Zagni (chrono)
RDG DDC (2)

CC: Messrs. Yoon (3)
Shibusawa (1)
Niaz (1)
Greenwood (1)

OFFICE MEMORANDUM

TO: Mr. M. Fenn,
Chief, Service II, DDC. Date: 28 September, 1982.

FROM: A.F.E. Zagni

SUBJECT: BURMA: Paddylands Development III Project
BANGLADESH: Barisal/Patuakhali Project
Back-to-Office Reports.

1. Acting on TOR dated 18 August, 1982, I arrived in Rangoon on 13 September, 1982, and departed for Bangladesh on 22 September. During my visits, I finalised all engineeering costs, equipment schedules, construction phasing and organisation, and O & M organisation proposals for Paddylands III project. Many outstanding minor points were resolved. In addition, I handed to the Irrigation Department final questionnaires on agriculture and economics to attempt to obtain data still outstanding from previous visits.

2. While in Rangoon, I visited the FAO Representative and the DG Irrigation Department. The latter discussed the forthcoming Irrigation Rehabilitation Project to be prepared with FAO/CP assistance. I was also able to meet Mr. G. Greenwood of ASPAA Division, World Bank, and we discussed FAO/CP activities in the irrigation sector in some detail.

3. I spent the period September 22/24 in Dacca, where I held discussions with the Chief Engineer (Planning) BWDB on the forthcoming FAO/CP Preparation Mission for Barisal/Patuakhali project. I also held discussions with Mr. H. Brammer on soil aspects of Paddylands III project (Burma) as he has wide experience of soil conditions in the region.

4. I paid visits to Mr.R.Rowe, Chief, World Bank Resident Mission and to the FAO Representative.

---

BK103/2.9 BUR
BK103/2.9 BGD

cc: Veraart, World Bank, Washington
All Team Members
FAO Representative, Rangoon
World Bank, Dacca
FAO Representative, Dacca
RDG DDC (4)

FORM NO. 27 - OCR
(3/82)

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TO: FERNANDO, FOODAGRI

BA - Paddylands (3)

ROME, ITALY

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DATE: 9/16/82

SUBJECT:

DRAFTED BY:

CLEARANCES AND COPY DISTRIBUTION:

cc: Messrs. Yoon, Shibusawa, Berkoff

cc: Mr. Besant-Jones, Spears

AUTHORIZED BY (Name and Signature):

Marius Veraart

DEPARTMENT:

Ag. & Rural Dev. Dept.

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Sept 8/82

Burma-irrig. - Kawmhu Reclamation

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Aug. 12, 82

Back to office report

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

Date: August 12, 1982

TO: Mr. Stanley J. Baker, Acting Chief, ASPAA

FROM: D.J.W. Berkoff, ASPAA

SUBJECT: BURMA - Irrigation Rehabilitation Project - Identification
Paddylands III (Kawmhu) Project - Preparation
Paddylands I (Cr. 642-BA) and II (Cr. 835-BA) Projects - Evaluation Studies
Irrigation Sector Review - Discussions
Back-to-Office Report

1. In accordance with terms of reference dated June 2, 1982, I visited Burma from June 7 to 24 to: (i) help identify a proposed Irrigation Rehabilitation Project, (ii) participate in preparation activities for the proposed Paddylands III (Kawmhu) Project, (iii) agree with GOB a timetable for carrying out an evaluation study for the Paddylands I and II Projects, and (iv) discuss the recently completed draft 'Irrigation Sector Review' with GOB. My mission was scheduled to coincide with that of Messrs. Zagni, Sugimura and D'Avis (FAO/IBRD Cooperative Program) who are currently finalizing the Paddy III preparation report and who also participated in the identification of the proposed Irrigation Rehabilitation Project. While in Rangoon, I attended the Tripartite Review Meeting for the UNDP/Burma Umbrella Project held on June 16 (consultants for the Irrigation Rehabilitation Project are to be financed under Umbrella III), and coordinated my activities with the concurrent missions of Messrs. Johri (General Programming), Panfil (UNDP Umbrella) and Azumi (Tank Irrigation, Groundwater Investigations and Tubewell I). Our conclusions were summarized in joint telexes to Messrs. Shibusawa and Yoon dated June 17 (Johri/Azumi/Berkoff) and June 23 (Azumi/Berkoff). Together with the FAO/CP mission, I visited the Ye U and Shwebo irrigation systems in Central Burma (proposed for the rehabilitation project) and made a brief field visit to the Paddy III project area. A list of the principal persons met during the mission is attached (Attachment 4).

## Proposed Irrigation Rehabilitation Project-Identification

2. Together with Mr. Zagni (FAO/CP), I prepared an Aide Memoire (dated June 20, see Attachment I) which summarized our joint conclusions and recommendations. This Aide Memoire was discussed with GOB officials at a series of round-up meetings (notably with the Irrigation Department (ID) on June 13), and general agreement was reached on its proposals.

3. Largely for socio-political reasons,1/ GOB requested that the project should comprise the first stage of the rehabilitation of the Ye U and Shwebo systems, which receive supplies from the Mu River, rather than that of the Zawgyi system which was originally proposed (see the Pre-Project Brief dated January 29, 1982). While the mission concluded that there was a reasonable prima facie case for selecting the Ye U and Shwebo systems, discharges in the Mu are nevertheless very variable and it was therefore agreed that, before a final decision is taken to proceed with full project preparation, hydrological studies would be undertaken to determine conclusively whether or not adequate irrigated areas can be supported.

4. The Ye U/Shwebo systems are the largest existing systems in Burma and it would be impracticable to include the full design command area of 358,000 acres in the first phase rehabilitation project. It has been agreed, therefore, that priority would be given to the Ye U system (128,000 acres). Depending on the scale of the project proposed for the Ye U system, a first stage of the larger Shwebo System (230,000 acres) could, with the agreement of GOB and IDA, also be included.

5. FAO/CP will be responsible for compiling the Preparation Report, assisted by ID and engineering consultants to be financed under the Umbrella III Project. Phase I of the consultancy would consist of the hydrological studies mentioned above. If these are positive, Phase II would comprise detailed project preparation. In the unlikely event of a negative result then, as an alternative, Phase II would comprise a reconnaisance study of four other irrigation systems in order to identify an alternative project. At the Tripartite Review Meeting for the UNDP/Burma Umbrella Project, it was agreed that US$300,000 would be allocated under Umbrella III for the proposed consultancy. Agreed Terms of Reference are attached to the Aide Memoire (Attachment I). On-going groundwater investigations, financed under the Umbrella program, are to be extended into a part of the Ye U canal command, and care has been taken to ensure that the two studies are complementary (see Mr. Azumi's BTO Report dated July 6, 1982). To expedite selection of consultants, it is proposed that letters of invitation should be issued by IDA in anticipation of the signing of the Umbrella III agreement, the letters explicitly stating that employment of consultants would be conditional on the satisfactory completion of the Umbrella III negotiations. A selection committee has been established to prepare a short list, and it is hoped letters of invitation can be issued shortly.

---

1/ In recent years, irrigation development (including that under the Kinda (Nyaunggyat) project - Cr.1031-BA) has been concentrated in Mandalay Division where the Zawgyi system is located. In contrast little such development has been undertaken in Sagaing Division, despite a long history of planning studies for the Mu river.

6. The Aide Memoire includes a proposed timetable for processing the project. Provided consultants can be in the field by about November 1, 1982, then the Preparation Report should be completed by about September/October 1983, allowing appraisal in November/December 1983 and Board presentation in April/May 1984.

Paddylands III (Kawmhu) Project-Preparation

7. The FAO/CP mision was the second full preparation mission for the proposed Paddylands III (Kawmhu) Project. The project background and results of the mission are summarized in the FAO/CP Aide Memoire, (dated June 20, 1982) and Project Brief (dated July 8, 1982) (Attachment 2). Unfortunately, the ID had failed to carry out a number of the activities agreed during the first preparation mission in February/March. While considerable progress was achieved during the course of the second FAO/CP mission, a third mission now appears necessary in September and this will inevitably delay the receipt of the draft Preparation Report, probably by about a month to end-October. While it would still be theoretically feasible to appraise the project for Board presentation in the current fiscal year, GOB has requested that priority be given to the Tubewell I project (see Mr. Azumi's BTO Report dated July 6, 1982) and that appraisal of Paddy III be delayed until early-1983. In our telex dated June 23, we urged that IDA should agree to this schedule in which case Board presentation of Paddy III would be delayed until August/September 1983.

8. Such a delay appears to be no bad thing for two main reasons. First, it would allow the Appraisal Mission to have access to the results of the proposed evaluation study for the Paddy I and II projects (see below). Secondly, a major issue has arisen concerning the economic viability of the proposed project due to: (i) the major (25% approx.) downward adjustment in the Bank's rice price projections, (ii) the discovery that the present land utilization rate in the project area is 92% rather than the 74% estimated by the Delta Consultants,1/ and (iii) the limited potential for crop diversification that has now been demonstrated. It is not yet possible to judge whether or not the project is economically viable, since FAO/CP have yet to prepare their first estimates of the project's costs and benefits. Given the advanced stage of project preparation, it is recommended that the preparation report be completed

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1/ Sir William Halcrow and Partners: "Irrawaddy Delta Hydrological Investigations and Delta Survey: Volume 4," Final Report, January 1982. It should, however, be pointed out that this was only a reconnaisance assessment of alternative project proposals and the consultants inevitably had to depend on the (obviously misleading) data they were given by GOB agencies. In retrospect it is clear that their TOR should have required a more in-depth study or, alternatively, the areas proposed by them should have been checked before a firm decision was taken on the Paddy III project area.

as currently scheduled. Upon review of the report and the initial results of the Paddy I and II evaluation study, a decision should be taken whether to proceed with the Paddy III project as presently envisaged or to seek agreement with GOB on an alternative area (in which case, of course, Board presentation would be delayed by about a year).

9. GOB strongly objected to a proposal that engineering consultants should be financed under the proposed project to assist in the design of the drainage system and major structures. Given the experience under Paddy I and II (see para 14 below), and the fact that two major creek closures are included in the project of a type not previously constructed in Burma, the mission equally strongly maintained the need for such consultants. In the event, it was agreed that: (i) the allocation for the planning and design consultants to be financed under the proposed Tanks I Project (see the Green Cover Report 3947-BA, Annex 3) should be increased by ten man-months to provide for a drainage systems specialist and a drainage structure specialist, specifically to assist in design work for Paddy III, and (ii) eight man-months for a closure specialist(s) would be included in the Paddy III credit. The timing of the creek closures towards the end of project implementation implies that it would be inappropriate to provide for the closure specialist under the Tanks I credit since by then this credit might be approaching its closing date. In some ways this compromise is preferable to the initial suggestion that the full consultancy be financed under the Paddy III credit itself, since this would permit the drainage specialists to be recruited in advance of the declaration of the project's effectiveness. If for any reason the Paddy III project was to be delayed (see previous paragraph), the timing of the consultants to be recruited under the Tanks I project could be adjusted accordingly.

Paddylands I and II Projects - Evaluation Study

10. An Aide Memoire (Attachment 3), setting out alternative proposals for carrying out the proposed 'agricultural impact evaluation study' of Paddy I and II, together with draft TOR, were discussed with GOB officials, notably from the Agricultural Corporation (AC), and it was agreed that:

(a) An official from the AC's Planning Division (probably U Nyi Nyi) would be appointed full time to take responsibility for the study;

(b) The study manager would be assisted by up to 4-5 junior officers, supported by an appropriate number of survey enumerators;

(c) Mr. David Potten, from Hunting Technical Services, would be employed for three weeks to help set up the survey, test the questionnaire and establish the survey schedule;

(d) The Irrigation Department would provide a vessel to enable the study team to visit the survey areas (i) in the initial stages to test the questionnaire and (ii) to carry out the survey proper; and

(e) The study would broadly conform to the requirements of the draft TOR but the final scope of work and approach would be discussed and agreed during the course of Mr. Potten's assignment.

11. A telex requesting agreement to finance Mr. Potten's services under the Paddy I credit was received in Washington on July 23, 1982, and approval was given on July 26 . A draft proposal was prepared by Huntings prior to my departure and it can be assumed that GOB and Huntings have, or will soon have, signed an agreement and that the study is proceeding on schedule.

12. My TOR did not require me to consider other aspects of the Paddy I and II projects. Nevertheless, I gathered some disturbing indications that the design capacities for some of the sluices provided under the two projects may be insufficient to evacuate flood waters within an acceptable time period. The basis for this is covered in a separate memorandum addressed to you dated August 11, 1982, together with my recommendation for pursuing this matter - together with the associated question of the quality of construction - during the course of the next supervision mission.

Draft Irrigation Sector Review -- Discussions

13. Copies of the draft 'Irrigation Sector Review'1/ were given to Dr. Maung Shein, Deputy Minister of Planning and Finance; Dr. Aye Hlaing, ex-Chairman of the Union Bank of Burma; FERD; the Ministry of Agriculture and Forests; and the Irrigation Department. Discussions on the review were held with all these, with the exception of Dr. Maung Shein, and a number of comments, suggestions and recommendations were received. These will be taken into account in a final revision of the Review which I am currently undertaking. In general, the Review was favorably received and the comments made were relatively minor. Both the Ministry and the Irrigation Department said that, provided 'Higher Authorities' agreed, they would welcome a fairly wide distribution for the report.

14. I was, however, unable to obtain a decision from Dr. Maung Shein prior to my departure as to whether GOB would be happy for the review to be distributed to the members of the Burma Aid Group or whether they would prefer it to remain an internal Bank document. A telex asking for such a decision, and addressed to the Director General of FERD was sent on August 6, 1982. Subject

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1/ Burma: 'Irrigation Sector Review', Agriculture Division A, South Asia Projects Department. Draft, June 4, 1982.

to the reply received, a decision will be taken on the final form in which this Review should be distributed.

Attachments

1. Aide Memoire on Proposed Irrigation Rehabilitation Project, together with Draft TOR for Engineering Consultants.

2. The FAO/CP Aide Memoire and Project Brief for the Paddylands III (Kawmhu) Project.

3. Paddylands I and II Evaluation Studies -- Aide Memoire and Draft TOR.

4. Itinerary and list of principal persons met.

cc: Messrs. Hopper, Abbott (ASNVP)
Thalwitz, Haynes, Geli, Nowicki, Saeed, Panfil (ASPDR)
Wiehen (ASA), Shibusawa (3), Johri, Hatendi (ASADC)
Azumi, Baker, Gupta (ASPAA)
Parsons, Unhanand (ASPAB), Tibor (ASPAC), Lee (ASPAD),
Nottidge (ASPAE)
Rajagopalan (PAS)(3), Yudelman, Hotes, Niaz, Sfeir-Younis (AGR)
Dickerson (PAS)
Jehani (LEG)
Zagni (FAO/IBRD Cooperative Program)
Ms. de Melo, Uchimura (ASADC), Gunnarsdottir (LOA)
SAIC

DJWBerkoff/jcj

# B U R M A

## PROPOSED IRRIGATION REHABILITATION PROJECT

## IDENTIFICATION MISSION

## AIDE MEMOIRE

(20 June 1982)

### Introduction

1. A joint mission from the FAO/IBRD Cooperative Program (FAO/CP) and the International Development Assiciation (IDA), comprising Messrs. A.F.E. Zagni, M. Sugimura, and B.A. D'Avis (FAO/CP) and D.J.W. Berkoff (IDA), visited the Shwebo/Ye U Irrigation Schemes in Central Burma between June 10th-12th with a view to identifying a possible irrigation rehabilitation project, to be prepared under the auspices of the FAO/CP for possible financing under an IDA credit. This Aide Memoire summarises the mission's findings and recommends a schedule for project processing. It reflects discussions held with GOB officials, in particular those of the Ministry of Agriculture and Forests (MAF), the Irrigation Department (ID) and the Foreign Economic Relations Department (FERD), as well as the mission's understanding of the project's current status in the Government's development program. The Aide Memoire does not necessarily reflect the views of the FAO/CP and IDA managements which will be confirmed following the mission's return to their respective head offices. The mission would like to thank the ID, in particular U Thein Tun and his colleagues in the Planning and Design Division and the officers of the Sagaing field offices, for their great hospitality and for the excellent arrangements made for the field visit.

### Project Background and Status

2. The possibility of an Irrigation Rehabilitation Project for one or more of the existing major schemes of the Central Dry Zone has been under discussion for several years. An IDA consultant (Y.K. Murthy) visited five possible project areas in 1979, including not only the Shwebo/Ye U systems, but also the Zawgyi, Mon, Man and Salin systems. Subsequent visits were made by both IDA and FAO/CP staff, in particular to the Zawgyi system which was initially proposed for a first phase project. In early 1982, however, GOB requested that first priority should be given to the Shwebo/Ye U or Mu (Kabo) project

2/...

area, and the current mission was scheduled in response to this request.

3. The mission believes there is a satisfactory prima facie case for proceeding with the preparation of a project to rehabilitate the Shwebo/Ye-U systems. Nevertheless, discharges in the Mu River vary widely from month-to-month, and from year-to-year, and it is possible that yields from the uncontrolled discharges may be of inadequate reliability to sustain acceptable economic viability. It has been agreed, therefore, that, before a final decision is taken to proceed with full project preparation, a computer simulation should be undertaken, based on historic river flows, to demonstrate conclusively whether or not adequate irrigated areas would be supported by a rehabilitated system. In the perhaps unlikely event that the results of the simulation are negative, then, as an alternative to preparation of the Mu (Kabo) Project, a reconnaissance study of four other irrigation systems would be undertaken in order to identify an alternative project.

4. The Shwebo/Ye U systems are the largest existing schemes in Burma and it would be impracticable to include the full design command area of 358,000 acres in a first phase rehabilitation project. The mission, therefore, supports GOB's intention to give priority to the Ye U system, (128,000 acres), given its more pronounced siltation problem, its greater suitability for non-paddy crops and its potential groundwater resources. Depending on the scale and complexity of the project proposed for the Ye U system, a first stage of the larger Shwebo system (230,000 acres) could, with the agreement of GOB, also be included.

5. The mission understands that the project is not included in the Fourth Four Year Plan (1982/83-85/86) but that it is included in the list of projects to be negotiated under the Five Year Investment Programme (1982/83-86/87) which is to be submitted to the meeting of the Burma Aid Group to be held in early July. Furthermore, it is understood that it is GOB's firm commitment to initiate the implementation of the project in 1984/85 if it can be satisfactorily prepared and negotiated.

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Project Preparation: Engineering

6. To assist the ID in preparing the project, it has been agreed that engineering consultants should be recruited to work under the general supervision of FAO/CP. At the Tripartite Review Meeting for the UNDP Umbrella Project, held on June 16th, it was agreed that finance for these consultants, to an estimated total of $300,000, would be provided under the Umbrella III project. Draft Terms of Reference for this assignment are attached to this Aide Memoire, and these also provide additional background to the Mu (Kabo) area and outline the possible scope of the proposed rehabilitation project.

7. It is suggested that the engineering investigations should be in two phases. The first phase (3 man months) would be devoted to establishing that the potential water resources are sufficient to meet planned crop water requirements. In the event that this is confirmed, Phase 2A (20 man months) would consist of the detailed engineering services required to prepare the Ye U Rehabilitation Project ( and, possibly, the first phase of the Shwebo System). In the event that rehabilitation of the Shwebo/Ye U system cannot be supported, Phase 2B (10 man months) would be devoted to the proposed reconnaissance investigations for four other schemes (the Zawgyi, Mon, Man and Salin systems). A decision whether to proceed with Phase 2A or Phase 2B would be taken following a Review Meeting held between ID, FAO/CP and IDA about 1½ months after the consultants start work.

The Role of Groundwater

8. At the Tripartite Review Meeting for the UNDP Umbrella project, it was also agreed that the groundwater investigations being financed under the Unbrella II Project should be extended up till December 1983 under the Umbrella III Project, and that the new area for further investigations should include a part of the Ye U canal command. The Draft TOR for the engineering consultants, attached to this Aide Memoire, requires them to take account of the possible utilization of groundwater, through pumping directly into the canals or by other means, in their designs for the secondary and tertiary canal networks.

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9. If groundwater resources are established in the Ye U command area, it would be possible (i) to include its development within the scope of the proposed rehabilitation project, (ii) to develop it separately as part of a second tubewell project (assuming that Tubewell I has by then been appraised), or (iii) to delay development until a second rehabilitation project for the remainder of the Shwebo/Ye U system (when water supplies will become more of a constraint). The mission recommends that a final decision should be delayed until more is known of the groundwater resources. It is understood that priority will be given to the Ye U command area in the new groundwater investigations and, by the time the engineering consultants finalise their preparation activities for the rehabilitation project, sufficient should be known for a decision to be taken. If it is decided at that time to include a groundwater component in the Ye U Rehabilitation Project, then FAO/CP would define its content and characteristics in their final preparation report, taking into account the findings of the groundwater investigations.

Other Project Components

10. A number of other components could be included in the project, for instance agricultural support services, support for the ID's workshop and maintenance facilities, training and other components designed to strengthen the operations of the ID and other agencies involved in the Mu (Kabo) project area. This reconnaissance mission has been unable to define these in any detail, but this would be undertaken by the FAO/CP in the context of its normal preparation activities.

Project Processing Timetable

11. The mission recommends that the timetable for the further processing of the project, assuming full preparation goes ahead, should be as follows:

| | | |
|---|---|---|
| August-October 1982 | - | Recruitment of Engineering Consultants |
| November 1, 1982 | | Mobilisation of Phase I Consultants |
| December 15, 1982 | | Review of Results of Phase I and mobilisation of Phase II Consultants |

| | |
|---|---|
| February 1983 | First full FAO/CP Preparation Mission |
| June 1983 | Receipt of Consultants Draft Report and Second full FAO/CP Preparation Mission |
| July-August 1983 | Receipt of Groundwater Investigation Results |
| August-October 1983 | Finalisation of FAO/CP Preparation Report |
| November-December 1983 | IDA Appraisal |
| April-May 1984 | IDA Board Presentation |
| Fiscal 1984/85 | Irrigation of Project Implementation |

# BURMA

# PROPOSED IRRIGATION REHABILITATION PROJECT

# PREPARATION STUDIES

## DRAFT TERMS OF REFERENCE FOR ENGINEERING CONSULTANTS

### A. Introduction

1. Engineering Consultants are required to assist the Irrigation Department (ID), Ministry of Agriculture and Forests (MAF) of the Government of the Socialist Republic of the Union of Burma (GOB) to prepare long established irrigation projects for rehabilitation. Of some five projects identified, that deriving its waters from the Mu River in Sagaing Division of Upper Burma is given highest priority by GOB, and it is the intention of GOB to seek financing for this rehabilitation from the International Development Association (IDA).

2. The FAO/World Bank Cooperative Programme (FAO/CP) has been requested by GOB to give assistance to ID in the preparation of a report as a basis for appraisal by IDA, and the engineering consultants will provide the technical, hydrological and engineering inputs to the FAO/CP report. The consultants work will be monitored by FAO/CP staff during their periodic visits, and will be subject to their technical direction.

### B. The Mu (Kabo) Project

3. The Mu (Kabo) project area comprises the left bank Shwebo system (design command area of 230,000 acres) and the right bank Ye U system (128,000 acres). These are the largest existing schemes in Burma, dating back to the early part of the century. The headworks were partly restored in 1957 following major damage during

a flood. These systems, like others in Burma, were constructed essentially to provide security to the main season rice crop. Even this is problematic in a dry year while the minimal flows in the river during the dry season support only a very limited second crop. Progressive siltation of the canal system and overall deterioration have over the years led to a loss of command of about 70,000 acres and to reduced irrigation efficiencies.

4. The highly seasonal and variable characteristics of the Mu have long suggested the desirability of providing inter-season storage, so as to provide increased security to the main season crop, promote double cropping and extend the irrigated area to make full use of the substantial water resources available. Feasibility studies have been completed for such a scheme and detailed designs are available for a major storage dam at Thaphanseik. Given its size and cost, (which has recently been updated to an estimated total of about US$600 million), GOB had deferred construction of the dam and the extension area. Nevertheless, continued deterioration of the existing systems, and the hardship to which this gives rise, have led to the proposal for an initial rehabilitation project of the existing run-of-river schemes. For several reasons, including its more pronounced siltation problems, its suitability for non-paddy crops and its potential groundwater resources, the Ye U system is to be given priority. The lower reaches of the Ye U system are to be included in on-going groundwater investigations being financed by UNDP and, if exploitable groundwater resources are confirmed, conjunctive use of surface and sub-surface supplies could be a valuable supplement to the project.

Depending on the scale of the works identified for the Ye U system, a first phase of the Shwebo system could, with the concurrence of GOB, be included in the project.

C. Scope of Work

5. A recent reconnaissance mission from FAO/CP/IDA carried out an initial assessment of the Mu (Kabo) project. It considered that substantial potential benefits would derive from its rehabilitation, but, due to the widely varying river discharges from month to month and from year to year, the yields from the uncontrolled discharges might be of inadequate reliability to sustain acceptable economic viability.

6. The consultants would thus be required to carry out a study of the river hydrology and rainfall, and to make a computer simulation with a rice dominated crop mix, to demonstrate conclusively the likely annual irrigated areas based on historic records extending over 32 years. The present design commend area of 358,000 acres would be the basis for the model and, in the first instance, groundwater would be excluded.

7. Should this study indicate acceptable reliability of adequate cropped areas then, following a joint review by ID, IDA and FAO/CP, the consultants would be required to expand their study of the Mu (Kabo) project to normal feasibility study levels. In the event that the potential cropped areas appear to provide only a marginal justification for proceeding with the project, then joint discussions would be held with the consultants engaged on the concurrent groundwater investigations to determine whether potential sub-surface supplies would provide an adequate basis to allow the full study to proceed.

8. Provided agreement is reached to continue with the Mu (Kabo) project, study priority would be given to the Ye U system (128,000 acres design command area) but, in agreement with GOB and FAO/CP, this could be expanded to include also a first stage of the larger Shwebo system (230,000 acres). The consultants would make recommendations for uprating the primary and secondary channels and structures; providing an appropriate tertiary canal network to serve the proposed crop mix; ensuring adequate cross-drainage and emergency escapes on major channels; and providing a drainage system if this is required. Silt exclusion devices should be considered. The extent of tertiary canal and land development in potential groundwater areas may differ from those served by run-of-the-river supplies, and the consultants should take this into account for possible groundwater areas. The extent of these will be determined by FAO/CP in the light of the results of the groundwater studies. Designs would be made to semi-detailed level, and costs derived. An operation manual would be produced to give optimum operating guidelines in order to achieve high efficiency of distribution in conjunction with the proposed physical improvements, including the possibility of future groundwater development. A FAO/CP preparation team would periodically visit Burma to monitor and advise the consultants, and to provide non-engineering inputs. The consultants' report would provide the engineering component of the FAO/CP report.

9. However, should the joint review of the water balance studies consider that the Mu (Kabo) project would be unlikely to be economically viable, the consultants would carry out a reconnaissance level study of four further projects requiring rehabilitation (the Zawgyi, Mon, Man and Salin systems with a combined total command area of about 260,000 acres). This would include a detailed review of the river hydrology and rainfall, computer operation simulations with proposed crop mixes, a detailed

inventory of the existing head works and canal systems with recommendations for system uprating, silt exclusion devices, and tertiary distribution systems. Cost estimates would be made at reconnaissance level for such improvements. The FAO/CP would periodically monitor and direct the work of the consultants, and the consultants' report would form an annex to the FAO/CP identification report.

10. Detailed Terms of Reference for these various studies are provided as an annex to this general scope of work.

D. Schedule of Assignment

11. The Consultants should adhere to the following schedule.

Phase I (Mu (Kabo) Project Study)

| | |
|---|---|
| 01 November 1982 | - Mobilisation of Phase I field team. |
| 01 December 1982 | - Submission of Mu (Kabo) project operations study report, followed by ID, IDA and FAO/CP reviews. |

Phase II (Mu (Kabo) Project)

| | |
|---|---|
| 15 December 1982 | - Remainder of field team mobilise |
| 15 February 1983 | - Submission of Inception Report |
| 15 April 1983 | - Submission of progress report |
| 15 June 1983 | - Submission of draft final report |
| 15 July 1983 | - Receipt of comments from ID |
| 15 August 1983 | - Submission of final report |

or

Phase II (Rehabilitation Reconnaissance Survey)

15 December 1982 - Remainder of field team mobilise

15 April 1982 - Submission of reconnaissance report

12. The above schedule is given in the attached bar chart.

E. Staffing

13. It is anticipated that the consultant will provide the following specialists, although this may be amended by the consultant in his proposal.

Phase I (Mu (Kabo) Project Study)

| | |
|---|---|
| Water Resources Engineer (Team Leader) | 1.5 m/m |
| Hydrologist | 1.5 m/m |
| Total | 3.0 m/m |

Phase II (Mu (Kabo) Project Study)

| | |
|---|---|
| Water Resources Engineer (Team Leader) | 7 m/m |
| Irrigation/Drainage Engineer | 6 m/m |
| Hydraulic Structure Engineer | 4 m/m |
| Hydrologist | 2 m/m |
| Head office supervision | 1 m/m |
| Total | 20 m/m |

or

Phase II (Rehabilitation Reconnaissance Study)

| | |
|---|---|
| Water Resources Engineer (Team Leader) | 4 m/m |
| Irrigation Engineer | 4 m/m |
| Hydrologist | 2 m/m |
| Total | 10 m/m |

F. Cost Estimates

14. It is estimated that the costs of the proposed consultancy will be as follows:

(a) Phase I - Mu (Kabo) Project Study: 3 m/m - US$ 36,000
Phase II - Mu (Kabo) Project Study: 20 m/m - US$ 240,000
(or) Phase II - Irrigation Reconnaissance Survey - US$ 120,000
10 m/m

(b) Technical Instruments and consumable items - US$ 24,000

Total Cost: Mu (Kabo) Project Study: - US$ 300,000
Irrigation Reconnaissance - US$ 180,000

## Detailed Terms of Reference

## Phase I - Mu (Kabo) Project Water Balance Study

a) Hydrological

The consultants will collect all available hydrological information pertaining to the project area, including daily rainfall in the commend area, dailydriver discharges at Kabo headworks, and potential evaporation for the region. They will carry out consistency tests, and will synthesise missing or unreliable data in order to give an unbroken record for the maximum possible period.

b) Agrometeorological

Using FAO publication No.24 "Crop Water Reqbirements"(1977) Consumption use for each major crop in the area will be computed. Then, for alternative crop mixes suggested by the Irrigation Department and FAO/CP, but including 100% monsoon season rice, ten day (decade) demands will be compiled for the headworks. Field and distribution system efficiencies will be used considering a fully uprated distribution system (including tertiary canals), but sensitivity analysis will be made taking plus and minus 5% of the overall efficiency used.

c) Water Balance Study

A computer simulation will be made for the period of actual and derived river discharge records, on a decade basis, for all selected crop mixes and the three overall

efficiencies proposed. The network diagram should be submitted for approval by ID and FAO/CP before finalisation of the computer programme. Results should be expressed such that annual crop successes and failures are clearly defined, and are presented statistically in summary. The whole canalised area of 358,000 acres will be the object of the simulation. The computer of the University of Rangoon or of the ID will be used as appropriate.

d) Project Viability

The consultants will give their recommendation on the appropriate sizes of project which, under the crop mixes and efficiencies utilized, might be sustained at normal risk criteria. These may be greater than the present commanded area of 358,000 acres.

Phase II A - Mu (Kabo) Project Feasibility Study

a) Project Concept

Based on the water balance studies carried out in Phase I above, a tripartite meeting comprising ID, IDA and FAO/CP will review the potential of the Mu (Kabo) Project, and will jointly decide if this is sufficient to indicate continuing to full feasibility study. If affirmative, the consultants should mobilise the staff in the agreed additional disciplines to continue their studies to Phase II A as specified below. They will be briefed by FAO/CP on any aspects of particular attention on minor variations at that time, providing these do not imply additional consultant time. The project area served by the Ya-U canal should be considered for rehabilitation of headworks,

channels, and structures, and for improved water management. A tertiary system should be designed for possible inclusion if this is economically viable. It is envisaged that in certain areas of good groundwater potential this resource will be utilized to supplement shortfalls in run of river discharges in the monsoon season, and to provide for limited dry season cropping. The designs of the secondary and tertiary systems should take into account the utilization of such groundwater by pumping directly into the canals, or by other means. Crop mixes and system efficiencies will be agreed with ID and FAO/CP.

b) Major Structures

A structural survey will be made of headworks at Kabo, cross regulators and offtakes on the primary and secondary canals. In conjunction with hydraulic redesign (if required) designs should be carried out for their renovation, and costs derived to feasibility level. Unit rates will be provided by ID in agreement with FAO/CP. A silt exclusion device and settling tank should be similarly considered at Kabo headworks. Where river training devices are required, these should be detailed and costed.

c) Distribution System

The major elements of the distribution system will be surveyed by ID to the consultants' specification, and will be redesigned to provide design capacity and costs derived. Typical sample areas of between 5% and 10% of total area commanded will be designed to feasibility level for

(i) tertiary offtakes only, and

(ii) tertiary offtakes with complete tertiary canals.

and costs derived. These will be extrapolated over the total command area. The selection of sample areas will be approved by ID and FAO/CP before proceeding with designs. A manual recommending optimum operation of the system will be produced.

d) Drainage

The consultants will examine the existing cross drainage to the main canal, and emergency exapes, and will design any improvements, required to feasibility level and derive costs. Should it be considered that a formal drainage network is required, a typical sample area from 5% to 10% of total area affected should be designed to feasibility level and costed. Where possible, the use of return flows by gravity only or pumping should be considered, with water quantities and costs estimated.

e) Construction

A construction schedule will be recommended for each solution considered, with a list of mechanical equipment itemised and costed. For each alternative, a plant utilization schedule (bar chart) will be derived to give maximum economy of plant.

Phase II B - Rehabilitation Reconnaissance Study

a) Project Concept

Should the tripartite meeting reviewing the consultants' findings under Phase I consider that the Mu (Kabo) project does not offer adequate economic development potential, the consultants will be required to carry out a reconnassiance level study of four sdditional existing run of river projects deemed to be in need of rehabilitation,

namely:-

(i) Zawgyi Irrigation Project (113,000 acres) in Mandalay Division.

(ii) Mon (Megali weir) Irrigation Project (97,000 acres) in Magwe Division.

(iii) Man (Aigma weir) Irrigation Projects (37,500 acres) in Magwe Division and

(iv) Salin Irrigation Project (28,500 acres) in Magwe Division.

Following computer studies using the same criteria as those under Phase I for Mu (Kabo) Project, the consultants will recommend a ranking in order of potential cropping intensity and development potential.

At reconnaissance level, the systems will be examined for rehabilitation requirements, and costs estmated. Phasing of construction will be recommended.

b) Hydrological

All available hydrological data will be collected for the projects concerned, including daily rainfall in the commend areas, daily average river discharges at the headworks, and potential evaporation. Consistency checks will be carried out, and missing and unreliable data will be synthesised or improved in order to give unbroken records for the maximum possible periods.

c) Agrometeorological

Using FAO publication No 24 "Crop Water Requirements" (1977) consumptive use for each major crop in the areas will be computed. Then, for alternative crop mixes suggested by the ID and FAO/CP, ten day (decade) demands will be compiled for the headworks. Field and distribution system efficiencies will be consistent with fully uprated distribution systems (including tertiary canals) and sensitivity analysis will be made taking plus and minus 5% of the overall efficiency used.

d) Water Balance Studies

Computer simulations will be made for the period of actual and derived river discharge records on a decade basis for all selected crop mixes with the three overall efficiencies proposed. The network diagram and output format should be as specified for Phase I. The computer of the University of Rangoon or of the ID will be used as appropriate.

e) Physical Uprating

A study will be made of the existing headworks, major structures and canal system, and recommendations will be made for uprating to acceptable standards. Inventories will be produced with and improvements itemised. Cost estimates will be derived at reconnaissance level for complete system rehabilitations. Tertiary canal systems should be considered as separately costed components.

f) Project Viabilities

The consultants will carry out reconnaissance level cost estimates for each alternative solution for the four projects concerned. They will recommend appropriate project sizes and configurations which indicate acceptable risk at normally accepted criteria. They will then rank the projects in their recommended order of attractiveness within the limitations of their studies.

# LOWER BURMA - PADDYLANDS DEVELOPEMENT

## THREE PROJECT (KAWMHU)

## AIDE MEMOIRE

### 1. Background

FAO/World Bank Cooperative Programme (FAO/CP) have been requested by the Government of the Socialist Republic of Burma (GOB) to assist the Irrigation Department (ID) to prepare a project suitable for World Bank financing involving drainage, flood-control and tidal exclusion in the Lower Irrawaddy Delta. Following joint deliberations, ID and FAO/CP selected on area of about 230,000 acres in the townships of Twante, Kawmhu and Kungyangon, to the south west of Rangoon.

A FAO/CP preparation mission visited Burma in February/March 1982 for onemonth to commence preparation activities, and in addition to numerous data questionnaires being left with concerned GOB agencies, soils, landuse, topographic, hydrological and salinity/tidal surveys were specified.

### 2. Mission Activities

A second mission comprising:

| | |
|---|---|
| Dr. A.F.E. Zagni | - Mission Leader/Irrigation and Drainage Engineer |
| Mr. J.S. Colombi | - Consultant Hydrologist |
| Mr. B.A. D'Avis | - Economist |
| Mr. T.G.H. Jansen | - Consultant Coastal Engineer |
| Mr. M. Sugimura | - Agronomist |

visited Burma between 23 May and 22 June 1982 to continue data retrieval and to initiate designs and costings.

The topographic survey was completed on their arrival (a commendable achievement in the short time available), and following minor field checks where anomolies existed a contour map was produced. Based on this, drainage networks were derived, and the data were taken to UK for detailed drainage calculations and earthworks quantity estimations to be made with the hydrologists computer programmes.

Criteria were derived by the Mission for hydraulic structure, embankment, and creek excavation designs. Using these, ID engineers commenced work on these elements to produce type designs and costs. A minor drainage sample area of some 7500 acres was designed for extrapolation purposes.

Of concern are the two large closures required at the north east and south west ends of the Bassein Creek which runs through the area. These are some 280 yd and 300 yd wide respectively, and this combined with very high tide variation and large storage in the creeks presents a formidable civil engineering task in order to close them following structure completion. The Coastal Engineer examined the sites and pertinent data available, and derived criteria for design and costing. ID engineers are continuing to design and cost these structures.

A village feeder road network was proposed considering rice procurment centres and rice mills, and following the agreement on earthworks and surfacing criteria ID engineers are completing designs and costings.

The Mission examined and agreed on the soils and landuse surveys carried out by ID to its specifications. These were to good standard and again were a commendable effort in the short time available. From these, land use statistics were extracted.

Visits were paid to Agricultural Corporation (AC), Agricultural Mechanisation Department (AMD), the Agricultural Research Institute (ARI), at Yezin, and Agricultural Food Product Trade Corporation (AFPTC) to finalize input data. Further visits were made to the townships for on the spot discussions with township officials. The Resident Representative of UNDP and FAO were visited and informed of project progress.

3. Revised Project Formulation

Based in information obtained during the current mission and derived from the various surveys, the project formulation is revised accordingly from that postulated in the Aide Memoire dated 24 March 1982 presented at the end of the previous Mission.

Present land use surveys indicates the following situation, which is subject to change on more detailed analysis:

| | Acres |
|---|---|
| Paddylands | |
| flood free | 92,580 |
| shallow flooded | 75,900 |
| medium flooded | 32,200 |
| deep flooded | 12,900 |
| sub total | 213,500 |
| Fallow land (very deep flooding) | 13,200 |
| Plantation, upland crops and grazing | 1,000 |
| Scrubland (saline) | 11,100 |
| Villages, water areas, salt pans | 8,700 |
| total | 247,500 |

Total cultivable land is 233,900 acres approximately. Present cropping index is thus 92%.

Following the anticipated flood protection and drainage measures under the project, the Mission estimates tentatively that the future situation would be as follows:

| | Acres |
|---|---|
| Paddylands 1/ | |
| Flood free | 219,700 |
| moderate flooding | 13,200 |
| sub total | 239,900 |

| | |
|---|---|
| Plantations, upland crops and grazing | 1,000 |
| Scrubland outside embankment | 4,900 |
| Villages, water-area, salt pans | 8,700 |
| total | 247,500 |

Note (1) includes lands to be left outside embankments.

In order to achieve the desired protection against tidal inundation, some 50 miles of embankments are required. Fortuitously the Dala-Twante road embankment and the laterite hills to the west of the projectobviate the need for embankments in the north and west of the project area. Drainage will be effected over an estimated 95% of the area to flood depths suitable for HYV rice by the construction of some 130 miles of new primary channels and the resectioning and realignment of some 50 miles of existing major creeks. Sample area studies indicate a minor channel system totalling about 1330 miles. Seven sluice structures will provide drainage outlets. Two major closures are required on the Bassein Creek.

To provide limited irrigation of pulses or oil seeds following monsoon paddy, fresh water may be taken into the system at the Twante canal structure by gravity, it is estimated, until late February. Thereafter limited pumping will be required to maintain a fresh water system in the project creeks for domestic requirements and to replace leakage and evaporation. By this means fresh water fisheries may be sustained and the creeks maintained for navigation.

The AC will be assisted with uprating of training centres and construction of fertilizer godowns. In addition, an experimental/demonstration farm would be equipped. The extension services would be strengthened by providing improved transportation and incremental staff costs. The AMD has declined to participate in the proposed project due to its planned expansion in the area under its own resources, which the Mission considers adequate to sustain the increased demand for power tiller and pump sales/service and tractor rental.

The project would provide village feeder roads to facilitate movement of agricultural inputs, and grain to the procurement centres and mills. Estimates have yet to be made of the extent of such roads.

4. Future Programme

The Hydrologist will complete computer studies of drainage requirements, leading to primary creek design and earthwork quantities, by early July. Meanwhile ID engineers are computing embankment earthworks and costs, and are designing and costing type drainage structures. It is anticipated that the Mission Leader will return in early September for a final visit to complete cost estimates and to resolve outstanding issues with ID. Thereafter finalisation of report preparation will occur, with a target completion date of 31 October 1982.

Rangoon
20 June 1982

A.F.E. Zagni
Mission Leader FAO/CP

BURMA

# LOWER BURMA PADDYLANDS DEVELOPMENT III PROJECT (KAWTHU)

## CP Project Brief

| | |
|---|---|
| Project No: | BBUAA109P |
| Sector: | Agriculture |
| Project Costs: | US$50 million (tentative) |
| Appraisal: | January 1983 |
| Related Reports: | Back-to-Office Report: 22 December, 1981 |
| | Back-to-Office Report: 28 January, 1982 |
| | Back-to-Office Report: 13 April, 1982 |
| | First Project Brief: 10 April, 1982 |
| | Second Project Brief: 8 July, 1982 |
| Project Officer: | Mr. A.F.E. Zagni |

## A. Sectoral Context

1. Burma is richly endowed with natural resources and has a highly literate population but low population density (130/mi2). Some 75% of its 34 million inhabitants live in rural areas and are dependent directly or indirectly on agriculture. Of its 260,000 mi2, about 27% or 45 M ac is considered arable. However, only about 20 M are presently cultivated, mainly due to adverse rainfall regime.

2. Despite its natural advantages, Burma's economic record has been disappointing. Its per capita income of US$150 p.a. places it in the 25 least developed countries. The Government of Burma's (GOB) philosophy combining socialism and Burmese traditions has induced progress in social adjustments, but has failed to achieve adequate economic growth. Indeed, the value added in the productive sectors in the 1960's and early 1970's failed even to match the 2.2% p.a. population growth, with declining exports.

3. Recognizing these shortcomings, GOB introduced selective inducements such as increased agricultural produce procurement prices, currency devaluation, increased interest on savings deposits and tax reform in the period 1971/78. In response to these, growth accelerated and GDP increased by an average of 4.8% p.a., and exports grew by some 10.6% p.a. in the latter part of this period. The agricultural sector in 1978 (the end of the Second Four Year Plan (SFYP) accounted for 36% of GDP, and agricultural products represented 85% of all exports. These were primarily teak and rice. In the period 1975/78, the sector average growth rate was 3.6% p.a.

4. Before World War II Burma was the world's largest exporter of rice, with annual exports of about 3 M tons out of a total production of 8 M tons. During the war embankments in the Irrawaddy Delta were not maintained, and changes in land tenure occurred after the war; thus although areas of rice in central and upper Burma increased, the overall production remained at about pre-war levels. In response to incentives, rice production grew from 9.2 M tons in 1976 to 10.4 M tons in 1978. Provisional production for 1981 was 13.1 M tons.

5. Since the first IDA credit in 1973, GOB has progressively increased its aid acceptance from unilateral and bilateral donors, and from UN agencies for the development of agriculture. Flood protection, drainage and irrigation have figured prominently in this programme.

## B. Project Origin

6. Two previous projects funded by IDA, Paddylands I and II Projects, are progressively raising rice production in the middle and lower Irrawaddy Delta through the introduction of HYV varieties made possible by the drainage of deeply flooded lands and the exclusion of tidal saline contamination.

7. Paddylands Development I Project comprises 11 sub-projects and covers an area of some 195,000 ac. It was commenced in 1976, and is estimated to cost about US$54 million. Completion is anticipated in May 1984, some two years behind schedule. Ten of the sub-projects are located in the lower delta, and due to lack of fresh water in the dry season the emphasis is on increasing monsoon rice production. The remaining sub-project is in the middle delta, and in this area irrigation facilities are also provided to irrigate jute and field crops during the dry season.

8. Paddylands Development II Project comprises 4 sub-projects and covers an area of some 150,000 ac. It was commenced in 1978, and is estimated to cost about US$56 million. Completion is scheduled for May 1985. Three sub-projects are located in the lower delta, and will increase rice production only. The fourth, in the middle delta, also has irrigation facilities similar to that in Paddylands I Project.

9. The present project is the third in the series. In its initial formulation, however, a strong emphasis was placed by GOB on maximising oilseed production in addition to the reclamation and improvement of paddyland.

10. The consultants to Paddylands I Project, Sir William Halcrow and Partners, carried out a reconnaissance level study of future project potential in the delta, and made a ranking in order of economic advantage 1/ . They divided future projects into Drainage Projects (lower delta), Small and Medium Scale Irrigation Projects (middle and upper delta and the flood berms of the mainstream Irrawaddy), and a large scale Irrigation Pilot Project. Highest in ranking was the Small and Medium Scale Irrigation Project group. Thereafter in various orders of attractiveness followed the drainage projects. Highest of these were three areas around Rangoon, selected due to their moderate population density, poor status of present development, and the minimum of existing fisheries.

11. In December 1981, a World Bank/FAO/CP mission discussed with ID senior staff the future project development to maintain continuity in paddy development and land reclamation and a short list of five project areas was evolved totalling some 500,000 ac. Three of these were in the Rangoon area, and two smaller areas were in the west of the delta at the mouth of the Bassein River. The mission requested DG/ID to select a definitive project area of about 250,000 ac such that this could be the object of

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1/ "Irrawaddy Delta-Hydrological Investigations and Delta Survey" Sir William Halcrow and Partners, Swindon, UK, August 1981.

transportation is very limited in the dry season. Some 16 government paddy procurement centres exist within the project area, together with 23 rice mills. Two new mills are under construction, which on completion will raise the milling capacity to 700 tonnes/day. Only one of these new mills with a capacity of 50 tonnes/day will produce rice of export quality. The present output, due to inadequate covered storage and poorly maintained mills, is rice with up to 35% "brokens". One Agricultural Mechanisation Department (AMD) tractor station exists in the north near Twante, offering medium tractor rental services. The Agricultural Corporation (AC) has about 10 Extension Training Centres serving the area, but these are poorly equipped.

18. The present population of the three constituent Townships is about 332,000, of which it is tentatively estimated that some 183,000 are in the project area. Field observations indicate that a large proportion of these persons live in the two towns of Kawmhu and Kungyangon, and along the Kungyangon-Twante-Dala road. Villages in the remaining area are sparse and small, due it is thought to the serious shortage of fresh water in the dry season. Preliminary estimates indicate that there are some 14,000 farm families in the project area, and that average farm size is about 15.2 ac. All agricultural land is the property of the State and is allocated to farmers on a beneficial use basis.

## E. The Project

19. The proposed project envisages the construction of some 24 miles of new embankments and the resectioning and retiring where required of some 26 miles of existing embankment. These, together with the existing Twante-Dala road embankment, the high ground to the west, and the raised old beaches to the south, will effectively empolder the project area, giving protection against a 25 year frequency tidal surge. To provide drainage water evacuation and saline water exclusion, five flap-gated sluice structures will be required with a total of 32 openings. Two major closure dams will be required to close the existing large creek (Bassein Creek) each with a width of about 300 yards.

20. It is known that fresh water exists at the north-west corner of the project in the Twante Canal even at high tide until about the end of February. Thus it is envisaged that a double flap-gate structure would be installed at this point to permit gravity inlet of fresh water in addition to monsoon drainage. After this time, it is thought that fresh water exists at low tide at Twante, and pumping would be required to provide project requirements. To provide replenishment for leakage, domestic requirements and evaporation, some 22 cusecs might be required by pumping. This would not require additional power installation. The existing creek system would be excavated and realigned to form an interconnected system. This has the advantages of providing a more efficient drainage system in the monsoon season, a multiple ring-main lagoon for fresh water supply in the dry season, and improving water communications for small country boats. Some 160 miles of major creeks would be so improved. It is anticipated that water hyacinth will proliferate, and design would attempt to permit periodic flushing.

21. Although it was intended that oilseed production should be maximised, the extent of lighter soils suitable for these crops was found to be negligible. ID has proposed that instead gram (chick pea) should be considered. This crop would appear to be ideally suited as it tolerates heavy soils, it is normally broadcast on the standing rice shortly before harvest, and following germination on the residual moisture requires only two or three irrigations before harvest in late February. Preliminary

project preparation with FAO/CP assistance commencing in February 1982.

## C. Project Concept

12. On the return of the FAO/CP mission in late February 1982, the DG/ID directed that the Area 17 (the consultant's designation for an area to the immediate south-west of Rangoon) should be selected for project preparation with a view to World Bank financing. The consultants had estimated that the present "land utilization index" was 74% and thus offered substantial potential incremental benefits. The project would include flood protection and drainage works similar to the previous Paddylands Projects, such that presently deeply flooded and saline contaminated areas could be reclaimed, and so that HYV rice production could be increased. The increased rice production would significantly contribute to Burma's export potential, necessary to generate foreign exchange and to service the increasingly large foreign debts.

13. A further objective of the proposed project was to increase the region's oilseed production. The DG/ID had indicated that it was GOB's intention to achieve national and regional self-sufficiency in this commodity. The project should therefore, within soils and climate constraints, include facilities to achieve increased production of oilseed crops.

14. To attain the objectives defined above, it would be necessary to provide physical control measures to exclude tidal and river flood surges by means of embankments, and to improve drainage during the monsoon season by improving the existing creek network and the provision of sluice structures. Fresh water would be required during the dry season so that irrigation of oilseed and other crops could be practiced using low lift pumps (LLP).

15. In order to provide an adequate infrastructure to sustain the increased production potential, the extension service, agricultural mechanisation, communications and research activities would require strengthening. It is envisaged that credit requirements would be covered under the Credit Project recently prepared for Myanma Agricultural Bank by FAO/CP.

## D. The Project Area

16. The project area encompasses some 237,500 ac gross on the island to the south and west of Rangoon, covering parts of the Townships of Twante, Kawmhu and Kungyangon. The project boundary is defined by the Twante Canal to the north, and the high ground to the west bounded by the Kungyangon-Twante road. A major creek (Bassein Creek) runs SW-NE through the project area. This is now very heavily silted in its central reach and is impassable to river traffic. The existing internal creek network is also heavily silted, and due to this the lower lying areas are deeply flooded during the monsoon. Most of these creeks are tidal, and there is a considerable saline contamination due to their overtopping during spring tides during the dry season. Soils in the project area are predominantly heavy cracking clays (Gley soils), but lighter soils exist in small pockets adjacent to the lateritic hills to the west, and in old beach deposits in the south.

17. The Township Development Committees of Twante, Kawmhu and Kungyangon are active, including the officers dealing with agricultural extension and mechanisation. Present communications are tenuous, with only deeply rutted secondary roads with many bridges unpassable, in addition to the only tarmac road Kungyangon - Kawmhu - Twante - Dala. Water

transportation is very limited in the dry season. Some 16 government paddy procurement centres exist within the project area, together with 23 rice mills. Two new mills are under construction, which on completion will raise the milling capacity to 700 tonnes/day. Only one of these new mills with a capacity of 50 tonnes/day will produce rice of export quality. The present output, due to inadequate covered storage and poorly maintained mills, is rice with up to 35% "brokens". One Agricultural Mechanisation Department (AMD) tractor station exists in the north near Twante, offering medium tractor rental services. The Agricultural Corporation (AC) has about 10 Extension Training Centres serving the area, but these are poorly equipped.

18. The present population of the three constituent Townships is about 332,000, of which it is tentatively estimated that some 183,000 are in the project area. Field observations indicate that a large proportion of these persons live in the two towns of Kawmhu and Kungyangon, and along the Kungyangon-Twante-Dala road. Villages in the remaining area are sparse and small, due it is thought to the serious shortage of fresh water in the dry season. Preliminary estimates indicate that there are some 14,000 farm families in the project area, and that average farm size is about 15.2 ac. All agricultural land is the property of the State and is allocated to farmers on a beneficial use basis.

## E. The Project

19. The proposed project envisages the construction of some 24 miles of new embankments and the resectioning and retiring where required of some 26 miles of existing embankment. These, together with the existing Twante-Dala road embankment, the high ground to the west, and the raised old beaches to the south, will effectively empolder the project area, giving protection against a 25 year frequency tidal surge. To provide drainage water evacuation and saline water exclusion, five flap-gated sluice structures will be required with a total of 32 openings. Two major closure dams will be required to close the existing large creek (Bassein Creek) each with a width of about 300 yards.

20. It is known that fresh water exists at the north-west corner of the project in the Twante Canal even at high tide until about the end of February. Thus it is envisaged that a double flap-gate structure would be installed at this point to permit gravity inlet of fresh water in addition to monsoon drainage. After this time, it is thought that fresh water exists at low tide at Twante, and pumping would be required to provide project requirements. To provide replenishment for leakage, domestic requirements and evaporation, some 22 cusecs might be required by pumping. This would not require additional power installation. The existing creek system would be excavated and realigned to form an interconnected system. This has the advantages of providing a more efficient drainage system in the monsoon season, a multiple ring-main lagoon for fresh water supply in the dry season, and improving water communications for small country boats. Some 160 miles of major creeks would be so improved. It is anticipated that water hyacinth will proliferate, and design would attempt to permit periodic flushing.

21. Although it was intended that oilseed production should be maximised, the extent of lighter soils suitable for these crops was found to be negligible. ID has proposed that instead gram (chick pea) should be considered. This crop would appear to be ideally suited as it tolerates heavy soils, it is normally broadcast on the standing rice shortly before harvest, and following germination on the residual moisture requires only two or three irrigations before harvest in late February. Preliminary

estimates indicate that an area of some 80,000 ac could be irrigated by the creek system using LLP, but further studies are required to ascertain if this area could be adequately supplied with fresh water through the Twante intake by gravity, and if the farmers would be likely to purchase pumps specifically for gram.

22. Discussions with AC indicated that a demonstration farm of about 200 ac should be included in the project. Further discussions with Agricultural Research Institute (ARI) senior staff at Yezin suggested that a field research station should be established together with the demonstration farm to carry out adaptive research. In the event that an irrigation requirement should be identified after late February, the intake structure at Twante could be fitted with additional pumping capacity. This could be financed by some future project, and constitutes a flexible response to development trends without committing large capital costs at this stage.

23. To improve communications, the project would provide some additional 65 miles of all-weather roads and bridges in addition to the navigable creek system. The project would also provide strengthening of the extension services with additional staff, transport and training centres, and fertiliser stores.

24. Unlike the Paddylands I and II projects, there is not an obvious demand for AMD reclamation services utilising heavy equipment in this project, as it appears that only low scrub must be cleared in the non-cultivated areas. AMD has indicated that it has a programme under local resources to improve the tractor rental service and to provide power tiller/pump sales and service facilities in the project area.

25. In view of the inadequate hydraulic designs and poor quality embankment and structure construction noted by Bank supervision missions in Paddylands I and II Projects, expatriate consultants are likely to be provided under the Minor Tanks Project now under negotiation for financing by IDA. A creek closure expert will be recommended to be financed under this (Paddylands III) project.

26. To economise on equipment costs, it has been agreed with ID that machinery becoming free from the Mobye and Paddylands I Project will be made available for use on this project following overhaul.

27. Project benefits are likely to derive predominantly from increased paddy production. Present estimates of the present and future-with-project situation are as follows:

| | Area (ac) | Description | Yield (ton/ac) |
|---|---|---|---|
| (a) | Present Situation | | |
| | 126,800 | HYV/LIV paddyland | 1.45 1/ |
| | 71,500 | LV paddyland | 0.98 1/ |
| | 13,000 | Average area of paddyland planted but failing | 0 1/ |
| | 13,200 | Fallow land deeply flooded | 0 |
| | 1,000 | Plantations, grazing, salt pans | N/A |
| | 4,000 | Saline scrubland | - |
| | 8,000 | Village and water surface areas | - |
| Total | 237,500 | | |

1/ Based on village tract statistics.

Estimated total present production is 254,200 tons paddy. The above data indicates that the present "land utilization index" is about 92%, and not 74% as estimated by the consultants. This is obtained by including paddyland planted but failing to be consistent with the consultants methodology.

| | | | |
|---|---|---|---|
| (b) | Future Situation | | |
| | 222,200 | HYV paddyland (potential) | 1.64 |
| | 5,500 | LV paddyland (moderate flooding) | 0.94 |
| | 1,000 | Plantations, grazing, salt pans | N/A |
| | 800 | Loss of area due to project works | - |
| | 8,000 | Village and water surface areas | - |
| Total | 237,500 | | |

Estimated total future production 369,600 tons rice.

On the above analysis, some 116,000 tons incremental paddy production will result. This, however, is based on the assumption that the farmers will grow 100% HYV on those areas where this is hydrologically feasible, as intended by GOB. In practice, these farmers may grow LV for their own domestic consumption, and by taking this into consideration the estimated total future incremental production would fall to about 94,000 tons of paddy.

28. Project costs and benefits have not yet been developed, but a tentative estimate of total cost is now US$50 million. Considerable economies will arise from constructing the project as a single polder, from the use of mechanical equipment being released from other projects, and from reduction in drainage capacity by integrated channel configuration. The construction period would be about five years.

## F. Issues and Considerations

29. The following are considered at this stage as issues and considerations affecting the project:

- ID's capacity to implement the project in the light of its current staff shortages;
- the supply of diesel fuel for construction and maintenance equipment, and for agricultural machinery, in the light of current national shortage;
- the ability of GOB to supply some additional 5,500 tons of fertiliser to sustain the anticipated increase in HYV rice production;
- the fresh water availability pattern at high tide at Twante intake;
- the improvement in milling quality in the project area which at present produces up to 35% brokens. This could be substantially improved with covered storage at procurement centres;
- the discovery that present land utilisation in the project area is 92% instead of 74% as previously assumed reduces the economic viability of the project.

## G. Project Status and Follow-Up Action

30. ID engineers are carrying out designs and costings of hydraulic structures, creek closures, channels and roads under FAO/CP guidance, but these will not be complete until late August. Meanwhile FAO/CP team members are continuing their analysis and formulations in Rome, and are completing map production.

31. A third FAO/CP mission will visit Burma in early September to receive and discuss designs and costings, and to finalise the project concept. Infrastructural components will be agreed.

32. Report preparation in Rome is expected to be completed by end October 1982 providing ID has completed designs and costings by end August to the required standards. Appraisal by World Bank is anticipated in January 1983.

BURMA

# LOWER BURMA PADDYLANDS DEVELOPMENT PROJECTS I AND II

## PROPOSED AGRICULTURAL IMPACT EVALUATION STUDY

### AIDE MEMOIRE

( 21 June 1982)

### Introduction

1. Under the Lower Burma Paddyland Development Project II (IDA Credit No. 835-BA) the Government of Burma (GOB) is covenanted to establish a Project Monitoring Unit, under the Project Implementation Committee, to undertake benchmark surveys of the agricultural situation in the project area as well as follow-up surveys at two-to-three year intervals. A "Project Benefit Monitoring Committee" chaired by the DG, Planning and Statistics, Ministry of Agriculture and Forests (MAF), has been established to coordinate this work, supported by committees at the Divisional and Township levels. This arrangement should facilitate the collection of statistical information from the local offices, and provide a basis for assessing overall trends in agricultural production, input use etc. However, it needs to be complemented by a more direct survey of farmer in the project area to establish the farm level perspective of the project's impact. Furthermore, although no provision for special surveys was made in the Paddy I agreement, the need for evaluation is no different in the two projects and it is strongly recommended that both the Paddy I and Paddy II areas should be covered.

2. This Aide Memoire summarises possible arrangements for carrying out a proposed initial "agricultural impact evaluation survey" to cover both the Paddy I and Paddy II areas. It represents the views of a mission comprising Mr. D.J.W. Berkoff (IDA) following his discussions with interested parties, notably the Ministry of Agriculture and Forests (MAF) and the Irrigation Department (ID). The mission understands that a final decision on how best to proceed must await

the return of the DG, Planning and Statistics at the end of June. Nevertheless, it is hoped that provisional arrangements can be agreed so that the study can proceed expeditiously.

## Scope of the Survey

3. Terms of Reference for an overall "Agricultural Impact Evaluation Study" are attached to this Aide Memoire, and these provide a description of the background, scope and objectives of the proposed study. These TOR cover not only the farm survey, but also the collection of statistical and related information from local offices in the Paddy I and II areas. The latter will be the responsibility of the Project Benefit Monitoring Committees, but it is suggested that the officer responsible for undertaking the farm survey should also coordinate this data collection exercise and should present such data, together with the results of the farm survey, in his final report.

## Arrangements for carrying out the Study

4. Responsibility for carrying out the farm survey will rest with GOB but it is possible that assistance could be provided to the officer(s) appointed for this purpose. Three possible alternatives could be considered:

a. An officer in the MAF, the Agricultural Corporation (AC) or the ID would be appointed to carry out the survey. He would need to be provided with supporting staff (notably farm survey interviewer / enumerator), transport facilities and office support. If he were to be given full responsibility for the study, he would need to finalise the questionnaire; test it in the field; supervise the field interviews; process the results; and produce a final report.

b. The officer and supporting staff appointed under (a) could be assisted in setting up the study by expatriate consultants. Given the timing and nature of the assignment, the only really feasible alternative would be to employ Mr. David Potten, of GDC - the firm currently engaged in the groundwater investigations on behalf of ID [1]. His present assignment ends in mid-July, and he could remain in Burma for a further two-to-three weeks to help set up the study; finalise and test the questionnaire in the field; and draw up an overall program for its implementation. The study itself and the final report would still be the responsibility of GCB, but the costs of Mr. Potten's services and associated inputs could probably be met from the proceeds of the Paddy II (or Paddy I) credit.

c. A local institution could be employed to undertake the survey under the general direction of the officer appointed under (a) and possibly with the assistance of Mr. David Potten as suggested under (b). One possibility might be the Institute of Economics which, the mission understands, has undertaken a comparable evaluation study in relation to a drinking water project. If this alternative was selected, then the Institute (or another agency) would agree with the GCB official appointed under (a) the scope of the survey; finalise and test the questionnaire in the field (possibly with Mr. Potten's assistance); undertake the field interviews; process the results; and submit a draft report to the GCB authorities. If a contract was signed with the Institute (or other agency), or with GDC, then the costs of the exercise could probably be met from the Paddy I (or Paddy II) credit.

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1/ Mr. Potten successfully carried out a similar farm survey in Monywa, in connection with the groundwater investigations, and is fully appraised of conditions and problems inherent in carrying out such surveys.

5. Any of these alternatives would be acceptable, although there would be strong advantages in utilising Mr. Potten's services. If he is to be employed, however, a decision will need to be taken very quickly. There may also be merit in utilising the Institute of Economics (or some other agency) if this can be arranged, since the mission understands that the relevant GOB institutions would find it difficult to appoint the necessary full time staff, given their general staffing constraints.

Mission Recommendations

6. The mission recommends therefore that if possible, and if acceptable to GOB, GDC should be employed to help initiate the farm survey and that the Institute of Economics (or another agency) should be requested to provide the actual survey personnel. This would require the following steps:

a. The appointment of a GOB officer (in MAF, AC or the ID) to supervise the survey (part time), coordinate the results with the data being collected by the Project Benefit Monitoring Committees and present a final comprehensive report to the Project Implementing Committee by December 31, 1982.

b. A brief proposal from GDC in accordance with the above, and in line with the TOR attached to this Aide Memoire, setting out the services to be provided by Mr. Potten, the costs of these services and the support that would be necessary from GOB.

c. A telex request to IDA in Washington for concurrence in meeting these costs from the IDA credit 835 BA or 625 BA, followed by the signing of an appropriate agreement between GOB and GDC.

d. A proposal from the Institute of Economics (or similar agency) for the services to be provided by them, either in cooperation with GDC or on their own (the proposals under (b) and (d) could, if appropriate, be combined and the joint costs could be met under the appropriate IDA credit), followed by an agreement between GOB and the Institute (or other agency).

e. Agreement from the MAF, ID and for AC to provide the necessary supporting services. The most serious constraint is likely to be in transport to and from the project area, and the Mission strongly urges that the ID release an appropriate vessel for the use of those involved in the survey. This would probably be for two separate periods : (i) a week-to-ten days for the initial testing of the questionnaire etc. and (ii) two-to-three weeks during which the actual farm interviews were undertaken. A follow-up visit to check the results might also be desirable.

7. It is provisionally estimated that the costs of this exercise are unlikely to exceed $10,000.

# LOWER BURMA PADDYLAND DEVELOPMENT PROJECTS I AND II

## AGRICULTURAL IMPACT EVALUATION STUDY

## DRAFT TERMS OF REFERENCE

### Background

1. The Lower Burma Paddyland Development Projects (Paddy I - Cr. 642-BA, and Paddy II - Cr. 835-BA) initiated a program of full scale empoldering and associated investments in the middle and lower Irrawaddy Delta with the aim of reclaiming abandoned land and promoting increased agricultural production. The major components of these two projects provide for: (i) construction of embankments, drainage canals and related structures to protect farmland from flooding and salt water intrusion, (ii) reclamation and settlement of abandoned agricultural land, (iii) promotion of low lift pump irrigation in areas with access to freshwater in the dry season, (iv) provision of agricultural machinery to meet increased land preparation and other farming requirements, (v) construction of fertilizer godowns, farm machinery workshops and other buildings, and (vi) strengthening of agricultural extension services through the initiation of a pilot "Training and Visit" program.

2. Paddy I was declared effective in August 1976 and is now scheduled for completion in June 1984. This represents a two-year delay from the original program, due mainly to the late arrival of equipment. Approximately 66% of the civil works had been completed by end-1981, with five sub-projects virtually complete (Zinbaung, Letpanbin, Kyetpham Wezaung and Dedalu in the lower delta, and Schwelaung, the only middle delta sub-project),three sub-projects about 50% complete, (Myogon, Dawnyein and Bantbwezu), two sub-projects 20% complete (Betut and Alegyun) and one sub-project yet to be started (Dauntgyi I). Paddy II was declared effective in October 1978 and is broadly on schedule, with completion expected in April 1985. Approximately 16% of the civil works had been completed by end-1981, with one sub-project about 60% complete (Bawchaung) but with the remaining three at only the initial stage of construction (Labutta, Dauntgyi II, and the middle delta island of Thongwa).

3. The Agricultural Corporation and the Land Records and Settlement Department are responsible for monitoring general trends in agricultural production in the project areas. In addition, the Paddy II credit agreement provides for the establishment of a Project Monitoring Unit, under the Project Implementation Committee, to undertake benchmark surveys of the agricultural situation in the project area, as well as follow-up surveys at two/three year intervals. In any event this unit has not been established and no surveys have been undertaken. Given the on-going implementation of the project, it is important that an evaluation should be initiated soon to establish a clear picture of the effect of the project. Instead of forming a new unit, therefore, with the delays that this might involve, it is proposed that an initial evaluation should be entrusted to an existing organization. Following the receipt of the evaluation report, a decision should be taken whether to undertake subsequent surveys and investigations in the same manner or whether to set up a monitoring unit as originally proposed.

4. No provision for special surveys was made in the Paddy I agreement. Nevertheless, the need for evaluation is no different in the two projects and there are strong arguments for broadening the initial exercise to cover not only the Paddy II but also the Paddy I areas. Although this might complicate the farm survey work itself (see below) expanding the scope of the initial exercise would allow inclusion of sub-project areas at different stages of development and thus broaden the basis for comparison. Furthermore, a major objective of the exercise is to contribute to the preparation and design of future land reclamation and drainage projects in the delta. A third such project is currently under preparation (the Kawmhu Reclamation Project), and a fairly comprehensive evaluation of the two on-going projects would not only contribute to this process but would provide the necessary justification for the new project.

5. These terms of reference therefore provide for a review of agricultural

performance and, where appropriate, an assessment of the impact of project works, throughout the Paddy I and Paddy II areas. They recommend that this review should be fairly straightforward and should concentrate on evaluating the justification for the major civil works included in these projects. Given the many influences at work in explaining agricultural trends and performance, it may be difficult to establish this with any certainty. Therefore, an important subsidiary aim should be to establish priorities for further investigations to broaden the evaluation process in the future.

Objectives

6. In the light of the above, the major objectives of the initial evaluation would be as follows:

(a) to establish the agricultural conditions prevailing in the Paddy I and II project areas, distinguishing in particular between (i) areas which have yet to receive any benefit from project works, (ii) areas which have obtained some benefit, and (iii) areas for which the major civil works have been completed;

(b) to review agricultural trends in the project areas, establishing, to the extent possible, the pre-project conditions, as well as the respective contributions of project works and other factors in promoting agricultural growth and development;

(c) In the light of (a) and (b), to review the assumptions relating to agricultural production presented in the two IDA appraisal reports, in particular those relating to cultivated and reclaimed areas, cropping patterns, yields and input use, and to recommend revisions, if necessary, for present and future, "with" and "without" project conditions;

(d) to undertake a preliminary re-assessment of the economic and

financial impact of project works, taking into account (i) the revised agricultural assumptions provided under (c), (ii) revised economic and financial price projections for major commodities, in particular paddy, and (iii) actual project costs and expenditures;

(e) to recommend priorities for further surveys and investigations, in particular to broaden the basis for the evaluation program.

Information Base

7. Three primary sources of information should be used as the basis for the evaluation:

(a) Official statistics collected by the Agricultural Corporation, the Land Records and Settlement Department, and other Government agencies should be used to provide a comprehensive picture of agricultural trends in the Paddy I and Paddy II areas;

(b) A fairly straightforward farm survey of perhaps 300-400 farmers should be used to establish the farmers' perspective of the impact of project works; and

(c) Interviews with Government officials and representatives of the People's Councils, Cooperatives and other local organizations should provide complementary views and judgements on project impact.

8. Official Statistics. To the extent possible, these should be presented on both a polder and a district basis for at least five years, to cover trends during the full project implementation period. These statistics might cover the following subjects :

(a) Project areas;

(b) Farm size distribution;

(c) Progress of settlement of reclaimed land;

(d) Cultivated areas and cropping patterns;

(e) Yields and production;

(f) Fertilizer and pesticide use;

(g) Farm equipment and draught animals;

(h) Credit;

(i) Project finances and costs; and

(j) Project implementation schedules.

9. The Farm Survey should be limited to selected areas since it would be impracticable to cover the full Paddy I and Paddy II areas. It is suggested samples of perhaps 70-80 farmers in five or six polders or groups of polders should be included. The proposed polders are:

(a) Middle Delta: Schwelaung (completed polder) and Thongwa (only very limited impact so far of project works).

(b) Lower Delta: Zinbaung/Letpanbin/Kyetpham Wezaung (completed polders), Betut and/or Baw Chaung (partially completed) and Daunggyi I and II ( works not started).

10. The interviewed farmers should to the extent possible be selected on a random basis from the total farm populations in these polders. List of farmers in the areas is available with the Village Councils. A random selection of perhaps 7 to 10 villages within each polder or groups of polders should be selected, followed by a random selection of perhaps 8 to 10 farmers within the selected village. If necessary, the number of polders should be reduced to ensure that a fully random selection is made within a defined population. A suggested draft questionnaire is attached.

Although in theory, some modification of the questionnaire could be considered depending on the stage of development of different polders, in practice it seems more practical to use the same questionnaire and to omit inappropriate questions. The draft questionnaire has purposely been kept fairly short and straightforward. Nevertheless, it covers both factual and attitudinal aspects with the aim of establishing, to the extent possible, both the actual and the perceived impact or likely impact of project works.

11. Interviews with Government officials and local leaders would be used to help in judging the overall impact of project works. The major institutions that could be consulted include:

(a) The Agricultural Corporation;

(b) The Land Records and Settlement Department;

(c) The Agricultural Mechanization Department;

(d) The Irrigation Department;

(e) The Myanma Agricultural Bank;

(f) Cooperatives; and

(g) The Village and Township Councils.

12. The form of these interviews, and the issues considered, would need to be adapted to the institutions concerned.

The Revised Evaluation

13. On the basis of the information thus collected, a revised economic and financial evaluation of the two projects should be undertaken. To the extent possible, the relative economic costs and benefits of individual polders should be established and at the very least the middle and lower delta areas should be separately evaluated. In the light of the results, and taking into account any other indicators and information collected, the major factors contributing to the relative economic and

financial performance of the two projects, and individual sub-projects, should be established.

14. The revised evaluation should in principle follow the methodology used in the Paddylands II Staff Appraisal Report, although this need not preclude modifications if these are thought desirable.

Timetable and Reporting

15. The draft evaluation report should be completed by December 31, 1982, so as to be available to the Paddy III Project appraisal mission, tentatively scheduled for Jan-Feb 1982. The report should present and evaluate the results of the analysis, and include the basic statistical information collected and the results of the farm surveys as annexes.

16. The draft/report should also recommend priorities for further surveys and investigations, in particular to broaden the basis for evaluation, for instance through assessments of such aspects as: (a) the role of project investments other than civil works in contributing to agricultural growth (farm equipment, storage facilities, etc.), (b) the effectiveness of the T&V extension services supported under the project and their future evolution, (c) the arrangements for implementing the project modifications for the future, (d) the operation of completed projects, in particular with a view to maximizing agricultural production, and (e) other organizational, institutional and related aspects which might influence the design of future projects.

BURMA

Back-to-Office Report

List of Principal Officials Met

Ministry of Planning and Finance

| | |
|---|---|
| Dr. Maung Shein | Deputy Minister |
| U Thein Myint | Director General, FERD |
| U Khin Maung | Deputy Director General, FERD |
| Dr. Thien Swe | Deputy Director, FERD |
| Dr. Ba Hle | Technical Advisor |

Union Bank of Burma

| | |
|---|---|
| Dr. Aye Hlaing | Ex-Chairman |

Ministry of Agriculture and Forests

| | |
|---|---|
| U Hla Moe | Director, Planning and Statistics |

Irrigation Department

| | |
|---|---|
| U Maung Maung Kyi | Director General |
| U Khin Maung Hla | Director |
| U Maung Maung Lay | Adviser (Planning) |
| Dr. Thein Tun | Superintending Engineer (Planning) |
| U Kyaw Htin | DD (Planning and Budget) |
| U Saw Hlaing | Project Director, Paddy I |
| Dr. Ohn Mying | EE (Planning and Design) |
| U Than Htay | EE (Shwebo) |
| U Hla Maung | EE (Ye U) |
| U Thaik Nyunt | EE (Groundwater) |

Agricultural Corporation

| | |
|---|---|
| U Hla Myint Oo | General Manager (Planning and Projects) |
| U Nyi Nyi | Dep. GM (Planning) |
| U Kyi Win | Dep. GM (Planning) |

Settlement and Land Records Department

| | |
|---|---|
| U Sein Kyu | Director General |
| U Pe Sein | DD (Settlements and Administration) |
| U Zaw Pe | DD (Crop Statistics) |

Institute of Economics

| | |
|---|---|
| Prof. George Thein Nyunt | Professor of Economics |

United Nation Development Program

| | |
|---|---|
| Mr. Erling Dessau | Resident Representative |
| Mr. Jacob Guijt | Deputy Resident Representative |
| Mr. Sam Oglesby | Asst. Resident Representative |

Groundwater Development Consultants

| | |
|---|---|
| Mr. Roger Jackson | Project Manager |
| Mr. David Potten | Economist |

BA-Irrig - Kawmhn R.

Jul 15, 82

Project brief

# OFFICE MEMORANDUM

TO: Mr. Marius Veraart
FAO and IFAD Coordinator
Agriculture and Rural Development
Department, CPS
World Bank, Washington, D.C.

DATE: 15 July, 1982.

FROM: for Maurice Fenn
Chief, Service II, FAO/WB CP

SUBJECT: Lower Burma Paddylands Development III Project (Kawmhu)

... Please find enclosed herewith 8 copies of the Project Brief Report on the above mission.

BK 103/2. 9 BUR
AZ/hl
cc: DDC Registry (2)
Fenn (2)
Zagni (3)

cc: Messrs Parsons (4)
Shibasawa (1)
Niaz (1)

RECEIVED
JUL 27 1982

# BURMA

## LOWER BURMA PADDYLANDS DEVELOPMENT III PROJECT (KAMTHU)

### CP Project Brief

| | |
|---|---|
| Project No: | 8BUAA109P |
| Sector: | Agriculture |
| Project Costs: | US$50 million (tentative) |
| Appraisal: | January 1983 |
| Related Reports: | Back-to-Office Report: 22 December, 1981 |
| | Back-to-Office Report: 28 January, 1982 |
| | Back-to-Office Report: 13 April, 1982 |
| | First Project Brief: 10 April, 1982 |
| | Second Project Brief: 8 July, 1982 |
| Project Officer: | Mr. A.F.E. Zagni |

## A. Sectoral Context

1. Burma is richly endowed with natural resources and has a highly literate population but low population density (130/mi2). Some 75% of its 34 million inhabitants live in rural areas and are dependent directly or indirectly on agriculture. Of its 260,000 mi2, about 27% or 45 M ac is considered arable. However, only about 20 M are presently cultivated, mainly due to adverse rainfall regime.

2. Despite its natural advantages, Burma's economic record has been disappointing. Its per capita income of US$150 p.a. places it in the 25 least developed countries. The Government of Burma's (GOB) philosophy combining socialism and Burmese traditions has induced progress in social adjustments, but has failed to achieve adequate economic growth. Indeed, the value added in the productive sectors in the 1960's and early 1970's failed even to match the 2.2% p.a. population growth, with declining exports.

3. Recognizing these shortcomings, GOB introduced selective inducements such as increased agricultural produce procurement prices, currency devaluation, increased interest on savings deposits and tax reform in the period 1971/78. In response to these, growth accelerated and GDP increased by an average of 4.8% p.a., and exports grew by some 10.6% p.a. in the latter part of this period. The agricultural sector in 1978 (the end of the Second Four Year Plan (SFYP) accounted for 36% of GDP, and agricultural products represented 85% of all exports. These were primarily teak and rice. In the period 1975/78, the sector average growth rate was 3.6% p.a.

4. Before World War II Burma was the world's largest exporter of rice, with annual exports of about 3 M tons out of a total production of 8 M tons. During the war embankments in the Irrawaddy Delta were not maintained, and changes in land tenure occurred after the war; thus although areas of rice in central and upper Burma increased, the overall production remained at about pre-war levels. In response to incentives, rice production grew from 9.2 M tons in 1976 to 10.4 M tons in 1978. Provisional production for 1981 was 13.1 M tons.

5. Since the first IDA credit in 1973, GOB has progressively increased its aid acceptance from unilateral and bilateral donors, and from UN agencies for the development of agriculture. Flood protection, drainage and irrigation have figured prominently in this programme.

## B. Project Origin

6. Two previous projects funded by IDA, Paddylands I and II Projects, are progressively raising rice production in the middle and lower Irrawaddy Delta through the introduction of HYV varieties made possible by the drainage of deeply flooded lands and the exclusion of tidal saline contamination.

7. Paddylands Development I Project comprises 11 sub-projects and covers an area of some 195,000 ac. It was commenced in 1976, and is estimated to cost about US$54 million. Completion is anticipated in May 1984, some two years behind schedule. Ten of the sub-projects are located in the lower delta, and due to lack of fresh water in the dry season the emphasis is on increasing monsoon rice production. The remaining sub-project is in the middle delta, and in this area irrigation facilities are also provided to irrigate jute and field crops during the dry season.

8. Paddylands Development II Project comprises 4 sub-projects and covers an area of some 150,000 ac. It was commenced in 1978, and is estimated to cost about US$56 million. Completion is scheduled for May 1985. Three sub-projects are located in the lower delta, and will increase rice production only. The fourth, in the middle delta, also has irrigation facilities similar to that in Paddylands I Project.

9. The present project is the third in the series. In its initial formulation, however, a strong emphasis was placed by GOB on maximising oilseed production in addition to the reclamation and improvement of paddyland.

10. The consultants to Paddylands I Project, Sir William Halcrow and Partners, carried out a reconnaissance level study of future project potential in the delta, and made a ranking in order of economic advantage 1/ . They divided future projects into Drainage Projects (lower delta), Small and Medium Scale Irrigation Projects (middle and upper delta and the flood berms of the mainstream Irrawaddy), and a large scale Irrigation Pilot Project. Highest in ranking was the Small and Medium Scale Irrigation Project group. Thereafter in various orders of attractiveness followed the drainage projects. Highest of these were three areas around Rangoon, selected due to their moderate population density, poor status of present development, and the minimum of existing fisheries.

11. In December 1981, a World Bank/FAO/CP mission discussed with ID senior staff the future project development to maintain continuity in paddy development and land reclamation and a short list of five project areas was evolved totalling some 500,000 ac. Three of these were in the Rangoon area, and two smaller areas were in the west of the delta at the mouth of the Bassein River. The mission requested DG/ID to select a definitive project area of about 250,000 ac such that this could be the object of

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1/ "Irrawaddy Delta-Hydrological Investigations and Delta Survey" Sir William Halcrow and Partners, Swindon, UK, August 1981.

project preparation with FAO/CP assistance commencing in February 1982.

## C. Project Concept

12. On the return of the FAO/CP mission in late February 1982, the DG/ID directed that the Area 17 (the consultant's designation for an area to the immediate south-west of Rangoon) should be selected for project preparation with a view to World Bank financing. The consultants had estimated that the present "land utilization index" was 74% and thus offered substantial potential incremental benefits. The project would include flood protection and drainage works similar to the previous Paddylands Projects, such that presently deeply flooded and saline contaminated areas could be reclaimed, and so that HYV rice production could be increased. The increased rice production would significantly contribute to Burma's export potential, necessary to generate foreign exchange and to service the increasingly large foreign debts.

13. A further objective of the proposed project was to increase the region's oilseed production. The DG/ID had indicated that it was GOB's intention to achieve national and regional self-sufficiency in this commodity. The project should therefore, within soils and climate constraints, include facilities to achieve increased production of oilseed crops.

14. To attain the objectives defined above, it would be necessary to provide physical control measures to exclude tidal and river flood surges by means of embankments, and to improve drainage during the monsoon season by improving the existing creek network and the provision of sluice structures. Fresh water would be required during the dry season so that irrigation of oilseed and other crops could be practiced using low lift pumps (LLP).

15. In order to provide an adequate infrastructure to sustain the increased production potential, the extension service, agricultural mechanisation, communications and research activities would require strengthening. It is envisaged that credit requirements would be covered under the Credit Project recently prepared for Myanma Agricultural Bank by FAO/CP.

## D. The Project Area

16. The project area encompasses some 237,500 ac gross on the island to the south and west of Rangoon, covering parts of the Townships of Twante, Kawmhu and Kungyangon. The project boundary is defined by the Twante Canal to the north, and the high ground to the west bounded by the Kungyangon-Twante road. A major creek (Bassein Creek) runs SW-NE through the project area. This is now very heavily silted in its central reach and is impassable to river traffic. The existing internal creek network is also heavily silted, and due to this the lower lying areas are deeply flooded during the monsoon. Most of these creeks are tidal, and there is a considerable saline contamination due to their overtopping during spring tides during the dry season. Soils in the project area are predominantly heavy cracking clays (Gley soils), but lighter soils exist in small pockets adjacent to the lateritic hills to the west, and in old beach deposits in the south.

17. The Township Development Committees of Twante, Kawmhu and Kungyangon are active, including the officers dealing with agricultural extension and mechanisation. Present communications are tenuous, with only deeply rutted secondary roads with many bridges unpassable, in addition to the only tarmac road Kungyangon - Kawmhu - Twante - Dala. Water

transportation is very limited in the dry season. Some 16 government paddy procurement centres exist within the project area, together with 23 rice mills. Two new mills are under construction, which on completion will raise the milling capacity to 700 tonnes/day. Only one of these new mills with a capacity of 50 tonnes/day will produce rice of export quality. The present output, due to inadequate covered storage and poorly maintained mills, is rice with up to 35% "brokens". One Agricultural Mechanisation Department (AMD) tractor station exists in the north near Twante, offering medium tractor rental services. The Agricultural Corporation (AC) has about 10 Extension Training Centres serving the area, but these are poorly equipped.

18. The present population of the three constituent Townships is about 332,000, of which it is tentatively estimated that some 183,000 are in the project area. Field observations indicate that a large proportion of these persons live in the two towns of Kawmhu and Kungyangon, and along the Kungyangon-Twante-Dala road. Villages in the remaining area are sparse and small, due it is thought to the serious shortage of fresh water in the dry season. Preliminary estimates indicate that there are some 14,000 farm families in the project area, and that average farm size is about 15.2 ac. All agricultural land is the property of the State and is allocated to farmers on a beneficial use basis.

## E. The Project

19. The proposed project envisages the construction of some 24 miles of new embankments and the resectioning and retiring where required of some 26 miles of existing embankment. These, together with the existing Twante-Dala road embankment, the high ground to the west, and the raised old beaches to the south, will effectively empolder the project area, giving protection against a 25 year frequency tidal surge. To provide drainage water evacuation and saline water exclusion, five flap-gated sluice structures will be required with a total of 32 openings. Two major closure dams will be required to close the existing large creek (Bassein Creek) each with a width of about 300 yards.

20. It is known that fresh water exists at the north-west corner of the project in the Twante Canal even at high tide until about the end of February. Thus it is envisaged that a double flap-gate structure would be installed at this point to permit gravity inlet of fresh water in addition to monsoon drainage. After this time, it is thought that fresh water exists at low tide at Twante, and pumping would be required to provide project requirements. To provide replenishment for leakage, domestic requirements and evaporation, some 22 cusecs might be required by pumping. This would not require additional power installation. The existing creek system would be excavated and realigned to form an interconnected system. This has the advantages of providing a more efficient drainage system in the monsoon season, a multiple ring-main lagoon for fresh water supply in the dry season, and improving water communications for small country boats. Some 160 miles of major creeks would be so improved. It is anticipated that water hyacinth will proliferate, and design would attempt to permit periodic flushing.

21. Although it was intended that oilseed production should be maximised, the extent of lighter soils suitable for these crops was found to be negligible. ID has proposed that instead gram (chick pea) should be considered. This crop would appear to be ideally suited as it tolerates heavy soils, it is normally broadcast on the standing rice shortly before harvest, and following germination on the residual moisture requires only two or three irrigations before harvest in late February. Preliminary

estimates indicate that an area of some 80,000 ac could be irrigated by the creek system using LLP, but further studies are required to ascertain if this area could be adequately supplied with fresh water through the Twante intake by gravity, and if the farmers would be likely to purchase pumps specifically for gram.

22. Discussions with AC indicated that a demonstration farm of about 200 ac should be included in the project. Further discussions with Agricultural Research Institute (ARI) senior staff at Yezin suggested that a field research station should be established together with the demonstration farm to carry out adaptive research. In the event that an irrigation requirement should be identified after late February, the intake structure at Twante could be fitted with additional pumping capacity. This could be financed by some future project, and constitutes a flexible response to development trends without committing large capital costs at this stage.

23. To improve communications, the project would provide some additional 65 miles of all-weather roads and bridges in addition to the navigable creek system. The project would also provide strengthening of the extension services with additional staff, transport and training centres, and fertiliser stores.

24. Unlike the Paddylands I and II projects, there is not an obvious demand for AMD reclamation services utilising heavy equipment in this project, as it appears that only low scrub must be cleared in the non-cultivated areas. AMD has indicated that it has a programme under local resources to improve the tractor rental service and to provide power tiller/pump sales and service facilities in the project area.

25. In view of the inadequate hydraulic designs and poor quality embankment and structure construction noted by Bank supervision missions in Paddylands I and II Projects, expatriate consultants are likely to be provided under the Minor Tanks Project now under negotiation for financing by IDA. A creek closure expert will be recommended to be financed under this (Paddylands III) project.

26. To economise on equipment costs, it has been agreed with ID that machinery becoming free from the Mobye and Paddylands I Project will be made available for use on this project following overhaul.

27. Project benefits are likely to derive predominantly from increased paddy production. Present estimates of the present and future-with-project situation are as follows:

| | Area (ac) | Description | Yield (ton/ac) |
|---|---|---|---|
| (a) | Present Situation | | |
| | 126,800 | HYV/LIV paddyland | 1.45 1/ |
| | 71,500 | LV paddyland | 0.98 1/ |
| | 13,000 | Average area of paddyland planted but failing | 0 1/ |
| | 13,200 | Fallow land deeply flooded | 0 |
| | 1,000 | Plantations, grazing, salt pans | N/A |
| | 4,000 | Saline scrubland | - |
| | 8,000 | Village and water surface areas | - |
| Total | 237,500 | | |

1/ Based on village tract statistics.

Estimated total present production is 254,200 tons paddy. The above data indicates that the present "land utilization index" is about 92%, and not 74% as estimated by the consultants. This is obtained by including paddyland planted but failing to be consistent with the consultants methodology.

| | | | |
|---|---|---|---|
| (b) | Future Situation | | |
| | 222,200 | HYV paddyland (potential) | 1.64 |
| | 5,500 | LV paddyland (moderate flooding) | 0.94 |
| | 1,000 | Plantations, grazing, salt pans | N/A |
| | 800 | Loss of area due to project works | - |
| | 8,000 | Village and water surface areas | - |
| Total | 237,500 | | |

Estimated total future production 369,600 tons rice.

On the above analysis, some 116,000 tons incremental paddy production will result. This, however, is based on the assumption that the farmers will grow 100% HYV on those areas where this is hydrologically feasible, as intended by GOB. In practice, these farmers may grow LV for their own domestic consumption, and by taking this into consideration the estimated total future incremental production would fall to about 94,000 tons of paddy.

28. Project costs and benefits have not yet been developed, but a tentative estimate of total cost is now US$50 million. Considerable economies will arise from constructing the project as a single polder, from the use of mechanical equipment being released from other projects, and from reduction in drainage capacity by integrated channel configuration. The construction period would be about five years.

## F. Issues and Considerations

29. The following are considered at this stage as issues and considerations affecting the project:

- ID's capacity to implement the project in the light of its current staff shortages;
- the supply of diesel fuel for construction and maintenance equipment, and for agricultural machinery, in the light of current national shortage;
- the ability of GOB to supply some additional 5,500 tons of fertiliser to sustain the anticipated increase in HYV rice production;
- the fresh water availability pattern at high tide at Twante intake;
- the improvement in milling quality in the project area which at present produces up to 35% brokens. This could be substantially improved with covered storage at procurement centres;
- the discovery that present land utilisation in the project area is 92% instead of 74% as previously assumed reduces the economic viability of the project.

## G. Project Status and Follow-Up Action

30. ID engineers are carrying out designs and costings of hydraulic structures, creek closures, channels and roads under FAO/CP guidance, but these will not be complete until late August. Meanwhile FAO/CP team members are continuing their analysis and formulations in Rome, and are completing map production.

31. A third FAO/CP mission will visit Burma in early September to receive and discuss designs and costings, and to finalise the project concept. Infrastructural components will be agreed.

32. Report preparation in Rome is expected to be completed by end October 1982 providing ID has completed designs and costings by end August to the required standards. Appraisal by World Bank is anticipated in January 1983.

BA - Irrig - Kawamba R.

Jul 8, 82

Project brief

SAIC Burma Paddylands III

Jul. 8, 82

BURMA

LOWER BURMA PADDYLANDS DEVELOPMENT III PROJECT (KAWMHU)

CP Project Brief

| | |
|---|---|
| Project No: | 8BUAA109P |
| Sector: | Agriculture |
| Project Costs: | US$50 million (tentative) |
| Appraisal: | January 1983 |
| Related Reports: | Back-to-Office Report: 22 December, 1981 |
| | Back-to-Office Report: 28 January, 1982 |
| | Back-to-Office Report: 13 April, 1982 |
| | First Project Brief: 10 April, 1982 |
| | Second Project Brief: 8 July, 1982 |
| Project Officer: | Mr. A.F.E. Zagni |

## A. Sectoral Context

1. Burma is richly endowed with natural resources and has a highly literate population but low population density (130/mi2). Some 75% of its 34 million inhabitants live in rural areas and are dependent directly or indirectly on agriculture. Of its 260,000 mi2, about 27% or 45 M ac is considered arable. However, only about 20 M are presently cultivated, mainly due to adverse rainfall regime.

2. Despite its natural advantages, Burma's economic record has been disappointing. Its per capita income of US$150 p.a. places it in the 25 least developed countries. The Government of Burma's (GOB) philosophy combining socialism and Burmese traditions has induced progress in social adjustments, but has failed to achieve adequate economic growth. Indeed, the value added in the productive sectors in the 1960's and early 1970's failed even to match the 2.2% p.a. population growth, with declining exports.

3. Recognizing these shortcomings, GOB introduced selective inducements such as increased agricultural produce procurement prices, currency devaluation, increased interest on savings deposits and tax reform in the period 1971/78. In response to these, growth accelerated and GDP increased by an average of 4.8% p.a., and exports grew by some 10.6% p.a. in the latter part of this period. The agricultural sector in 1978 (the end of the Second Four Year Plan (SFYP) accounted for 36% of GDP, and agricultural products represented 85% of all exports. These were primarily teak and rice. In the period 1975/78, the sector average growth rate was 3.6% p.a.

4. Before World War II Burma was the world's largest exporter of rice, with annual exports of about 3 M tons out of a total production of 8 M tons. During the war embankments in the Irrawaddy Delta were not maintained, and changes in land tenure occurred after the war; thus although areas of rice in central and upper Burma increased, the overall production remained at about pre-war levels. In response to incentives, rice production grew from 9.2 M tons in 1976 to 10.4 M tons in 1978. Provisional production for 1981 was 13.1 M tons.

5. Since the first IDA credit in 1973, GOB has progressively increased its aid acceptance from unilateral and bilateral donors, and from UN agencies for the development of agriculture. Flood protection, drainage and irrigation have figured prominently in this programme.

## B. Project Origin

6. Two previous projects funded by IDA, Paddylands I and II Projects, are progressively raising rice production in the middle and lower Irrawaddy Delta through the introduction of HYV varieties made possible by the drainage of deeply flooded lands and the exclusion of tidal saline contamination.

7. Paddylands Development I Project comprises 11 sub-projects and covers an area of some 195,000 ac. It was commenced in 1976, and is estimated to cost about US$54 million. Completion is anticipated in May 1984, some two years behind schedule. Ten of the sub-projects are located in the lower delta, and due to lack of fresh water in the dry season the emphasis is on increasing monsoon rice production. The remaining sub-project is in the middle delta, and in this area irrigation facilities are also provided to irrigate jute and field crops during the dry season.

8. Paddylands Development II Project comprises 4 sub-projects and covers an area of some 150,000 ac. It was commenced in 1978, and is estimated to cost about US$56 million. Completion is scheduled for May 1985. Three sub-projects are located in the lower delta, and will increase rice production only. The fourth, in the middle delta, also has irrigation facilities similar to that in Paddylands I Project.

9. The present project is the third in the series. In its initial formulation, however, a strong emphasis was placed by GOB on maximising oilseed production in addition to the reclamation and improvement of paddyland.

10. The consultants to Paddylands I Project, Sir William Halcrow and Partners, carried out a reconnaissance level study of future project potential in the delta, and made a ranking in order of economic advantage 1/ . They divided future projects into Drainage Projects (lower delta), Small and Medium Scale Irrigation Projects (middle and upper delta and the flood berms of the mainstream Irrawaddy), and a large scale Irrigation Pilot Project. Highest in ranking was the Small and Medium Scale Irrigation Project group. Thereafter in various orders of attractiveness followed the drainage projects. Highest of these were three areas around Rangoon, selected due to their moderate population density, poor status of present development, and the minimum of existing fisheries.

11. In December 1981, a World Bank/FAO/CP mission discussed with ID senior staff the future project development to maintain continuity in paddy development and land reclamation and a short list of five project areas was evolved totalling some 500,000 ac. Three of these were in the Rangoon area, and two smaller areas were in the west of the delta at the mouth of the Bassein River. The mission requested DG/ID to select a definitive project area of about 250,000 ac such that this could be the object of

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1/ "Irrawaddy Delta-Hydrological Investigations and Delta Survey" Sir William Halcrow and Partners, Swindon, UK, August 1981.

project preparation with FAO/CP assistance commencing in February 1982.

## C. Project Concept

12. On the return of the FAO/CP mission in late February 1982, the DG/ID directed that the Area 17 (the consultant's designation for an area to the immediate south-west of Rangoon) should be selected for project preparation with a view to World Bank financing. The consultants had estimated that the present "land utilization index" was 74% and thus offered substantial potential incremental benefits. The project would include flood protection and drainage works similar to the previous Paddylands Projects, such that presently deeply flooded and saline contaminated areas could be reclaimed, and so that HYV rice production could be increased. The increased rice production would significantly contribute to Burma's export potential, necessary to generate foreign exchange and to service the increasingly large foreign debts.

13. A further objective of the proposed project was to increase the region's oilseed production. The DG/ID had indicated that it was GOB's intention to achieve national and regional self-sufficiency in this commodity. The project should therefore, within soils and climate constraints, include facilities to achieve increased production of oilseed crops.

14. To attain the objectives defined above, it would be necessary to provide physical control measures to exclude tidal and river flood surges by means of embankments, and to improve drainage during the monsoon season by improving the existing creek network and the provision of sluice structures. Fresh water would be required during the dry season so that irrigation of oilseed and other crops could be practiced using low lift pumps (LLP).

15. In order to provide an adequate infrastructure to sustain the increased production potential, the extension service, agricultural mechanisation, communications and research activities would require strengthening. It is envisaged that credit requirements would be covered under the Credit Project recently prepared for Myanma Agricultural Bank by FAO/CP.

## D. The Project Area

16. The project area encompasses some 237,500 ac gross on the island to the south and west of Rangoon, covering parts of the Townships of Twante, Kawmhu and Kungyangon. The project boundary is defined by the Twante Canal to the north, and the high ground to the west bounded by the Kungyangon-Twante road. A major creek (Bassein Creek) runs SW-NE through the project area. This is now very heavily silted in its central reach and is impassable to river traffic. The existing internal creek network is also heavily silted, and due to this the lower lying areas are deeply flooded during the monsoon. Most of these creeks are tidal, and there is a considerable saline contamination due to their overtopping during spring tides during the dry season. Soils in the project area are predominantly heavy cracking clays (Gley soils), but lighter soils exist in small pockets adjacent to the lateritic hills to the west, and in old beach deposits in the south.

17. The Township Development Committees of Twante, Kawmhu and Kungyangon are active, including the officers dealing with agricultural extension and mechanisation. Present communications are tenuous, with only deeply rutted secondary roads with many bridges unpassable, in addition to the only tarmac road Kungyangon - Kawmhu - Twante - Dala. Water

transportation is very limited in the dry season. Some 16 government paddy procurement centres exist within the project area, together with 23 rice mills. Two new mills are under construction, which on completion will raise the milling capacity to 700 tonnes/day. Only one of these new mills with a capacity of 50 tonnes/day will produce rice of export quality. The present output, due to inadequate covered storage and poorly maintained mills, is rice with up to 35% "brokens". One Agricultural Mechanisation Department (AMD) tractor station exists in the north near Twante, offering medium tractor rental services. The Agricultural Corporation (AC) has about 10 Extension Training Centres serving the area, but these are poorly equipped.

18. The present population of the three constituent Townships is about 332,000, of which it is tentatively estimated that some 183,000 are in the project area. Field observations indicate that a large proportion of these persons live in the two towns of Kawmhu and Kungyangon, and along the Kungyangon-Twante-Dala road. Villages in the remaining area are sparse and small, due it is thought to the serious shortage of fresh water in the dry season. Preliminary estimates indicate that there are some 14,000 farm families in the project area, and that average farm size is about 15.2 ac. All agricultural land is the property of the State and is allocated to farmers on a beneficial use basis.

## E. The Project

19. The proposed project envisages the construction of some 24 miles of new embankments and the resectioning and retiring where required of some 26 miles of existing embankment. These, together with the existing Twante-Dala road embankment, the high ground to the west, and the raised old beaches to the south, will effectively empolder the project area, giving protection against a 25 year frequency tidal surge. To provide drainage water evacuation and saline water exclusion, five flap-gated sluice structures will be required with a total of 32 openings. Two major closure dams will be required to close the existing large creek (Bassein Creek) each with a width of about 300 yards.

20. It is known that fresh water exists at the north-west corner of the project in the Twante Canal even at high tide until about the end of February. Thus it is envisaged that a double flap-gate structure would be installed at this point to permit gravity inlet of fresh water in addition to monsoon drainage. After this time, it is thought that fresh water exists at low tide at Twante, and pumping would be required to provide project requirements. To provide replenishment for leakage, domestic requirements and evaporation, some 22 cusecs might be required by pumping. This would not require additional power installation. The existing creek system would be excavated and realigned to form an interconnected system. This has the advantages of providing a more efficient drainage system in the monsoon season, a multiple ring-main lagoon for fresh water supply in the dry season, and improving water communications for small country boats. Some 160 miles of major creeks would be so improved. It is anticipated that water hyacinth will proliferate, and design would attempt to permit periodic flushing.

21. Although it was intended that oilseed production should be maximised, the extent of lighter soils suitable for these crops was found to be negligible. ID has proposed that instead gram (chick pea) should be considered. This crop would appear to be ideally suited as it tolerates heavy soils, it is normally broadcast on the standing rice shortly before harvest, and following germination on the residual moisture requires only two or three irrigations before harvest in late February. Preliminary

estimates indicate that an area of some 80,000 ac could be irrigated by the creek system using LLP, but further studies are required to ascertain if this area could be adequately supplied with fresh water through the Twante intake by gravity, and if the farmers would be likely to purchase pumps specifically for gram.

22. Discussions with AC indicated that a demonstration farm of about 200 ac should be included in the project. Further discussions with Agricultural Research Institute (ARI) senior staff at Yezin suggested that a field research station should be established together with the demonstration farm to carry out adaptive research. In the event that an irrigation requirement should be identified after late February, the intake structure at Twante could be fitted with additional pumping capacity. This could be financed by some future project, and constitutes a flexible response to development trends without committing large capital costs at this stage.

23. To improve communications, the project would provide some additional 65 miles of all-weather roads and bridges in addition to the navigable creek system. The project would also provide strengthening of the extension services with additional staff, transport and training centres, and fertiliser stores.

24. Unlike the Paddylands I and II projects, there is not an obvious demand for AMD reclamation services utilising heavy equipment in this project, as it appears that only low scrub must be cleared in the non-cultivated areas. AMD has indicated that it has a programme under local resources to improve the tractor rental service and to provide power tiller/pump sales and service facilities in the project area.

25. In view of the inadequate hydraulic designs and poor quality embankment and structure construction noted by Bank supervision missions in Paddylands I and II Projects, expatriate consultants are likely to be provided under the Minor Tanks Project now under negotiation for financing by IDA. A creek closure expert will be recommended to be financed under this (Paddylands III) project.

26. To economise on equipment costs, it has been agreed with ID that machinery becoming free from the Mobye and Paddylands I Project will be made available for use on this project following overhaul.

27. Project benefits are likely to derive predominantly from increased paddy production. Present estimates of the present and future-with-project situation are as follows:

| | Area (ac) | Description | Yield (ton/ac) |
|---|---|---|---|
| (a) | Present Situation | | |
| | 126,800 | HYV/LIV paddyland | 1.45 1/ |
| | 71,500 | LV paddyland | 0.98 1/ |
| | 13,000 | Average area of paddyland planted but failing | 0 1/ |
| | 13,200 | Fallow land deeply flooded | 0 |
| | 1,000 | Plantations, grazing, salt pans | N/A |
| | 4,000 | Saline scrubland | - |
| | 8,000 | Village and water surface areas | - |
| Total | 237,500 | | |

1/ Based on village tract statistics.

Estimated total present production is 254,200 tons paddy. The above data indicates that the present "land utilization index" is about 92%, and not 74% as estimated by the consultants. This is obtained by including paddyland planted but failing to be consistent with the consultants methodology.

| | | | |
|---|---|---|---|
| (b) | Future Situation | | |
| | 222,200 | HYV paddyland (potential) | 1.64 |
| | 5,500 | LV paddyland (moderate flooding) | 0.94 |
| | 1,000 | Plantations, grazing, salt pans | N/A |
| | 800 | Loss of area due to project works | - |
| | 8,000 | Village and water surface areas | - |
| Total | 237,500 | | |

Estimated total future production 369,600 tons rice.

On the above analysis, some 116,000 tons incremental paddy production will result. This, however, is based on the assumption that the farmers will grow 100% HYV on those areas where this is hydrologically feasible, as intended by GOB. In practice, these farmers may grow LV for their own domestic consumption, and by taking this into consideration the estimated total future incremental production would fall to about 94,000 tons of paddy.

28. Project costs and benefits have not yet been developed, but a tentative estimate of total cost is now US$50 million. Considerable economies will arise from constructing the project as a single polder, from the use of mechanical equipment being released from other projects, and from reduction in drainage capacity by integrated channel configuration. The construction period would be about five years.

## F. Issues and Considerations

29. The following are considered at this stage as issues and considerations affecting the project:

- ID's capacity to implement the project in the light of its current staff shortages;
- the supply of diesel fuel for construction and maintenance equipment, and for agricultural machinery, in the light of current national shortage;
- the ability of GOB to supply some additional 5,500 tons of fertiliser to sustain the anticipated increase in HYV rice production;
- the fresh water availability pattern at high tide at Twante intake;
- the improvement in milling quality in the project area which at present produces up to 35% brokens. This could be substantially improved with covered storage at procurement centres;
- the discovery that present land utilisation in the project area is 92% instead of 74% as previously assumed reduces the economic viability of the project.

## G. Project Status and Follow-Up Action

30. ID engineers are carrying out designs and costings of hydraulic structures, creek closures, channels and roads under FAO/CP guidance, but these will not be complete until late August. Meanwhile FAO/CP team members are continuing their analysis and formulations in Rome, and are completing map production.

31. A third FAO/CP mission will visit Burma in early September to receive and discuss designs and costings, and to finalise the project concept. Infrastructural components will be agreed.

32. Report preparation in Rome is expected to be completed by end October 1982 providing ID has completed designs and costings by end August to the required standards. Appraisal by World Bank is anticipated in January 1983.

17 JUNE 1982

INTBAFRAD WASHINGTON DC

FOR SHIBUSAWA AND YOON RE IRRIGATION PROJECTS AND TECHNICAL ASSISTANCE

BA-Irrig.- Kammhu Mr Haleem

BA-Irrig. Rehab.

BA-Tubewell Irrig.

BA-UNDP-Gen. (Umbrella-3)

① Fils: Paddy III Irrig Rehab.

② Shibusawa o/r

③ Yoon o/r

AAA PADDY KKK. PREPARATION PROCEEDS REASONABLY SATISFACTORILY SCOPE OF PROJECT AS SET OUT IN FAO/CP INITIAL

AAA PADDY III. . PREPARATION PROCEEDS REASONABLY SATISFACTORILY SCOPE OF PROJECT AS SET OUT IN FAO/CP INITIAL PROJECT BRIEF (APRIL 19, 1982) EXCEPT (I) SEVEN SLUICES NOW ENVISAGED RATHER THAN NINE, (II) SCOPE FOR OILSEEDS APPEARS VERY SMALL BUT PULSES WITH LIMITED IRRIGATION MAY BE AN ALTERNATIVE, (III) FINAL PROPOSALS FOR AC RICE SEED FORM STILL NEED TO BE ESTABLISHED. UNFORTUNATELY, FAO/CP MISSION FOUND ON ARRIVAL THAT: (1) DESPATE MAJOR EFFORT, TOPOGRAPHICAL SURVEYS CONTAINED UNACCEPTABLE IN CONSISTENCIES (2) SITE SOIL INVESTIGATIONS FOR MAJOR STRUCTURES HAD NOT BEEN CARRIED OUT. (3) SALINITY AND TIDAL OBSERVATIONS WERE UNSATISFACTORY (4) LITTLE INITIAL DESIGN WORK HAD BEEN UNDERTAKEN AND (5) AGRO-ECONOMIC QUESTIONNAIRES WERE INCOMPLETELY ANSWERED. CONSIDERABLE PROGRESS HAS BEEN ACHIEVED DURING FAO/CP VISIT BUT ZAGNI EXPECTS HE WILL HAVE TO RETURN FOR SHORT VISIT IN SEPTEMBER, IN PARTICULAR TO REVIEW INITIAL DESIGNS FOR MAJOR STRUCTURES. THIS WILL PROBABLY DELAY PREPARATION REPORT UNTIL ABOUT END-OCTOBER

BBB IRRIGATION REHABILITATION. PRIMA FACIE CASE EXISTS FOR REHAB PROJECT IN SHWEBO/YE U SYSTEM AS REQUESTED BY GOB. SUCCESS, HOWEVER, WILL DEPEND ON WATER BEING AVAILABLE TO MEET CROP WATER REQUIREMENTS ON EXPANDED AREA, GIVEN GREAT VARIABILITY IN MU'S FLOWS. PROVIDED HYDROLOGICAL STUDIES CONFIRM WATER SUFFICIENT THEN PROJECT COSTING USDOLS20-30M COULD COVER REHABILITATION OF EXISTING CANAL/ DRAINAGE SYSTEM: EXTENSION OF TERTIARY SYSTEM TO EXTENT JUSTIFIED BY PLANNED CROPPING: PROVISION OF SILT EXCLUDERS:

IMPROVEMENTS T

JUSTIFIED BY PLANNED CROPPING: PROVISION OF SILT EXCLUDERS: ETC:

O I

IMPROVEMENTS TO INFRASTRUCTURE: AND STRENGTHENING OF AGRI-CULTURAL SUPPORT SERVICES. PRIORITY WOULD BE GIVEN TO YE U SYSTEM BUT FIRST STAGE OF SHWEBO SYSTEM WOULD ALSO BE INCLUDED. ROLE OF GROUNDWATER WOULD ALSO BE TAKEN INTO ACCOUNT.

CCC TUBEWELL CONSULTANTS HAVE COMPLETED IDENTIFICATION OF PROJECT AND DRAFT FEASIBILITY REPORT IS EXPECTED END JULY AS SCHEDULED. THE PROPOSED 5 YEAR TUBEWELL DEVELOPMENT PROJECT WOULD CONSIST OF:

(1) DRILLING OF 86 NEW WELLS IN MONYWA AREA (AREA 2)
(2) ELECTRIFICATION OF 25 EXISTING (CONSTRUCTED UNDER GW I AND KK) AND 86 NEW WELLS IN AREA 2
(3) LAND-LEVELING AND CONSTRUCTION OF IRRIGATION WORKS FOR 86 NEW WELLS
(4) UPGRADING OF IRRIGATION SYSTEMS FOR 35 EXISTING WELLS IN YINMABIN - PALE AREA (AREA 1), AND
(5) AGRICULTURAL EXTENSION SUPPLIES, AND MONITORING AND EVALUATION.

COST OF TUBEWELL I IS TENTATIVELY ESTIMATED AT USDOLS 19.0 MILLION AT MID - 1983 PRICE LEVELS (INCLUDING PHYSICAL AND PRICE CONTINGENCIES), OF WHICH 12.5 MILLION IS FOREIGN EXCHANGE. PRELIMINARY ESTIMATE OF ERR IS IN THE ORDER OF 15 TO 20 PERCENT.

DDD UMBRELLA III PROJECTS. TRIPARTITE REVIEW MEETING, HELD ON JUNE 16 AND CHAIRED BY DR. MAVPG SHEIN,
JUNE 16 AND CHAIRED BY DR. MAUNG SHEIN, -004
JUNE 16 AND CHAIRED BY DR. MAUNG SHEIN, APPROVED EXTENSION OF GROUNDWATER II FOR 15 MONTHS AT COST OF USDOLS700,000 OF WHICH DOLS 200,000 WOULD REPRESENT SAVINGS UNDER KINDA PROCUREMENT AND DOLS 500,000 WOULD COME FROM UMBRELLA. EXTENSION AREA

WOULD BE NORTH OF AREA 2, INCLUDING PART OF YE U COMMAND AREA. TPM ALSO APPROVED TA FOR ENGINEERING CONSULTANTS TO HELP PREPARE IRRIGATION REHAB PROJECT AT COST DOLS300,000. PHASE I HYDROLOGICAL INVESTIGATIONS (3 MANMONTHS) WOULD SEEK TO CONFIRM WATER AVAILABILITY. PHASE TWO WOULD THEN EITHER BE DETAILED SERVICES REQUIRED TO PREPARE YE U/ SHWEBO PROJECT (20 M/M) OR, IF THIS NOT JUSTIFIED, RECONNAISANCE STUDY OF FOUR FURTHER SCHEMES (10 MAN MONTHS) TO IDENTIFY ALTERNATIVE PROJECT.

EEE DURING TPM AND IN PRIOR MEETINGS, GOB STATED THAT TUBEWELL I, PADDY III AND IRRIGATION REHAB ALL INCLUDED IN 5 YEAR INVESTMENT PROGRAM AND WOULD BE IMPLEMENTED DURING FOURTH FOUR YEAR PLAN IF FINANCING FROM IDA FORTHCOMING. GIVEN PREPARATION STATUS, BOTH TUBEWELL 1 AND PADDY III WOULD BE PRESENTED TO BOARD IN FY83. TOGETHER WITH TANK IRRIGATION, HOWEVER, THIS WOULD PROBABLY OVER-BURDEN IRRIGATION DEPARTMENT WHICH IS VERY RELUCTANT TO INITIATE SO MANY NEW PROJECTS. NEVERTHELESS U THEIN MYINT TOLD US PRIVATELY THAT FERD MUCH PREFERS TUBEWELL 1 BE INCLUDED IN FY83 AND IF NECESSARY PADDY III BE DELAYED TO FY84. ALOHOUGH DR MS DISAPPOINTED WITH SMALL SIXE OF PROPOSED TUBEWELL PROJECT, WE UNDERSTAND THIS ALSO HIS POSITION AND HE STRONGLY URGED IDA TO APPRAISE TUBEWELL SOONEST. AT TRM WE ASKED FOR A STATEMENT OF PRIORITIES AND DR MS REQUESTED MINISTRY OF AGRICULTURE TO REVIEW POSITION AND IF POSSIBLE INFORM AZUMI/BERKOFF BEFORE THEIR DEPARTURE OF THEY VIEWS. LATER DISCUSSIONS JOHRI/FERD INDICATE THAT AGREEMENT BETWEEN FINANCE AND AGRICULTURE MAY NOT COME EARLY OR EASILY AND THEREFOR, IF POSSIBLE, BOTH TUBEWELL AND PADDY SHOULD BE PROCESSED AS FY83 HOPEFULLS

FFF NOTWITHSTANDING ABOVE, WE RECOMMEND PROPOSED RESCHEDULING IF REQUESTED BE CONSIDERED FOR FOLLOWING REASONS:

(1) TUBEWELL APPEARS WELL CONCEIVED AND PREPARED CONSULTANTS REPORT HAS BEEN REVIEWED BY AZUMI AND REVISED VERSION IS EXPECTED TO FOLLOW CLOSELY SAR FORMAT AND WOULD VIRTUALLY CONSTIOUME DRAFT WHITE COVER SIGNIFICANO PROGRESS IN WELL UTILIZATION AND GENERAL INSTITUTIONAL ASPECTS HAS BEEN NOTED IN PROJECT AREA.

(2) EXTENSION OF GW II UNDER UMBRELLA WILL PROVIDE FURTHER ASSISTANCE IN O AND M, IRRIGATION AGRONOMY AND WATER MANAGEMENT: AND

(3) ANY SLIGHT DELAY NOW IN PADDY III PREPARATION WOULD INVOLVE TIGHT SCHEDULE FOR FY83 BOARD PRESENTATION AND FOR NUMBER OF REASONS SLOWER PROCESSING WOULD BE DESIRABLE.

GGG IF ACCEPTED AND PROVIDED WE GET GREEN SIGNAL FROM GOB THIS SUGGEST TUBEWELL APPRAISAL IN OCTOBER/NOVEMBER FOR FY83 BOARD PRESENTATION. PADDY III APPRAISAL JANUARY/FEBRUARY 1983 FOR FY84 BOARD PRESENTATION BUT ADVANCED AS FAR AS POSSIBLE IF TUBEWELL NOT AGREED AS FY83. IRRVQNIOHUDJHAB AVRAIFAL IF TUBEWELL NOT AGREED AS FY83. IRRIGATION REHAB APPRAISALJ JULY/AUGUST 1983 FOR FY84 BOARD PRESENTATION WE WILL INFORM YOU MINISTRY OF AGRICULTURE'S VIEWS AND GOB'S FINAL REQUEST IF OBTAINED PRIOR TO DEPARTURE.

REGARDS

JOHRI AZUMI AND BERKOFF

CORRECTION: IN BBB (2) GW I AND GWII RPT GW I AND GW III

COL CKD

+++++

BA-Irrig - Kawmhu Re.

Jul. 6, 82

Back to office report

# OFFICE MEMORANDUM

TO: Mr. Marius Veraart
FAO and IFAD Coordinator
Agriculture and Rural Development
Department, CPS
World Bank, Washington, D.C.

DATE: 6 July, 1982.

FROM: Maurice Fenn
Chief, Service II, FAO/WB CP

SUBJECT: BURMA: Lower Burma Paddylands Development III Project (Kawmhu)
Preparation Mission - Irrigation Rehabilitation I Project
Identification Mission: Back-to-Office Report.

... Please find enclosed herewith 8 copies of the Back-to-Office Report on the above mission.

RECEIVED
JUL 19 1982

BK 103/2.9 BUR
AZ/hl
cc: DDC Registry (2)
Fenn (2)
Zagni (chr.3)

cc: Messrs Yoon (4)
Shibusawa (1)
Niaz (1)

OFFICE MEMORANDUM

To: Mr. M. Fenn, Chief, Service II, DDC.

Date: 6 July, 1982.

From: A.F.E. Zagni, Irrigation Engineer, Service II, DDC.

Subject: BURMA: Lower Burma Paddylands Development III Project (Kawmhu) Preparation Mission - Irrigation Rehabilitation I Project Identification Mission: Back-to-Office Report

## Introduction

1. In accordance with Terms of Reference dated 22 April 1982, the Mission 1/ visited Burma during the period 23 May through 22 June to continue the preparation of Lower Burma Paddylands Development III Project (previously named Kawmhu Reclamation Project), and to make a field inspection of the Mu (Kabo) irrigation system as a continuation of the identification process for the Irrigation Rehabilitation I Project.

## Paddylands III Project

### Background

2. The background to the project is covered in my BTO dated 13 April, 1982. It is recalled that the project area was selected by the Director General, Irrigation Department (DG/ID) due to its proximity to Rangoon, its compact area requiring the minimum of embanking, a minimum of fishery interests, and, most importantly, a present land utilization index of 74% as calculated by the consultants to Paddylands I project.

3. The first preparation mission from 24 February to 25 March, 1982, initiated data collection and generation by ID staff, and produced a base map using 1:20,000 scale air photography. Specifications were given to ID for topographic, creek and site surveys, hydrological surveys and soil and land use surveys to be carried out. In addition, requests were made for agronomic, economic and socio-economic data collection for the village tracts concerned.

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1/ A.F.E. Zagni, (Irrigation Engineer and Mission Leader)
B.A. d'Avis, (Economist)
J.S. Colombi, (Consultant Hydrologist during period 30 May through 14 June)
T.G.H. Jansen, (Consultant Coastal Engineer during period 13 through 22 June)
M. Sugimura, (Agronomist)

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AZ/hl
BK 103/2.9 BUR

cc: World Bank, Washington (8)
All Team Members
RDG DDC (4)

Present Mission Activities

4. Regrettably, the activities of ID during the interim period between missions were less than anticipated, except in the cases of the topographic, creek and site surveys, and of the soils and land use surveys which were completed on time. In particular, the collection of economic, socio-economic and agricultural statistics for the constituent Townships and Village Tracts had not been initiated, the foundation conditions at major structure sites had not been investigated, the hydrological survey had not been diligently carried out, and the type designs for structures had not been started.

5. The mission urgently requested ID to provide the data specified, and before its departure much had been received. Outstanding data will be forwarded to Rome as available. The topographic survey of the area was found to contain major errors and a week was required to carry out field checking for correction to acceptable standards. Unfortunately, it was revealed that the surveyors had not been provided with the base map drawn by the previous mission, and in consequence had to construct a new map by plane tabling which was of lower plan accuracy. The mission leader and hydrologist spent a disproportionate time correcting and transferring topographic data onto the standard base map. Due to heavy monsoon rains during the mission, site foundation conditions could not be examined, which implies the need to increase physical contingencies on foundation design. The very limited attempt to collect hydrological data has resulted in the inability to predict with confidence the suitability of water in the Twante Canal for irrigation.

6. Following interpolation of landform, drainage basins were delineated and approximate discharge capacities determined for the major drainage structures. The hydrologist returned to UK on 14 June to carry out final drainage analysis with his established computer programmes. As a major creek has to be closed at both ends (each about 300 yards top width) under tidal ranges up to 16 ft, a closure expert (coastal engineer) joined the mission for 8 days. He confirmed that these are particularly difficult closures and made recommendations on their designs and closing techniques to reduce the risk of failure to a minimum. No indigenous experience exists in Burma on closures of this scale. Under the mission's guidance, the designs of embankments and type structures were commenced for subsequent costings. A minor drainage sample area of about 7,000 ac was designed and costed during the mission.

7. Soils and land use maps and data were prepared in formats for the report. Visits were made to Agricultural Corporation (AC), Agricultural Mechanisation Department (AMD), Agricultural Research Institute (ARI) at Yezin, Agriculture and Farm Produce Trade Corporation (AFPTC) and the township councils concerned. It was not possible to visit the Myanma Export/Import Corporation as requested.

Proposed Project

8. Using the most recent data, the gross project area has been revised to 247,000 ac, of which some 233,900 ac net are considered cultivable. Present HYV/LIV area is about 128,000 ac. Contrary to the consultants' estimate of present land utilization of 74%, present estimates by the mission indicate that this is about 92%. The soil survey indicates that a negligible area is suitable for oilseed production and ID has agreed to drop the previous emphasis on oilseeds. Production of gram (chick pea) is now being considered as an alternative dry season irrigated crop, but the extent of the potential area may not be assessed until the creek delineation is finalised.

9. In order to clearly assess the potential improvements in the project area, the following summary tables based on most recent data are presented:

(a) Present Situation

| | (ac) |
|---|---|
| Flood free paddy | 92,500 |
| Shallow flooded paddy | 75,900 |
| Medium flooded paddy | 32,200 |
| Deep flooded paddy | 12,900 |
| Sub-Total | 213,500 |
| Fallow land (very deeply flooded) | 13,200 |
| Plantations, upland crops, grazing | 1,000 |
| Scrubland (saline) | 11,100 |
| Villages, water areas, salt pans | 8,700 |
| Total | 247,500 |

(b) Future with project situation

| | |
|---|---|
| Flood free/shallow flooded paddy (potentially HYV) | 219,700 |
| Medium flooded paddy | 13,200 |
| Sub-Total | 232,900 |
| Plantations, upland crops, grazing | 1,000 |
| Scrubland outside embankment | 4,900 |
| Villages, water areas, salt pans | 8,700 |
| Total | 247,500 |

10. Revised civil works estimates, yet to be finalised, are:

(a) 7 major sluice drainage structures, 3 with navigation locks;

(b) 130 miles of new primary channels and 50 miles of realigned and improved existing channels;

(c) 1,330 miles of minor channels;

(d) 50 miles of flood embankments;

(e) 2 major creek closures.

No costs have yet been calculated as designs are continuing. It is intended to use equipment becoming free from the on-going Mobye Project and Paddylands I Project. Limited pumping capacity is being considered at the Twante inlet/outlet structure to sustain dry season domestic, livestock, evaporation and seepage requirements.

11. A limited village feeder road network is proposed to permit easy access to rice procurement centres and to facilitate movement of farm inputs. The AC extension services would be improved by providing additional fertilizer godowns, training centres and equipment, and a small demonstration/experimental farm. As AMD has a comprehensive programme in the area under local resources, no workshops will be included in the project. Should pumps be required for irrigation, these would be procured under local arrangements with credit being made available through the proposed IDA Credit Project.

Status of Preparation

12. ID is completing data collection and designs and costing for creeks, embankments, structures and closures. The hydrologist is finalising primary creek computations and costings. An Aide-Memoire was left with DG/ID outlining revised project concepts.

13. It will be necessary for the Mission Leader to return to Burma in early September 1982 to finalise cost estimates and scrutinise designs. A structures expert may be required to assist him. Project concepts will be finalised with ID and management aspects agreed. Thereafter it is planned to complete the report in October 1982. IDA has indicated that appraisal may be scheduled for December 1982 or January 1983.

Outstanding Questions

14. Two of the questions raised in the BTO of 13 April were the area of lighter soils suited for oilseed production, and GOB's budget provision for the project. The former is answered by the soil survey results showing negligible area and ID's acceptance that the emphasis on this crop may be dropped. The second question has been satisfied by the inclusion of the project in the Fourth Four Year Plan. The other questions raised in the former BTO are still outstanding.

15. In addition to those above, two further questions have arisen as follows:

- the discovery that the present land utilisation in the project area is 92% instead of 74% as previously assumed throws some doubt on the economic viability of the project;

- in addition to the need to uprate private milling capacity and quality, there is a pressing requirement to provide covered storage at procurement centres in order to prevent excessive drying, which is a major factor in the current production of a high proportion of "brokens".

## Irrigation Rehabilitation I Project

### Background

16. The first phase of this irrigation rehabilitation programme was initially to be carried out on the Zawgyi Irrigation Project in the Mandalay Division. The FAO/CP mission of February/March 1982 paid an initial visit to the project and recorded their comments in the BTO dated 13 April, 1982.

17. The Minister of Agriculture and Forests (MAF) has directed that the Shwebo Project (more correctly entitled the Mu (Kabo) Project) should be given the highest priority for rehabilitation, due to the comparatively lower development in Sagaing Division compared with the Mandalay Division.

18. The Mu (Kabo) Irrigation Project is the largest in Burma with a design command area of 358,000 ac. The uncontrolled flows of the Mu River are diverted by a weir at Kabo into the Shwebo Canal on the left bank (230,000 ac design command area) and the Ye-U Canal on the right bank (128,000 ac design command area). The project was constructed in the early part of the century. Due to degeneration, only approximately 285,000 ac are now supplied.

19. The headworks are still in remarkably good condition following some renovation in the late 1950s, but the canal system is heavily silted. Cross regulators and minor head regulators are crude giving poor water control, and lack of tertiary canals makes final distribution difficult and inefficient. There are no silt ejection or interception devices at the Kabo headworks.

20. The run of river potential is very variable due to the bi-modal monsoon rainfall pattern and the flashy nature of the Mu River with poor base flow characteristics. Although the total volumetric resource is considerable, its temporal distribution produces a discharge regime of poor reliability. A large storage dam has been proposed upstream of the Kabo headworks, but to date international financing has not been forthcoming.

### Mission Activities

21. The present mission visited the project area with Mr. D.J.W. Berkoff (World Bank) and senior ID planning staff during the period 10-12 June, 1982. The Kabo headworks were inspected, and the potential locations and techniques for silt exclusion devices were assessed. Sections of both Shwebo and Ye-U main canals were inspected near the headworks, together with cross-regulators and minor head regulators. A tertiary offtake was examined.

22. The mission assisted in arrangements for finanace to support consultancy services to provide the semi-detailed engineering studies for project preparation. A provisional allocation of US$300,000 under the UNDP Third Umbrella Project was made for this purpose at the Tripartite Meeting (UNDP, World Bank and GOB) on 16 June.

### The Proposed Project

23. The ID has proposed that the first phase of rehabilitation should be the uprating of the Ye-U command area. This would include the addition of silt exclusion devices at Kabo headworks, re-modelling the structures and canal system, and the addition of tertiary canals.

24. The mission was concerned by the high degree of variability of river discharges which, under run of river conditions, indicates that the reliability of supply for 358,000 ac is uncertain. Thus a two-phase study is proposed for the consultants as follows:

(i) Phase A (one month) - a water resources specialist and a hydrologist carry out detailed computer simulation with various crop mixes.

(ii) Tripartite review by ID, World Bank and FAO/CP.

(iii) Phase B (i) (six months) - if the project is shown to be of adequate reliability, the remaining consultant team mobilises to complete engineering studies;

or

(iv) Phase B (ii) (four months) - if the project is shown to be of inadequate reliability, the consultants would mobilise a reduced team and carry out a reconnaissance level study of the Zawgyi, Mon, Man, and Salin projects with a view to their rehabilitation, and to rank in order of attractiveness.

25. It is likely that groundwater may be available in exploitable quantities in certain parts of the Mu (Kabo) project area, and following evaluation under an on-going UNDP project, this could also be included if found to be economic. The integration would be studied by FAO/CP.

Further Action

26. Using terms of reference drawn up by the mission and Mr. Berkoff, and agreed by ID, proposals for consultancy services will be invited by IDA from firms shortlisted by IDA with ID concurrence. It is anticipated that the scrutiny of proposals and contract award may take until October 1982. Thus, the Phase A team should mobilise in early November. Following the computer simulation, the Tripartite review of results should take place in mid-December.

27. On the assumption that the Mu (Kabo) system shows a favourable reliability, the consultants would carry out engineering studies on the Ye-U system, with possibly a part of the Shwebo system, over about six calendar months. Their report would be completed by June 1983. FAO/CP missions would visit Burma in February and June to supervise the consultants and for data collection.

28. The results of the on-going groundwater studies are anticipated in July or August 1983. Should they prove attractive and should ID wish to incorporate groundwater into Rehabilitation I project, a further FAO/CP mission, including a hydrogeologist, would visit the area. Thereafter completion of the preparation report would be by end October 1983 ready for IDA appraisal in November/December.

29. Should the Tripartite review reject the Mu (Kabo) rehabilitation on hydrological grounds, FAO/CP would supervise the consultants and prepare an identification report on the four alternative projects for rehabilitation. This would require one mission in April 1983.

VERHART

AGRI & RURAL DEV
MR R STERN
MR GOLAN BA-Irrig-Kawasan Reclam

Jul. 1, 82

7915 NO. 137

ONE INDONESIA IRRIGATION PROGRAMME SHALLOW RETURNED FROM Hussain
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WITH AGRONOMIST AND ECONOMIST IN SEPTEMBER TO AAA EVALUATE
PROPOSALS FOR REMODELLING WEST TARUM CANAL IN CIBEET SCHEME
AS DISCUSSED WITH WADSWORTH BBB REVIEW PROGRESS ON JATILUHUR
SCHEME CCC REVIEW AND DISCUSS PARIGI POSO INCEPTION REPORT STOP
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VISIT WASHINGTON SHORTLY BEFORE SEPTEMBER VISIT STOP WE ASSUME
YOU WILL DECIDE MEANWHILE WHETHER FINANCING OF TARUM CANAL ENLAR-
GEMENT SHOULD BE RESPONSIBILITY OF AGRICULTURE OR URBAN AND WATER
SUPPLY

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ON ZAGNIS AIDE MEMOIRE ON PROJECT WRITTEN IN DACCA PLEASE NOTE
ALSO HIS BTO DATED 15 JUNE WE WILL CONSULT YOU AGAIN ON THESE
MATTERS BEFORE ZAGNIS NEXT VISIT IN OCT/NOV

THREE INDIA REAINFED FARMING APPRAISAL REYOURTEL 93 AND CONFIRMING Nottidge
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JOIN MISSION AND WE HAVE REARRANGED SCHEDULE SO HE CAN PARTICIPATE
FOR 2 1/2 WEEKS FROM END AUGUST THEREFORE KINDLY CANCEL ITEM TWO
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FOUR BIS INDONESIA COTTON FOR HUSSAIN SINCE LAURIE ROBERTSON HAS Hussain
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IN WASHINGTON IN MAY

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BY MITRA

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THIS WEEK

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PROJECTIONS FOR 1985 AND 1990 RICE PRICE ARE BEING REVISED
SUBSTANTIALLY DOWNWARDS GARTEFUL ANY INFORMATION FOR PURPOSES
OF THIS PROJECT AND FOR OUR GENERAL INTEREST BBB SPECIFICALLY
WHAT PROJECTED ECONOMIC PRICE WOULD YOU NOW ADVISE FOR USE IN
ANALYSIS OF THIS PROJECT CCC ZAGNIS BTO BEING SENT TO YOU EARLY
NEXT WEEK PLEASE NOTE NEW EVIDENCE WHICH CAUSES CONCERN OVER
JUSTIFICATION FOR THIS PROJECT (FENN FOODAGRI ROME)

Recd Jul. 1, 1982

BA - Kawmhu Reclam.

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ONE PAKISTAN ADBP IV PROJECT MECHANISATION TRIALS

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THREE BURMA KAWMHU RECLAMATION PROJECT FOR DREWES STOP REYOURTEL 21 APRIL PLESE SUPPLY ONE HUNDRED THOUSAND SCALE IMAGERY AS AGREED AND INVOICE INVESTMENT CENTRE COST QUOTED IN YOURTEL US DOLLARS 640 REGARDS (FENN FOODAGRI ROME)

Recd 4/27/82

BA - Irrig. - Kawmhu R.

Apr. 28, 82

Project brief

# OFFICE MEMORANDUM

TO: Mr. Marius Veraart,
FAO and IFAD Coordinator,
Agriculture and Rural Development
Department, CPS,
World Bank, Washington, D.C.

DATE: 28 April, 1982.

FROM: Maurice Fenn,
Chief, Service II, FAO/WB CP.

SUBJECT: BURMA: Kawmhu Reclamation Project - Project Brief

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Please find enclosed herewith 8 copies of the Project Brief on the above mission.

BK 103/2.9 BUR

cc: Fenn (2)
DDC Reg. (2)
Zagni (chr. 2)



cc: Messrs. Yoon (4)
Shibasawa (1)
Niaz (1)

# BURMA

## KAWMHU RECLAMATION PROJECT

### Initial CP Project Brief

| | |
|---|---|
| Project No: | 8BUAA109P |
| Sector: | Agriculture |
| Project Costs: | US$60-65 M (very tentative) |
| Appraisal: | November 1982 |
| Related Reports: | Back to Office Report: 22 December 1981<br>Back to Office Report: 28 January 1982<br>Back to Office Report: 13 April 1982<br>Project Brief: 10 April 1982 |
| Project Officer: | Mr. A.F.E. Zagni |

## A. Sectoral Context

1. Burma is richly endowed with natural resources, and has a highly literate population but low population density (130 per square mile). Some 75% of its 34 M inhabitants live in rural areas and are dependent directly or indirectly on agriculture. Of its 260,000 sq miles, about 27% or 45 M ac is considered arable. However, only about 20 M ac are presently cultivated, mainly due to adverse rainfall regime.

2. Despite it's natural advantages, Burma's economic record has been disappointing. Its per capita income of US$150 p.a. places it in the 25 least developed countries. The Government's (GOB) philosophy combining socialism and Burmese traditions has induced progress in social adjustments, but has failed to achieve adequate economic growth. Indeed, the value added in the productive sectors in the 1960's and early 1970's failed even to match the 2.2% p.a. population growth, with declining exports.

3. Recognizing these shortcomings, GOB introduced selective inducements such as increased agricultural produce procurement prices, currency devaluation, increased interest on savings deposits and tax reform in the period 1971/78. In response to these, growth accelerated and GDP increased by an average of 4.8% p.a., and exports grew by some 10.6% p.a. in the latter part of this period. The agricultural sector in 1978 (the end of the Second Four Year Plan (SFYP)) accounted for 36% of GDP, and agricultural products represented 85% of all exports. These were primarily teak and rice. In the period 1975/78, the sector average growth rate was 3.6% p.a.

4. Before World War II Burma was the world's largest exporter of rice, with annual exports of about 3 million tons out of a total production of 8 million tons. During the war embankments in the Irrawaddy Delta were not maintained, and changes in land tennure occured after the war; thus although areas of rice in central and upper Burma increased the overall production remained at about pre-war levels. In response to incentives, rice production grew from 9.2 M tons in 1976 to 10.4 M tons in 1978. Provisional production for 1981 was 13.1 M tons.

5. Since the first IDA credit in 1973, GOB has progressively increased its aid acceptance from multilateral and bilateral donors, and from UN agencies for the development of agriculture. Flood protection, drainage and irrigation have figured prominently in this programme.

## B. Project Origin

6. Two previous projects funded by IDA, Paddylands Development I and II Projects, are progressively raising rice production in the middle and lower Irrawaddy Delta through the introduction of HYV varieties, made possible by the drainage of deeply flooded lands and the exclusion of tidal saline contamination.

7. Paddylands Development I Project comprises 11 sub-projects and covers an area of some 195,500 ac. It was commenced in 1976, and is estimated to cost about US$54 M. Completion is anticipated in May 1984, some two years behind schedule. Ten of the sub-projects are located in the lower delta, and due to lack of fresh water in the dry season the emphasis is on increasing monsoon rice production.The remaining sub-project is in the middle delta, and in this area irrigation facilities are also provided to irrigate jute and field crops during the dry season.

8. Paddylands Development II Project comprises 4 sup-projects and covers an area of some 150,000 ac. It was commenced in 1978, and is estimated to cost about US$56 M. Completion is scheduled for May 1985. Three sub-projects are located in the lower delta, and will increase rice production only. The fourth, in the middle delta also has irrigation facilities similar to that in Paddylands I Project.

9. It was previously intended that the current project should be the third in the Paddylands series using the same criteria, with hopefully the experienced ID staff and equipment becoming available from the previous two projects. However, due to the delay to Paddylands I Project this is not now feasible. In addition, GOB has recently increased the emphasis on vegetable oils, and has indicated that future projects should maximise oilseed production in the dry season.

10. The consultants to Paddylands I Project, Sir William Halcrow and Partners, carried out a reconnaissance level study of future project potential in the delta, and made a ranking in order of economic advant-

age 1/. They divided future projects into Drainage Projects (lower delta), Small and Medium Scale Irrigation Projects (middle and upper delta and the flood berms of the mainstream Irrawaddy), and a large scale Irrigation Pilot Project. Highest in ranking was the Small and Medium Scale Irrigation Project group. Thereafter in various orders of attractiveness followed the drainage projects. Highest of these were three areas around Rangoon, selected due to their moderate population density, poor state of present development, and the minimum of existing fisheries.

11. In December 1981, a World Bank/ FAO/CP mission discussed with ID senior staff the future project development to maintain continuity in paddy development and land reclamation, and a short list of five project areas was evolved, totalling some 500,000 ac. Three of these were in the Rangoon area, and two smaller areas were in the west of the delta at the mouth of the Bassein River. The mission requested DG/ID to select a definitive project area of about 250,000 ac such that this could be the object of project preparation with FAO/CP assistance commencing in February 1982.

12. In January 1982, senior World Bank Projects staff visited Burma, and agreed with the Burmese authorities to give the future project a higher priority on oil-seed production in order to satisfy GOB's recent decision to attempt to achieve regional self- sufficiency in this commodity.

## C. Project Concept

13. On the return of the FAO/CP mission in late February 1982, the DG/ID directed that the Area 17 (the consultant's designation for an area to the immediate south-west of Rangoon) should be selected for project preparation with a view to World Bank financing. The project should include flood protection and drainage works similar to the previous Paddylands Projects, such that presently deeply flooded and saline contaminated areas can be reclaimed, and so that HYV rice production can be increased. The increased rice production would significantly contribute to Burma's export potential, necessary to generate foreign exchange and to service the increasingly large foreign debts.

14. A further objective of the proposed project is to increase the region's oil seed production. The DG/ID has indicated that it is GOB's intention to achieve national and regional self-sufficiency in this

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1/ "Irrawaddy Delta-Hydrological Investigations and Delta Survey" Sir W. Halcrow and Partners, Swindon, UK, August 1981.

commodity. The project should therefore, within soils and climate constraints, include facilities to achieve increased production of oil seed crops.

15. To attain the objectives defined above, it would be necessary to provide physical control measures to exclude tidal and river flood surges by means of embankments, and to improve drainage during the monsoon season by improving the existing creek network and the provision of sluice structures. Fresh water would be required during the dry season so that irrigation of oil seed and other crops could be practiced using low lift pumps.

16. In order to provide an adequate infrastructure to sustain the increased production potential, the extension service, agricultural mechanisation, communications and research activities would require strengthening. It is envisaged that credit requirements would be covered under the Credit Project recently prepared for Myanma Agricultural Bank by FAO/CP.

## D. The Project Area

17. The project area encompasses some 230,000 ac gross on the island to the south and west of Rangoon, covering parts of the Townships of Twante, Kawmhu, and Kungyangon. The project boundary is defined by the Twante Canal to the north, the Rangoon River to the east, the China Bakir River to the south, and the high ground to the west bounded by the Kungyangon-Twante road. A major creek, (Bassein Creek) runs SW-NE through the project area. This is now very heavily silted in its central reach and is impassable to river traffic. The existing internal creek network is also heavily silted, and due to this the lower lying areas are deeply flooded during the monsoon. Most of these creeks are tidal, and there is a considerable saline contamination due to their overtopping during spring tides during the dry season. Soils in the project area are predominantly heavy cracking clays (Gley soils), but lighter soils exist in small pockets adjacent to the lateritic hills to the west, and in old beach deposits in the south.

18. The Township Development Committees of Twante, Kawmhu and Kungyangon are active, including the officers dealing with agricultural extension and mechanisation. Present communications are tenuous, with only deeply rutted secondary roads with many bridges unpassable, in addition to the only tarmac road Kungyangon - Kawmhu - Twante - Dala. Water transportation is very limited in the dry season. Some 18 government paddy procurement centres exist within the project area, and about the same number of old steam driven rice mills are now being supplemented by two new mills. The quality of milled rice is generally poor, with up to 35% broken. One Agricultural Mechanisation Department (AMD) tractor station exists in the north near Twante, offering medium tractor rental services. The Agricultural Corporation (AC) has about 10 Extension Training Centres serving the area, but these are poorly equipped.

19. The present population of the three constituent Townships is 331,737, of which it is tentatively estimated that some 199,000 are in the project area. Field observations indicate that a large proportion of these persons live in the two towns of Kawmhu and Kungyangon, and along the Kungyangon-Twante-Dala road. Villages in the remaining area are sparse and small, due it is thought to the serious shortage of fresh water in the dry season. Preliminary estimates indicate that there are some 16,700 farm families in the project area, and that average farm size is about 13 ac. All agricultural land is the proprety of the State and is allocated to farmers on a beneficial use basis.

## E. The Project

20. The proposed project envisages the construction of some 27 miles of new embankments and the resectioning and retiring where required of some 20 miles of existing embankment. These, together with the existing Twante-Dala road embankment, the high ground to the west, and the raised old beaches to the south, will effectively empolder the project area. To provide drainage water evacuation and saline water exclusion, about nine flap-gate structures will be required with from 3 to 9 openings. Two major cross dams will be required to close the existing large creek (Bassein Creek), of dimensions approximately 800 yds and 100 yds respectively.

21. It is known that fresh water exists at the north-west corner of the project in the Twante Canal even at high tide until about the end of February. Thus it is envisaged that a double flap-gate structure would be installed at this point to permit gravity inlet of fresh water in addition to monsoon drainage. After this time, it is thought that fresh water exists at low tide at Twante, and pumping would be required to provide project requirements. To provide replenishment for leakage, domestic requirements and evaporation, some 15 cusec might be required by pumping. This would not require additional power installation. The existing creek system would be excavated and realigned to form an interconnected system. This has the advantages of providing a more efficient drainage system in the monsoon season, a multiple ring-main lagoon for fresh water supply in the dry season, and for facility of water communications for small country boats. Some 120 miles of major creeks would be improved. It is anticipated that water hyacinth will proliferate, and design would attempt to permit periodic flushing.

22. Although it is intended that oil seed production should be increased, the extent of lighter soils normally regarded as suitable is thought to be small. Preliminary considerations indicate that the most suitable oil crop is sunflower, and that it would require two or possibly three irrigations following germination on residual moisture following paddy. These could be achieved before end-February, and thus the fresh water potential intake at Twante could be utilised without pumping requirement. Groundnuts require a longer season, and sesame is temperature sensitive.

23. Discussions with AC indicated that a rice seed farm of about 1,000 ac should be included in the project. Further discussions with Agricultural Research Institute (ARI) senior staff at Yezin suggested that a field research station should be established together with the seed farm to carry out adaptive research, especially on oil seeds. It is anticipated that the heavier soils may be utilized for oil seed production by using certain husbandry practices such as ridging. In the event that an irrigation requirement should be identified after late February, the intake structure at Twante could be fitted with additional pumping capacity. This could be financed by some future project, and constitutes a flexible response to development trends without committing large capital costs at this stage.

24. To improve communications, the project would provide some additional 65 miles of all-weather roads and bridges in addition to the navigable creek system. Although GOB agencies have not yet confirmed the requirement, the project could also provide strengthening of the extension services with additional staff, transport and training centres; fertilizer stores; and the provision of agricultural machinery service centres.

25. Unlike the Paddylands I and II projects, there is not an obvious demand for AMD reclamation services utilizing heavy equipment in this project, as it appears that only low scrub must be cleared in the non-cultivated areas.

26. In view of the inadequate hydraulic structure designs and poor quality embankment and structure construction noted by Bank supervision missions in Paddylands I and II Projects, expatriate consultants should be employed under a Technical Assistance element in the project. Although the most appropriate equipment for embankment construction are draglines and backhoes, giving year-round operation, ID officials indicate that it is difficult to provide operators of adequate skills. Thus in Paddylands I and II Projects scrapers have been utilised giving only 100-120 working days per year. It is proposed therefore to include an operator training element in the Project to rectify this, such that rapid construction progress may be achieved. To economise on equipment costs, the possibility of uprating existing ID construction plant under the Project is being explored.

27. Project benefits will derive predominantly from increased paddy production, which is provisionally estimated at about 107,000 tons p.a. at full development. This is compounded as follows:

| Area (ac) | Description | Yield (ton/ac) |
|---|---|---|
| a) Present situation | | |
| 10,000 | villages, roads etc. | 0 |
| 10,000 | scrubland, saline contaminated land | 0 |
| 10,000 | deeply flooded land | 0 |
| 110,000 | LV paddy | 0.84 |
| 90,000 | HYV paddy | 1.50 |

Estimated total present production : 227,400 tons

b) Future - with project

| | | |
|---|---|---|
| 10,000 | villages, roads etc. | 0 |
| 10,000 | moderately deeply flood land producing LV paddy | 0.94 |
| 63,000 1/ | shallow flooded producing LIV paddy | 1.33 |
| 147,000 1/ | shallow flooded producing HYV paddy | 1.64 |

Estimated total future production : 334,300 tons

Cultivation of oil seeds has been provisionally estimated at 10,000 ac, utilising the lighter soils. Yields of 500 lbs sunflower seed per acre are anticipated.

28. By extrapolation from Paddylands I Project the project capital cost is estimated very tentatively to be in the order of US$60-65 M. Considerable economies will arise from constructing the project as a single polder, utilizing natural high ground where possible. By considering Paddylands I and II Projects construction progress, the project construction period would be about five years.

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1/ Mission estimates that 30% of productive 210,000 ac will be allocated to LIV paddy for domestic consumption due to present unpalatability of HYV varities.

## F. Issues and Considerations

29. The following are considered at this stage as issues and considerations affecting the project:

- ID's capacity to implement the project in the light of its current staff shortages;
- the supply of diesel fuel for construction and maintenance equipment, and for agricultural machinery, in the light of current national shortage;
- the ability of GOB to supply some additional 5,500 tons of fertilizer to sustain the anticipated increase in HYV rice production;
- the area of lighter soils for oil seed production;
- the fresh water availability pattern at high tide at Twante intake.
- the improvement in milling quality in the project area.

## G. Project Status and Follow-Up Actions

30. The FAO/CP Mission requested ID to carry out topographical, hydrological, soils and socio-economic surveys in the project area to its specifications, and these are in progress. Concurrently, further data is being obtained from line agencies. ID engineers are carrying out preliminary designs of hydraulic structures according to Mission guidelines. Maps, based on tracings of 1:20,000 areal photography, are being prepared in Rome.

31. A second FAO/CP Mission is scheduled to visit Burma in late May-June 1982 to complete data collection, to obtain GOB clearance on major issues, and to carry out final design and costings of civil structures. The mission will include a river closure expert to advise on the cross dams on the Bassein Creek, which may be major cost items.

32. Report preparation in Rome is expected to be completed by end-September 1982 providing all data are complete. Appraisal by World Bank is scheduled for November/December 1982 for inclusion in FY 83 lending programme.

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BA-Irr-Kawmhu Re.

OFFICE MEMORANDUM

22 April 1982

TO: Mr. A.F.E. Zagni (Irrigation Engineer and Mission Leader)
Mr. B.A. D'Avis (Economist)
Mr. M. Sugimura (Agronomist)

FROM: Maurice Fenn, Chief, Service II, DDCB

SUBJECT: BURMA - Kawmhu Reclamation Project Preparation Mission
Terms of Reference

1. You will arrive in Burma on or about 23 May 1982 for a period of about four weeks to carry out further data retrieval and field inspections for completion of the above project preparation report. You will be joined by Mr. S.J. Colombi (consultant Hydrologist) and Mr. T. Jansen (consultant Coastal Engineer) during this period for approximately two and one week inputs respectively. Their Terms of Reference have been issued separately.

2. You should attempt to ensure that all outstanding data necessary for project formulation and analysis has been obtained before your departure. This includes data requested by questionnaire during your previous mission, and data subsequently found to be required. Any key data not received and which you consider may take excessive time to supply should be formally requested by Mr. Zagni to Director-General, Irrigation Department, pointing out the effect it may have on report completion.

3. Using the base maps prepared during your previous mission, draft anotations should be made on present land use, soils and land classification, hydrology, engineering, and infrastructural aspects. These should be professionally traced on your return to Rome to scales and definition as detailed by Mr. Zagni.

4. You should pay particular attention to the practical and economic extent of flood depth reduction by drainage in the monsoon season, to maximise rice production, and on the determination of the areal extent of lighter soils for maximisation of oil seed production. You should follow-up your previous dialogue with Agricultural Research Institute on oil seed production, especially with regard to heavier soils.

AFEZ/jrf
BK 103/2.9 BUR
PE 13/1 - Zagni, D'Avis, Sugimura

cc: Fernando
de Brichambaut
Granieri
Fenn (2)
Celiberti
Zagni (chrono. 2)
D'Avis
Sugimura
DDC Reg. (4)

RECEIVED
MAY 05 1982

cc: Messrs. Yoon (1)
Shibusawa (1)
Niaz/Drewes (1)

5. Provisional drainage computations should be made such that channel and hydraulic structure sizing may be proposed. Type designs of hydraulic structures should be made in association with ID design staff and costings made. The sample area defined in your previous mission should be designed and costed, such that minor drainage improvement costs may be extrapolated over the project. The two proposed closures on the Bassein Creek should be carefully assessed by Mr. Jansen, and methods, sketch designs and costs derived.

6. You should finalise the project concept towards the end of your mission, and this should be cleared with DG/ID and any modifications he may require should be noted. You should in particular determine if Agricultural Mechanisation Department wishes to include elements in the project in view of their previously stated reluctance to particpate.

7. In all your considerations relating to project configuration, design and construction, you should utilize existing facilities wherever possible to ensure a least cost solution in the light of the preliminary findings that benefits may be lower than originally anticipated. This is especially important in respect of mechanical plant.

8. As potential oil-seed production is likely to be low using present husbandry techniques on light soils only, you should allow provision for a subsequent modification for the fresh water intake at Twante by pumping should techniques be subsequently derived to permit their production of heavier soils. Alternatively a demand for irrigated pulses may develop, also requiring prolonged irrigation.

9. On your return to Rome, you should submit a Back-to-Office Report and then prepare a Full Project Preparation Report.

FORM NO. 27 - OCR
(11-78)

# WORLD BANK OUTGOING MESSAGE FORM (Telegram, Cable, Telex)

IMPORTANT (PLEASE READ INSTRUCTIONS BELOW BEFORE TYPING FORM.)

too light

Class of Service: TELEX

Date: APRIL 21, 1982

4361018 1/219

Telex No.:

Originators Ext: 61749/50

X X

— WAIC
— BA — Paddyland (3)

4/C

START HERE

TO: FERNANDO, FOODAGRI

CITY/COUNTRY: ROME, ITALY

MESSAGE NO: 63

ONE. BURMA KAWMHU RECLAMATION PROJECT. COST FOR THE TWO 1:100,000 SCALE SOUTHERN HALF OF THE PEGU SCENE AND THE NORTHERN HALF OF PYAPON SCENE WOULD TOTAL DOLLARS SIX HUNDRED FORTY AND COULD BE PROVIDED IN ONE WEEKS TIME SINCE ALL TAPE PROCESSING HAS BEEN DONE. YOUR COSTS ARE STRICTLY BASED ON FILM SIZE OF APPROX 80 INCHES BY 80 INCHES OF FILM IN TWO PORTIONS.

TWO. CAMEROON AGRICULTURAL RESEARCH. REGRET TO ADVISE THAT NIGHTINGALE WILL BE ON APPRAISAL MISSION CAMEROON MONTH MAY, THEREFORE UNABLE TO MEET WITH HOCOMBE AS SUGGESTED. PRIMO HAVE FOLLOWING COMMENTS ON RESEARCH IDENTIFICATION MISSION TORS DATED MARCH 31, 1982: AAA. PROJECT VIEWED AS INSTITUTION BUILDING PARTICULARLY INVOLVING FOODCROPS AND LIVESTOCK AND CONCENTRATING ON STAFFING, TRAINING AND ORGANIZATION. BBB. STRENGTHENED ADMINISTRATION EXPECTED TO HAVE MAJOR IMPACT ON RATIONALIZATION AND COORDINATION OF RESEARCH OPERATIONS. CCC. ESTABLISHMENT OF ECONOMIC EVALUATION, DEMONSTRATION AND PRE-EXTENSION OUTREACH CONSIDERED PRIORITY COMPONENTS. SECUNDO NIGHTINGALE HOLDS SOME DATA HIS OFFICE. ALSO ANTICIPATE UPDATED PROJECT BRIEF AVAILABLE

END OF TEXT

/c

NOT TO BE TRANSMITTED

SUBJECT:

DRAFTED BY:

CLEARANCES AND COPY DISTRIBUTION:

1-cc: Mr. Drewes
2-cc: Messrs. Nkodo, Nightingale

AUTHORIZED BY (Name and Signature):

Mr. Marius Veraart

DEPARTMENT:

Ag. & Rural Dev. Dept.

SECTION BELOW FOR USE OF CABLE SECTION

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FORM NO. 27 - OCR
(1978)

**WORLD BANK OUTGOING MESSAGE FORM (Telegram, Cable, Telex)**

IMPORTANT (PLEASE READ INSTRUCTIONS BELOW BEFORE TYPING FORM.)

Class of Service: TELEX Date: APRIL 21, 1982

Telex No.: Originators Ext: 61749/50



X X

START HERE TO

CITY/COUNTRY

MESSAGE NO

THAT TIME. TERTIO RECOMMEND HOCOMBE MAINTAINS HALF DAY PROGRAMMED FOR SCRUTINY OF MATERIAL AND DISCUSSIONS WITH OTHER WAPA2 STAFF.

THREE. GUINEA CONAKRY FORESTRY. GRATEFUL YOU SEND ANY FORESTRY REPORTS USEFUL TO BANK SECTOR MISSION BEING PLANNED MAY 30 TO JUNE 10.

FOUR. NIGER SRO AND YURTEL OF APRIL 15. NO OBJECTION TO RECRUITMENT OF GENTIL, DOUCET AND DENECKE UPON RECEIPT OF GOVERNMENT CLEARANCE PAYMENT FOR THEM CAN BE MADE THROUGH NORMAL DISBURSEMENT REQUESTS SUBMITTED BY NIGER GOVERNMENT TO THE BANK UNDER THE PPF OR BY PROCEDURE III WHERE EITHER THE CONSULTANTS ARE PAID DIRECTLY OR FAO IS REIMBRUSED FOR ANY PREFINANCING MADE. REGARDS VERAART.

END OF TEXT

NOT TO BE TRANSMITTED

SUBJECT:

DRAFTED BY:

CLEARANCES AND COPY DISTRIBUTION:

3-cc: Messrs. Nkodo, Harvey
4-cc: Messrs. Steeds, Guillo, Baah-Dwomoh

AUTHORIZED BY (Name and Signature):
Mr. Marius Veraart

DEPARTMENT:
Ag. & Rural Dev. Dept.

SECTION BELOW FOR USE OF CABLE SECTION

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WASHINGTON DC

NO 087

BA - Paddyland (3)

FAO/:2483 ONE. FOR PICKERING FROM SUMEON REYOURCAB 059 SENSGAL LIVESTOCK MISSION SCHEDULED TOIARRIVE DAKAR MONDAY THREE COMMA VISIT FIELD FROM SIX TO SIXTEEN MAY AND BE IN DAKAR AGAIN FROM SIXTEEN TO TWENTY ONE MAY

Steeds

Steengaard

TWO. FOR YOON/BERKOFF STOP COPY OF LETTER YOON-CASATI OF 16 MARCH STOP REGRET COPY OF DRAFT 1982 ECONOMIC REPORT ATTACHED HAS ONLY PAGES 80 AND 99 THROUGH 116 PLUS TABLES STOP THUS ALTHOUGH HYDROELECTRIC ASPECTS COVERED IRRIGATION MISSING STOP GRATEFUL YOU POUCH PAGES 81 THROUGH 98 TO ZAGNI SOONEST FOR USE SECOND PREPARATION MISSION

Yoon

Berkoff

THREE. FOR DREWES BURMA KAWMHU RECLAMATION PROJECT STOP THANKS YOURTEL TO ZAGNI STOP AAA REGRET ERROR IN MYTEL 077 AND CONFIRM LOWER HALF PATH 142 ROW 48 AND UPPER HALF PATH 142 ROW 49 STOP IF IN DOUBT REFER TO COORDS GIVEN IN MYTEL 077 BBB AS 28 DECEMBER 1978 IMAGERY NOT ALREADY IN CATEGORIZED FORM COMMA GRATEFUL YOU ADVISE COST AND DELIVERY TIME FOR ONE HUNDRED THOUSAND SCALE CATEGORIZED IMAGERY FOR 5 JANUARY 1974 (PEGU SCENE ROW 48) AND 18 DECEMBER 1973 (PYAPON SCENE ROW 49) FOR AREAS GIVEN IN AAA ABOVE

Drewes

FOUR. PAKISTAN RURAL DEVELOPMENT PROJECT FURTHER MYTEL 084 GOP CLEARANCE FOR PREPARATION MISSION RECEIVED THANKS

Nothidge

FIVE. FROM FERNANDO NUMBER CRUNCHER ENQUIRES WHETHER KOREA MARKETING PROJECT CAN BE INCLUDED AS CP-ASSISTED STOP REGARDS (FENN FOODAGRI ROME)

INBAFRA

613286 FAO I

Rec'd Apr. 16, 1982

SAIC
BA-Irr-Kawmhu Reclam.

# OFFICE MEMORANDUM

TO: Mr. Marius Veraart
FAO and IFAD Coordinator
Agriculture and Rural Development Department, CPS
World Bank, Washington, D.C.

DATE: 15 April, 1982.

FROM: Maurice Fenn
Chief, Service II, FAO/WB CP

SUBJECT: BURMA: Kawmhu Reclamation Project Preparation Mission - Irrigation Rehabilitation I Project Identification Mission - Back-to-Office Report.

- filed April 13/82

... Please find enclosed herewith 8 copies of the Back-to-Office Report on the above mission.

Marius
P/se get a copy made for Jerney
& this copy back to me
Ster
4/27/82.

Division 'A'
Log No. 5043
Date Rec'd 4/27/82
Action/Info

BK 103/2.9 BUR

cc: DDC Registry (2)
Fenn (2)
Zagni (2)

cc: Messrs Goon (4)
Shibasaura (1)
Niaz (1)

TOR

4

# OFFICE MEMORANDUM

TO: Mr. J.S. Colombi
Consultant Hydrologist

DATE: 15 April 1982

BA-Kawmhu Reclam

FROM: Maurice Fenn
Chief, Service II, DDC

SUBJECT: BURMA: Kawmhu Reclamation Project Preparation Mission
Terms of Reference

1. As a continuation of the previous mission from 25 February to 25 March, you should carry out up to four days work on the project preparation during your tour in Burma with Natmaw Project as required between 1 April and 2 May to maintain continuity in the hydrological and topographical surveys now being carried out by Irrigation Department (ID).

2. The second preparation mission is scheduled to arrive in Burma on 23 May for about four weeks to complete data retrieval. Based on your previous discussions with the Mission Leader Mr. Zagni, you should arrive in Burma on or about 19 May for a minimum of 14 working days exclusive of travel time. This may be extended as appropriate with the approval of Mr. Zagni. On your arrival you should ascertain the progress of the hydrological and topographic surveys with ID staff, and if anomalies or deficiencies are detected, you should urgently request ID to rectify these before the end of May and the onset of the monsoon.

3. During this period in Burma, you should complete data collection on the aspects of project preparation previously allocated to you by the Mission Leader. You should as far as possible calculate the size of drainage structures required.

4. Following completion of the assignment in Burma, you should carry out drainage computer studies in UK during a three week period, provisionally scheduled as 7 through 25 June.

5. You should then carry out further analysis, project design and report writing in Rome for a two week period, provisionally scheduled as 28 June through 11 July.

6. The Mission will be based at the Inya Lake Hotel, Rangoon, and accommodation will be reserved for you following receipt of your final travel schedule.

RECEIVED
MAY 05 1982

AFEZagni/bf
BK 103/2.9 BUR
PE 13/1 Colombi, J.S.
Zagni, A.F.E.

cc: Fernando
de Brichambaut
Granieri
Fenn (2)
Sylvia Celiberti
Zagni (chrono)
DDC Registry (4)

cc: Messrs. Yoon (1)
Shibusawa (1)
NIAZ (1)
Drewes (1)

TOR

BA-Irr-Kawmhu Reclan

# OFFICE MEMORANDUM

TO: Mr. T. Jansen
Consultant Coastal Engineer

DATE: 14 April, 1982

FROM: Maurice Fenn
Chief, Service II, DDC

SUBJECT: BURMA: Kawmhu Reclamation Project Preparation Mission
Terms of Reference

1. You should arrive in Burma on 13 June 1982 to carry out an assignment with the Kawmhu Reclamation Project preparation mission led by Mr. Zagni. You should spend a minimum of seven working days exclusive of travel time, but this period may be extended up to a maximum of 14 working days should the situation so indicate, with the approval of Mr. Zagni.

2. You should carry out site visits to the proposed closures on the Bassein Creek, and make any site observations you consider necessary. Any follow-up surveys should be specified to Irrigation Department through Mr. Zagni. Transport and accommodation in the field will be arranged by ID.

3. You should advise the mission and ID on the most appropriate method to effect these closures and produce a working paper which also includes preliminary designs and costs, considering the work to be carried out by ID under Force Account.

4. Any preliminary work which might be carried out by ID to assist in the eventual closure operation should be specified.

5. The mission will be based in the Inya Lake Hotel, Rangoon, where accommodation will be reserved for you.

6. It is likely that Mr. Zagni will be in Dacca from 14 through 23 May, and in this event he would wish to brief you further.

AFEZagni/bf
BK.103/2.9 BUR
PE 13/1 Jansen, T.
Zagni, A.F.E.

cc: Fernando
de Brichambaut
Granieri
Fenn (2)
Sylvia Celiberti
Pamela Cross-Griscioli
Zagni (chrono)
DDC Registry (4)



cc. Messrs. Yoon (1)
Shibusawa (1)
Niaz/Drews (1)

BA-Roddyland Dev (3)
April 13/82

FAO

Back to office report

BA - Paddyland Dev (3)
BA - Irr Rehab & Main



OFFICE MEMORANDUM

TO: Mr. M. Fenn
Chief, Service II, DDCB

13 April 1982

FROM: A.F.E. Zagni
Irrigation Engineer, Service II, DDCB

SUBJECT: BURMA: Kawmhu Reclamation Project Preparation Mission - Irrigation Rehabilitation I Project Identification Mission: Back to Office Report

## Introduction

1. In accordance with Terms of Reference dated 29 January 1982, the Mission 1/ visited Burma during the period 24 February through 25 March to start preparation of the Kawmhu Reclamation Project (previously known as Paddylands Development III Project), and to make a field inspection of the Zawgyi Irrigation Project as the first stage of Irrigation Rehabilitation I Project.

## Kawmhu Irrigation Project

### Background

2. This project is the third in a series of IDA-funded land reclamation, tidal protection and drainage projects in the Irrawaddy Delta. Paddylands Development I Project, commenced in 1976, involves the improvement of some 195,500 ac in 11 subprojects. Paddylands Development II Project, commenced in 1978, involves the improvement of some 150,000 ac in four sub-projects. Both are in the lower and middle delta, and are still under construction. The major project objectives are to reclaim derelict

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1/ A.F.E Zagni (Irrigation Engineer and Mission Leader)
B.A.D'Avis (Economist)
M. Sugimura (Agronomist)
J.S. Colombi (consultant Hydrologist during period 24 February through 9 March)

---

AFEZ/jrf
BK103/2.9 BUR

cc: Veraart, WB, Washington(8)
FAOR, Rangoon
All team members
Documents unit (2)
Zagni (chrono.)
DDC Reg. (2)

paddylands and salt affected areas, and to maximise HYV monsoon rice production. In those sub-projects in the middle delta where fresh water is available in the dry season, irrigation facilities are also provided.

3. An identification mission which visited Burma in November/December 1981 selected, in discussions with Irrigation Department (ID), a short list of four sub-project areas totalling some 500,000 ac in the lower delta, and requested the Director-General (DG/ID) to select the definitive area for a project to cover about 250,000 ac to be prepared by FAO/CP ready for World Bank appraisal in late 1982. It was agreed to give special attention to possibilities of increasing oilseeds production in association with the monsoon paddy crop.

4. On arrival in Burma the Mission was requested by DG/ID to prepare a project along these lines in the townships of Twante, Kawmhu and Kungyangon, bounded by the Twante Canal to the north, the Rangoon River to the east, the China Bakir River to the south, and the Twante-Kungyangon road to the west. The gross area encompassed is about 230,000 ac.

5. The Mission carried out a four-day field visit, and also visited the main Agricultural Research Institute at Yezin, between Rangoon and Mandalay, and the Central Research Farm at Hmawbi near Rangoon. Meetings were held with Ministry of Cooperatives, Agricultural Corporation, Agricultural Mechanisation Department, Myanmna Agricultural Bank, Agricultural Farm Produce Trade Corporation, and Land Records and Settlement Department. Data is under preparation by these agencies. Close liasion was maintained with Mr. S.J. Baker, World Bank, during the early period of the visit, and Representatives of UNDP and FAO were fully briefed on the proposed project.

## Proposed Project

6. Within the area at present, it is estimated that some 110,000 ac are producing LV monsoon paddy and some 90,000 ac are producing HYV monsoon paddy. Irrigation in the dry season appears to be limited to minor areas receiving spring flows from the high ground to the west of the Twante-Kungyangon road, but due to generally heavy clay soils, this is mainly LIV paddy. Minimal areas of oil seeds are presently grown. In the low lying areas some 60,000 ac are either fallow or used to produce long stem broadcast rice. Communications are poor, with only the Kungyangon-Twante-Dhala road having tarmac surface. Other tracks are very rutted and many bridges are unpassable.

7. The proposed project would ensure that tidal surges do not contaminate the project lands with saline water by improving about 20 miles of existing embankments and constructing about 27 miles of new embankments. It is estimated that nine flap-gate type structures ranging from 3 openings to 9 openings will be required to evacuate storm water and to prevent saline inflow. A major creek will require two cross dams at either end of about 800 yds and 100 yds respectively. Preliminary layout indicates that some 120 miles of major creeks will require straightening and re-excavation.

8. Although the project area lies in the lower delta, it is known that fresh water is available even at high tide at the north west corner of the project area in the Twante Canal, possibly until late February. Therefore, it is proposed to include gravity intake facilities in the structure located at this point such that the interconnecting creek system is maintained as a

fresh water lagoon providing irrigation, domestic and fisheries requirements. It is planned to provide only limited pumping capacity at this intake such that evaporation, leakage and domestic requirements are satisfied after the Twante Canal becomes saline at high tide, and fresh water is only available at low tide. Thus any irrigation should be completed by the end of February to avoid high pumping costs.

9. Preliminary studies indicate that lighter soils suitable for oilseed production are likely to be of limited area and it is proposed to include a sub-station of the Agricultural Research Station in the project area to carry out adaptive research on oil seed cultivation with particular reference to the heavier soils. Should this indicate substantial irrigation requirement after late February, further pumping capacity could be added under a subsequent project, thus giving flexibility in response to future development needs. A large seed farm is also to be included.

10. Water and road communication facilities would be improved. If required, other infrastructural elements would be provided or improved, such as strengthening the extension service and providing training centres, fertilizer and grain stores, and machinery workshops. If project preparation work indicates an irrigation demand, equipment would be provided.

Status of Preparation

11. Irrigation Department is carrying out topographic, hydrological, soils and land use surveys to the Mission's specifications. As there were no recent maps of the project area, the Mission produced a base map from recent aerial photographs with ID assistance. An Aide Memoire was left with DG/ID outlining the project concepts.

12. A return mission is planned during late May-June 1982 to complete preparation of the project. The preparation report would thus be completed by end September 1982, ready for Bank appraisal in November/December 1982.

Outstanding Questions

13. Further preparation of the project will have to give special attention to the following questions:

- the ID's capacity to implement the project in the light of its current staff shortages;
- the supply of diesel fuel for construction and maintenance equipment in the light of current national shortage;
- the area of lighter soils suitable for oil seed production;
- the ability of GOB to supply some additional 5,500 tons of fertilizer for the increased production of HYV rice;
- the availability of fresh water until late February in the Twante Canal at the proposed intake;
- GOB ability to provide budget allocation in the Fourth Four Year Plan.

## Irrigation Rehabilitation I Project

### Background

14. In December 1981, a World Bank mission identified the Zawgyi Project near Mandalay as a suitable area for an irrigation rehabilitation project and as a follow-up the present Mission discussed this with ID. Since the Bank mission however, GOB has reduced the priority on Zawgyi and have instead proposed the Shwebo project. This is a part of the area commanded by the proposed Mu Dam, and lies in Sagaing Division.

15. The Mission declined the suggestion by ID that it should visit Shwebo instead of Zawgyi project, but proposed that if the World Bank agrees to the substitution, a visit to Shwebo could be carried out during the forthcoming visit in May 1982. A visit was made to Zawgyi as planned.

### Proposed Projects

16. The Zawgyi Irrigation Project commands some 113,000 ac net by four offtake structures on the Zawgyi River near Mandalay, parts of which date back to the turn of the century. Some rehabilitation was carried out in the 1950's. Now the system is heavily silted and the structures require remodelling and repair. ID proposes it should be rehabilitated in two phases separated by one year, taking two weirs and their commanded areas in each phase.

17. The Shwebo Irrigation Project in Sagaing Division commands some 350,000 ac, of which only about 280,000 ac can be irrigated by diverting Mu River flows. The project was also constructed at the turn of the century. ID proposed to rehabilitate an area of some 230,000 ac in two phases. Eventually it is planned to construct the Mu Dam, when the area commandable would rise to about 500,000 ac. The Shwebo system would form a part of this larger project.

### Status of Proposals

18. Whichever project is accepted by the World Bank for first phase financing, consultant engineers will be required to supervise surveys and to assist ID in design and costing the engineering works. ID have accepted this proposal, and agreed that they would provide the engineering inputs to the FAO/CP preparation report. Mr. S.J. Baker, World Bank, agreed with this approach, and indicated that the Bank would consider the financing of consultants under Technical Assistance if requested.

19. The Mission discussed with UNDP the possibility of funding the consultants under the UNDP Third Umbrella Project and with the FAO Country Representative the possibility of financing under TCP. Both were sympathetic and advised ID to apply formally. The Mission pressed ID to make application as a matter of urgency.

20. It is hoped to carry out the first major FAO/CP mission in February 1983, with report completion at end June 1983. For this to be feasible, engineering consultants should be in position by end September 1982. It is anticipated that appraisal would follow in October 1983.

Next Steps

21. It is now necessary for the World Bank and the Government to agree on whether the proposed project should be based on the Zawgyi or the Shwebo scheme. It is also necessary for the Government to decide whether it wishes to engage consultant engineering services through World Bank Technical Assistance, or through other means, and to make the necessary arrangements.

Other Activities

22. Mr. Zagni undertook further supervision work on the Paddylands Development I and II projects, as a follow-up to his assignment in November/December 1981. He also joined Mr. S.J. Baker on further flood studies on the Medium Tanks Project, appraised during November/December 1981. The outcome of these tasks is detailed in a separate Note to Files.

FORM NO. 27 - OCR
(2-81)

# WORLD BANK OUTGOING MESSAGE FORM Telegram, Cable, Telex

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PAGE 1 OF 1

EXTENSION 60356

MESSAGE NUMBER

TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

TO: FENN FOODAGRI

BA- Paddyland (3)

CITY/COUNTRY ROME, ITALY

FOR ZAGNI. REUR TELEX 077 REGARDING BURMA PROCESSED IMAGERY. AAA EYE ASSUME YOU MEAN UPPER REPEAT UPPER HALF OF PATH 142 ROW 49 AND LOWER REPEAT LOWER HALF OF PATH 142 ROW 48 AS LOWER HALF OF ROW 49 IS MOSTLY IN BAY OF BENGAL. DATE OF CATEGORIZED IMAGERY IS JANUARY 5, 1974 (PEGU SCENE ROW 48) AND DECEMBER 18, 1973 (PYAPON SCENE ROW 49) NOT DECEMBER 28, 1978 AS YOU REQUIRE. BBB TO ORDER AND RECEIVE SCENE FOR DECEMBER 28, 1978 WOULD TAKE MINIMUM OF THREE MONTHS FROM NASA/EROS PLUS PROCESSING TWO WEEKS AT ERIM AND COST APPROX DOLLARS FOUR HUNDRED FOR TAPE AND DOLLARS THREE THOUSAND FOR CATEGORIZATION PROCESSING.EDGE ENHANCEMENT PROCESSING COSTS DOLLARS ONE THOUSAND ONE HUNDRED FIFTY. PLEASE ADVISE. REGARDS DREWES

END OF TEXT

NOT TO BE TRANSMITTED

CLASS OF SERVICE: TELEX

TELEX NO. 610181

DATE: APRIL 13, 1982

SUBJECT: BURMA LANDSAT IMAGERY

DRAFTED BY: W.U. DREWES:JC

CLEARANCES AND COPY DISTRIBUTION:

AUTHORIZED BY (Name and Signature): W.U. DREWES
SENIOR RESOURCE PLANNER

DEPARTMENT: AGR

SECTION BELOW FOR USE OF CABLE SECTION

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# OFFICE MEMORANDUM

SAVO BA-Paddyland(3) SAIC
4/6/82
Proposed Burma: Paddylands III Project
-to be renamed Kawmhu Reclamation Project

TO: Mr. D.J.W. Berkoff,
ASPAA, World Bank.

DATE: 31 March, 1982.

FROM: A.F.E. Zagni
DDC.

SUBJECT: BURMA - Paddylands Development I Project Credit 642 BA

- Kawmhu Reclamation Project
- Irrigation Rehabilitation I Project

see 642-BA

1. I enclose the consultants' proposal to ID for the envisaged extension to the Irrawaddy Delta Study. It appears to be consistent with our previous understandings, but I am concerned that Halcrow's are requesting advance payments which I recall are not admissable. The document is at present under review by ID, but the DG has stated his intention to continue the studies. At present, USaw Hlaing, PD Paddy I, will not commit himself to finding the cost of the study from unallocated funds. Thus some Bank pressure is indicated.

Mar 24/82

2. I also enclose my Aide Memoire, left with ID at the end of my recent mission, on the Kawmhu Reclamation Project (previously known as Paddy III). I am confident that we have a project which is flexible enough to satisfy all parties concerned, yet which can be implemented quickly. The major differences technically compared with Paddy I and II are:-

(a) the entire area of about 230,000 ac gross is in one location, requiring the minimum length of embankments;

(b) the whole system would be drained through nine structures, thus these would be fairly large requiring expatriate design and construction supervision;

(c) the creeks would be converted into a fresh water inter-connected system to satisfy domestic, irrigation and transport needs.

My full Back-to-Office report will follow shortly.

.../...

---

BK103/2.9 BUR

cc: Fenn
Zagni (chr.2)
DDC Reg.

Div:
Log No. 4932
Date Rec'd 4/6/82
Action/Info

3. While in Burma, ID requested that the mission consider the Shwebo Irrigation Project rehabilitation instead of Zawgyi Project. As time was very limited and my TOR indicated we should visit Zawgyi, we were unable to include a site visit to Shwebo. However, I indicated that this could be done during our second visit in May/June. This is part of the Mu System. Present commanded area is about 350,000 ac, of which some 280,000 ac can be irrigated by run of river. The system is heavily silted and requires considerable rehabilitation. ID propose that Irrig. Rehab. I project includes the run of river potentially commanded area, in one or two stages as appropriate. At some future date, the dam could command the remainder and permit multiple cropping.

4. I feel that either Zawgyi or Shwebo, whichever is agreed for first preparation, will need a small team of engineering consultants to supervise surveys and designs. ID has tentatively agreed to this. FAO/CP would be responsible for project preparation, with the consultants providing the engineering inputs. I have visited Resident Representatives of both UNDP and FAO on this matter. The Resident Representative UNDP is amenable to include the cost of about US$250,000 in his 3rd Umbrella Project, and I have already advised U Thein Tun to request this allocation through Dr U Ba Hli, Technical Adviser, Ministry of Planning and Finance. On our side, we should advise Bob Panfil so he may be in the picture for his forthcoming mission to Burma. If this fails, the Resident Representative FAO advises he has TCP funds which might be used.

5. I would be grateful if you would advise us soonest if Bank approves of our proposed visit to Shwebo in May so I may include it in our TOR.

BA - Paddyland (3)

Mar 24/82

AIDE MEMOIRE

Paddy 3
Mar 24/82

KAUMHU RELAMATION PROJECT

FIRST PREPARATION MISSION 24 FEBRUARY - 25 MARCH 1982

AIDE MEMOIRE

1. Background

FAO/WORLD BANK Cooperative Programme (FAO/CP) were requested by the Government of the Socialist Republic of the Union of Burma (GOB) to assist the Irrigation Department (ID) to prepare a suitable project for World Bank (WB) financing, similar to the ongoing Paddylands Development I and II projects in the middle and lower Irrawaddy Delta. Preliminary discussions were carried out with senoir ID staff in December 1981 based upon the results of an identification study carried out by the consultants, Sir William Halcrow and Partners (SWH&P), which ranked selected subproject areas in order of economic attractiveness in the upper, middle and lower delta.

These preliminary discussions lead to the shortlisting of four high priority areas:

(i) South of the ongoing Bauchaung subproject in Syriam Township (Paddy II)

(ii) The low ground on the island immediately to the south-west of Rangoon (Twenta, Kaumhu and Kungyangon Townships)

(iii) South of the ongoing Labutta subproject in Alegyun Township (Paddy II)

(iv) North of the ongoing Alegyun subproject (Paddy I)

The total gross area was estimated at about 500,000 acres, all in the lower delta. The short list was submitted at that time to Director General (DG/ID) for the final selection of a project covering some 250,000 acres.

Although the previous Paddyland projects were primarily intended to reclaim derelict former paddylands and to increase the proportion of HYV paddy production, the provision of irrigation facilities in the middle delta subprojects was also included. Recent discussions between Ministry of Agriculture and Forests (MAF) and WB reflected GOB's intention to increase oil seed production, especially in the delta area, and that this activity should be maximised in future delta area development.

2. Mission Activities

A FAO/CP mission comprising:

Dr. A.F.E. Zagni (Irrigation Engineer/Mission Leader)
Mr. J.S. Colombi (Consultant Hydrologist)
Mr. B.A. D'Avis (Economist)
Mr. M. Sugimura (Agronomist)

Arrived in Burma on 24/25 February. The Hydrologist carried out a two week assignment, and the other mission members departed on 25 March 1982.

An intensive review of previous documentation was carried out prior to the mission's arrival, and based on this, detailed questionnaires were prepared for Agricultural Corporation (AC), Agricultural Mechanisation Department (AMD), Ministry of Cooperatives, Myanma Agricultural Bank (MAB), Land Records and Settlement Department (LRSD), Agriculture Farm Produce Trade Corporation (AFPTC), and Irrigation Department on data required for project formulation. Meetings were held with all the above. Ministry of Social Welfare and Labour and Myanma Export Import Corporation were unable to schedule an appointment. Based on these meetings and the questionnaires, further questionnaires were submitted in order to clarify or elaborate where required. It is considered important that these key questions are fully answered before the return of the mission in late May 1982.

At the initial briefing meeting by DG/ID, the Mission was requested to prepare a project on the island to the south west of Rangoon in these lowland areas of Twante, Kawhhu and Kungyangon south of the Twante Canal. This area covers some 230,000 acre gross, but about 80,000 acres lie to the south east of the Bassein Creek, running roughly SW/NE through the project. DG/ID indicated that this smaller area should be considered a possible extension area, but WB representatives at the meeting pressed for the full project to be prepared. The maximisation of oil seed production was again stressed.

The Mission, together with senior ID planning staff, visited the area during the period 4 through 7 March, and on 12 March. Major creek and structure sites, typical low-lying areas, garden lands, and present HYV paddy lands were inspected. Meetings were held with the Township Councils at Twante, Kawhhu and Kungyangon, and further information was requested.

Further visits were made by the Mission to Hmawbi Research Station and the Agricultural Research Institute (ARI), Yezin, to discuss the production of oil seeds in the lower delta area. The proposed project was discussed with the Resident Representatives of UNDP and FAO.

3. Provisional Formulation

Based on data obtained during this first mission, the project layout has been provisionally delineated. The project boundary is defined as the Twante Canal to the north, the Rangoon River to the east, the Bay of Martaban to the south, and the Twante - Kungyangon road and China Bakir river to the west. The gross area is about 230,000 acres. This includes approximately 60,000 acres of deeply flooded land which at present is fallow or suitable for tall LV rice only. There are no forest areas, and only minor areas of saline resistant scrub occur near the Bassein Creek.

The Bassein Creek, which was previously a major water way, is now totally silted for about 10 miles in its central section, and this is yearly increasing. It is impractical and uneconomic to reopen it.

The envisaged drainage net work involves the deepening and widening of the existing major creeks, and their mutual interconnection throughout. Some seven of these will enter the Bassein Creek, which will become a double lagoon. Some nine major drainage sluice structures will effect stormwater evacuation while maintaining acceptable water levels for HYV rice production. The Bassein Creek would be dammed at both ends to prevent further siltation. All structures would be provided with one flume type discharge section to permit the flushing out of water hyacinth which will inevitally proliferate, and to provide passage for small country boats.

Suitable embankment will be provided over a distance of about 25 miles, and some 20 miles of existing embankments will be resectioned. The existing cross drainage culverts on the Twante - Kungyangon road will be uprated.

It is intended to provide fresh water access by gravity into the creek system through Twante structure, at least until late February. This, with judicious operation of the remaining structures, will provide a continuous fresh water lagoon for agricultural, domestic use and river transportation. After late February, it is envisaged that the water in Twante Canal will be saline at high tide but fresh at low tide - thus pumping must be provided. At this stage of the project formulation, with uncertainty over dry season production potential, it is proposed to provide only adequate pump capacity (about 30 cusec) to replace domestic consumption, leakage, and evaporation.

Soils in the project area are mainly heavy cracking clays. Adjacent to the Tuante - Kungyangon road pockets of lighter soil are found. Several raised beach deposits also exist in the south, containing lighter soils. These lighter soils would provide the first stage irrigation areas.

It is proposed to include a large AC seed farm (about 1000 acres), and in association with this a sub-station of ARI would be located. During the early stages of the project the latter would carry out adaptive research to ascertain the oil-seed production capability of the heavier soils, and would recommend suitable techniques and varieties.

Thus the project in its first identifiable stage would be primarily to improve rice production, with limited oil seed production capability. Following ARI findings, a future stage could increase the oil-seed output using the existing fresh water capacity until late February. Thereafter, additional pumping capacity could be provided at Tuante, funded by some future aided project. Thus heavy capital outlay and high installed electric power need not be considered at this stage.

The project would improve road communications, and would provide strengthening to AC, AMD and other infrastructural elements such as rice milling and storage, fertilizer storage and training centres as appropriate.

4. Proposed Schedule

The Mission is scheduled to return to Burma on 23 May for a further month to finalise data collection, and to agree on project concepts with the various GOB agencies. Providing the data is adequate, final analysis and report production should be completed by end September 1982.

Presently, soils, mapping and analysis, and hydrological and topographic surveys are being carried out by ID to the Mission's specifications. These are vital inputs without which the analysis could not be finalised, ID have undertaken to complete these by end May 1982.

During the second mission, design and costing of drainage structures, pump station, creek excavation (including one sample area for minor creek improvement totalling 10,000 acres) and embankments will be undertaken. ID have been requested to commence work on these items such that they can be reviewed and finalised at that time.

Rangoon
24 March 1982

A.F.E. Zagni
Mission Leader FAO/CP

BA - Paddylands Dev (3)

TO: Messrs. A.F.E. Zagni, Irrigation Engineer, Leader, DDCB
M. Sugimura, Agronomist, DDCB
B.A. D'Avis, Economist, WFP

DATE: 15 February 1982

FROM: Maurice Fenn
Chief, Service II, DDCB

SUBJECT: BURMA: Paddylands Development III Project Preparation Mission - Revision of Terms of Reference

The terms of reference for the above mission as given in my memo of 29 January are now amended as follows:

(a) The arrival of the mission in Rangoon is postponed until approximately 24 February.

(b) Paras 3 and 4 of my earlier memo referred to project areas already identified in the lower Irrawaddy Delta. On the basis of subsequent discussions between the Government and the World Bank, the mission should be prepared to examine and agree upon other project areas if appropriate.

(c) In addition to your work on a third Paddylands Development project, you should also discuss with the Government initial steps in the preparation of an Irrigation Rehabilitation and Maintenance project. Within the time available, you should, if agreed by the Government, initiate preparation and, if appropriate, undertake a field trip in the proposed project area.

The separate terms of reference given to Mr. Colombi in my memo of 2 February are amended to conform to the above. Mr. Colombi will now arrive in Burma for about two weeks from 25 February.

Mr. Zagni should particularly note the World Bank's latest message to the Government concerning the mission, as quoted to us in Mr. Veraart's telex No. 23 of 11 February.

MF:acc

BK 103/2.9 BUR
PE 13/1 Zagni, A.F.E.
PE 13/1 Sugimura, M.
PE 13/1 D'Avis, B.A.

cc: Veraart, WB, Washington
Fernando
de Brichambaut
Granieri
Fenn (2)
DDC Registry (6)

cc: Messrs. Joon (1)
Shibuawa (1)
NIAZ/collins/sfeir.-
yours

RECEIVED
MAR 15 1982
Division
Log No. 4953
Date Rec'd 3/15/82

FORM NO. 27 - OCR
(2-81)

# WORLD BANK OUTGOING MESSAGE FORM Telegram, Cable, Telex

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PAGE 1 OF 1

EXTENSION 60356

MESSAGE NUMBER B187 W

TEST NUMBER (FOR CASHIER'S USE ONLY)

START HERE

TO: FOODAG-BMT

BA-Irrig. Seet (Paddy-3)

3/18/82

CITY/COUNTRY RANGOON, BURMA

ATTEN: MR ZAGNI. RETELEX 612520 OSRO I NUMBER 062. AAA SCENE 142/048 OF RANGOON-PEGU AREA AVAILABLE IN BOTH CATEGORIZED AND EDGE ENHANCED RENDITION BUT SCENE 142/049 SOUTH OF RANGOON IS AVAILABLE ONLY IN CATEGORIZED RENDITION UNLESS DOLLARS 1100 ARE SPENT TO PROCESS IT FOR EDGE ENHANCEMENT RENDITION. BBB PLEASE INFORM IF YOU WANT IT PROCESSED AND THE ACCOUNT NUMBER AGAINST WHICH TO CHARGE IT. CATEGORIZED RENDITION IS WHERE LANDUSE AND FOREST TYPES WERE ESTABLISHED BUT IN BURMA WERE NEVER GROUND CHECKED FOR CONFIRMATION AND MODIFICATION. EDGE ENHANCEMENT IS USED PRIMARILY FOR BASE MAPS, HYDROLOGY AND GEOLOGIC STRUCTURE MAPPING. CCC ENLARGEMENT TO 1:100,000 SCALE MEANS EACH QUARTER LANDSAT SCENE IS ENLARGED TO APPROX 40 X 40 INCHES OR DOLLARS 520/SCENE ( 130 X 4 ) FOR FIRST COPY AND DOLLARS 420 FOR THE SECOND COPY IF NEEDED. MULTIPLY THIS AMOUNT BY THE NUMBER OF SCENES DESIRED AND THE RENDITION DESIRED AND WE WILL PLACE ORDER IF YOUR DIVISION PROVIDES A PROJECT ACCOUNT NUMBER AGAINST WHICH BANK COMPTROLLER CAN CHARGE IT. WOLFRAM DREWES

END OF TEXT

NOT TO BE TRANSMITTED

CLASS OF SERVICE: TELEX

713

TELEX NO.: 21505

DATE: MARCH 18, 82

SUBJECT: BURMA PADDY III

DRAFTED BY: W.U. DREWES

CLEARANCES AND COPY DISTRIBUTION:

C.C. SHIBUSAWA/YOON

AUTHORIZED BY (Name and Signature): W.U. DREWES WUDrews

DEPARTMENT: SENIOR RESOURCE PLANNER, AGR

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240423 WORLDBANK

Urgent Distribution to names mentioned below. cc Yoon. STVO 3/2/82

INTBAFRAD BANGKOK MARCH 2, 1982

WASHINGTON DC

BA Tank Irrig
BURI 91/003-Soil and Water
Distribution
BA-Paddyands Dev (3)
Met
Mr. Yoon
Mr. Lamson Scribner
Mr. Shibusawa

234 FOR YOON, COPY LAMSON-SCRIBNER AND SHIBUSAWA

AAA RE TANK IRRIGATION PROJECT. IN OUR OPENING MEETING WITH COB, U TIN TUT, D.G. OF GENERAL AFFAIRS DEPT, MINISTRY OF HOME AND RELIGIOUS AFFAIRS, PRESENTED US WITH FAIRLY DETAILED FEASIBILITY REPORT ON MUDON TOWN WATER SUPPLY. REPORT INCORPORATES ALL DATA REQUESTED IN OUR AIDE MEMOIRE FOR MUDON WATER SUPPLY AND IS VERY WELL PREPARED. MESSRS. STITCHENWIRTH AND SKYTTA REVIEWED DATA IN THEIR RECENT VISIT TO MUDON AND RETURNED CONVINCED THAT THIS COMPONENT OF TANK IRRIGATION PROJECT IS WELL ENOUGH PREPARED FOR INCLUSION IN IDA-FINANCED PROJECT. THEY FAVOR ADOPTION OF ALTERNATIVE THREE (ISSUES PAPER), WITH TOTAL ADDITIONAL COST OF ABOUT KYATS 20.5 M (US$2.8M). THIS WOULD INCREASE TOTAL PROJECT COST TO ABOUT US$26.5M AND IDA FINANCING TO ABOUT US$20.0M. EYE ATTEMPTED TO OBTAIN FIRM COMMITTMENT FROM GOB IN SUPPORT OF ALTERNATIVE THREE IN CLOSING MEETING BUT THIS IS STILL PENDING. UPON RECEIPT OF SUCH CONFIRMATION EYE WOULD CONCUR THAT ALTERNATIVE THREE BE MISSION RECOMMENDATION. EYE WILL SEND FEASIBILITY REPORT AND OTHER DATA TO WASHINGTON VIA UN POUCH FROM COLOMBO.

BBB WE HAVE REACHED AGREEMENT ON DAM AND SPILLWAY SIZING AND DESIGN, BASED ON ZAGNI'S STORM DATA AND ID HYDROLOGICAL FLOOD ROUTING STUDIES, AND SOME MODIFICATION WILL BE REQUIRED IN ROBIE'S TABLES AND COSTS. EYE THINK IT ADVISABLE HE RETURN TO WASHINGTON FOR ONE OR TWO WEEKS UPON MY RETURN. EYE HAVE LATEST DAM DESIGNS AND WILL REVIEW THEM AND SAM SAFETY ISSUES IN DEPTH WITH PINKERTON.

CCC AGRICULTURAL CORPORATION REVIEWED YIELD AND MARKET PRICE LEVELS ASSUMED BY APPRAISAL MISSION FOR ORCHARD CROPS AND PROVIDED THEIR VIEWS JUST BEFORE MY DEPARTURE FROM RANGOON YESTERDAY. THEY AGREE TO MARKET PRICES USED BUT RECOMMENDED FOLLOWING YIELD LEVELS PER HA: AC ? MANGO LL.2, POMELO 9.0, DURIAN 7.3, MANGOSTEEN 4.0, RAMBUTAN 6.0, COCONUT (COPRA) 2.1, BANANA 5.5, PINEAPPLE 10.7. EYE ATTEMPTED TO GET CLARIFICATION OF LOW YIELD LEVELS FOR COCONUT, BANANAS, AND PINEAPPLE BEFORE DEPARTURE, AS TO WHETHER YIELDS WERE BASED ON FULL IRRIGATION SUPPLY WITH NECESSARY INPUTS AND EXTENSION ASSISTANCE, BUT DID NOT SUCCEED. EYE WOULD ASSUME NOT AND THAT HIGHER YIELDS COULD BE USED.

DDD REYRTEL FEB 24 ON LAND OWNERSHIP OF AZIN ORCHARD LANDS, GOB HAS BEEN LOOKING INTO THIS MATTER SINCE MY ARRIVAL AND WILL TELEX RESPONSE TO YOU WITHIN ABOUT ONE WEEK.

EEE RE PADDY THREE PREPARATION. EYE PARTICIPATED IN OPENING MEETING OF PADDY THREE PREPARATION MISSION WITH DC IRRIGATION DEPT. INVESTICATION WILL COVER ABOUT 250,000 GROSS HA TO ALLOW SELECTION OF PROJECT COVERING ABOUT 150,000 HA. IT WAS AGREED THAT PADDY BE PRINCIPAL CROP BUT THAT OIL SEED CROPS (SESAMUM, SUNFLOWER, OR GROUNDNUT) BE EMPHASIZED TO EXTENT POSSIBLE. MISSION APPEARS FULLY CABLE OF PREPARING PROJECT AS REQUIRED FOR APPRAISAL.

FFF DG INFORMED ME THAT PADDY THREE AND REHAB PROJECTS HAVE BEEN INCLUDED IN GOB'S FOURTH 4-YR PLAN FOR FY80 AND FY84, RESPECTIVELY. GROUNDWATER PROJECT (TUBEWELLS) IS NOT INCLUDED. SUBJECT TO AVAILABILITY OF IDA FUNDS AND YOUR CONCURRENCE, THE FOLLOWING TENTATIVE PREPARATION AND APPRAISAL SCHEDULES HAVE BEEN AGREED.

(ALPHA) PADDY THREEE: PREPARATION MISSION MAR 82: FINAL FEASIBILITY REPORT END JULY, APPRAISAL MID-OCTOBER.

(BETA) REHAB PROJECT (ZAWGI): PREPARATION MISSION 1ST FEB 83, IDA REVIEW MISSION MID MAY, FINAL FEABILISTY REPORT END JUNE, AND PROJECT APPRAISAL MID- OCT 83.

GGG RE MATHAMATICAL MODEL FOR PADDY PROJECTS.

ODA HAS TURNED DOWN FINANCING OF WOLLINGFORD (HRS) INPUT TO MATHEMATICAL MODELING AND IF THIS WORK IS TO BE CONTINUED UNDER HALCROW WILL REQUIRE FUNDING FROM ONE OF IDA'S CREDITS. ROUGH COST OF WORK ABOUT US$200,000. GOB AGREES EXTENSION OF HRS MODEL DESIRABLE AND WILL REVIEW ONGOING PROJECTS AND MAKE RECOMMENDATION AS TO FUNDING BY END MARCH.

GGG RE BURMA GROUNDWATER II SUBPROJECT UNDER UMBRELLA II-PANTILLS TELEX TO GOB JAN 26, 1982. GOB WILL NOT AGREE TO EMPLOYMENT OF TUBEWELL MANAGEMENT SPECIALIST AS RECOMMENDED, SINCE TOR OF GDC ALREADY INCORPORATE TERMS INCLUDED IN TELEX AND GDC HAS AGREED TO PROVIDE INTERIM REPORT ON PART OF AREA TO IDENTIFY CONSTRAINTS AND PROPOSE SOLUTIONS.

HHH WE ARRIVED BANGKOK ON OUR WAY TO COLOMBO AS SCHEDULED AND ARE STAYING ORIENTAL HOTEL ROOM 1222. WE DEPART MAR 3 FOR COLOMBO. THIS TELEX SENT FROM BANGKOK RMD. REGARDS

BAKER

Division 'A'

Log No. 4625

Date Rec'd 3/2/82

Action to

KCF

240422 WORLDBANK MBH

BA-Irrig. Sect. (Paddy-3)

# OFFICE MEMORANDUM

TO: Messrs. A.F.E. Zagni, Irrigation Engineer, Leader, DDCB
M. Sugimura, Agronomist, DDCB
B.A. D'Avis, Economist, WFP

DATE: 15 February 1982

FROM: Maurice Fenn
Chief, Service II, DDCB

SUBJECT: BURMA: Paddylands Development III Project Preparation Mission - Revision of Terms of Reference

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The separate terms of reference given to Mr. Colombi in my memo of 2 February are amended to conform to the above. Mr. Colombi will now arrive in Burma for about two weeks from 25 February.

Mr. Zagni should particularly note the World Bank's latest message to the Government concerning the mission, as quoted to us in Mr. Veraart's telex No. 23 of 11 February.

MF:acc

BK 103/2.9 BUR
PE 13/1 Zagni, A.F.E.
PE 13/1 Sugimura, M.
PE 13/1 D'Avis, B.A.

cc: Veraart, WB, Washington
Fernando
de Brichambaut
Granieri
Fenn (2)
DDC Registry (6)

RECEIVED
MAR 12 1982

cc: Messrs. Goon (1)
Shibuwawa (1)
NIAZ/Collins/Sfeir.-
Yours

FORM NO. 27 - OCR
(1) 78

# WORLD BANK OUTGOING MESSAGE FORM (Telegram, Cable, Telex)

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Class of Service: TELEX/LT Date: FEBRUARY 8, 1982

Telex No.: Originators Ext: 75095

12 10

BA - Irrig. Rehab.

BA - Irrig. Sect. (Paddy - 3)

START 1 HERE TO

CITY/COUNTRY

MESSAGE NO

BOOK OF FOUR (SEE ATTACHED TEXT)

(X) U MAUNG MAUNG KYI
DIRECTOR-GENERAL
IRRIGATION DEPT.
RANGOON, BURMA (TLX. 21217 IRRBUR BM)
713-

(X) H.E. U YE MAUNG
MINISTER OF AGRICULTURE AND FORESTS
MINISTRY OF AGRICULTURE AND FORESTS
RANGOON, BURMA 713-21310

(X) DR. MAUNG SHEIN
DEPUTY MINISTER OF FINANCE AND PLANNING
MINISTRY OF FINANCE AND PLANNING
RANGOON, BURMA 713-21300

(X) U KHIN MAUNG LATT
DIRECTOR-GENERAL
PLANNING AND STATISTICS
MINISTRY OF AGRICULTURE AND FORESTS
RANGOON, BURMA 713-21310

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# WORLD BANK OUTGOING MESSAGE FORM (Telegram, Cable, Telex)

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Class of Service: _____ Date: FEBRUARY 8, 1982

Telex No.: _____ Originators Ext: 75095

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TO ADDRESSED U MAUNG MAUNG KYI, DIRECTOR-GENERAL IRRIGATION DEPT.

CITY/COUNTRY INFORMATION COPIES H.E. U YE GOUNG, MINISTER OF AGRICULTURE AND

MESSAGE NO FORESTS, DR. MAUNG SHEIN, DEPUTY MINISTER OF FINANCE AND PLANNING,

U KHIN MAUNG LATT, DIRECTOR-GENERAL, PLANNING AND STATISTICS,

MINISTRY OF AGRICULTURE AND FORESTS, RANGOON, BURMA.

YOU WILL RECALL THAT IT WAS AGREED BETWEEN H.E. MINISTER U YE

GOUNG, DR. MAUNG SHEIN AND MR. THALWITZ, DURING THEIR

RECENT MEETINGS IN RANGOON, THAT PREPARATION OF THE PROPOSED LAND

RECLAMATION AND IMPROVEMENT PROJECT (FORMERLY PADDY III) AND

IRRIGATION REHABILITATION/MAINTENANCE PROJECT SHOULD PROCEED AS

ORIGINALLY SCHEDULED. THIS WOULD PERMIT IMPLEMENTATION TO

COMMENCE DURING THE FOURTH FOUR YEAR PLAN PERIOD, SUBJECT TO THE

APPROVAL OF THE APPROPRIATE AUTHORITIES. FURTHERMORE, IT HAS

BEEN AGREED THAT THE FAO/WORLD BANK COOPERATIVE PROGRAM SHOULD

ASSIST IN THE PREPARATION OF THESE TWO PROJECTS AND THAT AN INITIAL

PREPARATION MISSION SHOULD REACH BURMA DURING THE SECOND HALF OF

FEBRUARY. I HAVE REQUESTED FAO/WORLD BANK CP TO PROCEED

ACCORDINGLY AND A MISSION TO BE LED BY MR. ZAGNI, AND COMPRISING

IN ADDITION AN AGRICULTURALIST AND AN ECONOMIST, PLANS TO ARRIVE

IN RANGOON ON OR ABOUT FEBRUARY 18. IT IS INTENDED THAT THEY

END OF TEXT →

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(11-78)

# WORLD BANK OUTGOING MESSAGE FORM (Telegram, Cable, Telex)

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Class of Service: _____ Date: FEB. 8, 1982

Telex No.: _____ Originators Ext: 75095



12 10

2 2

START HERE TO

SHOULD CARRY OUT INTENSIVE PREPARATION WORK ON THE LAND

CITY/COUNTRY

RECLAMATION AND IMPROVEMENT PROJECT AND INITIATE DISCUSSIONS ON

MESSAGE NO

THE IRRIGATION REHABILITATION/MAINTENANCE PROJECT TO PERMIT

DETAILED PREPARATION OF THIS PROJECT TO COMMENCE SOME TIME IN

MID 1982.

BEST REGARDS, YOON

END OF TEXT

NOT TO BE TRANSMITTED

SUBJECT:
BURMA - Land Reclamation & Improvement proj.

DRAFTED BY:
THYoon/DJWBerkoff:mg

CLEARANCES AND COPY DISTRIBUTION:
Cleared with &
cc: Mr. Shibusawa

AUTHORIZED BY (Name and Signature):
Tae-Hee Yoon, Chief, Ag.

DEPARTMENT:
South Asia Projects

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Agric. & Rural Dev. Dept.

BA - Ag Sector (Paddy-land-3)

Feb 4/82

2-4-82

INBAFRA

035 1824

INBAFRA

613286 FAO I

(1) M Bertoft

(2) SAIC

Division 'A'
Log No. 4428
Date Rec'd 2/5/82
Action/Info

VERAART
INTBAFRAD
WASHINGTON

NO.029

ONE INDIA WATER MANAGEMENT FOR RODGER BRANSCHEID PROPOSES MEET YOU HYDERABAD INSTEAD OF NEW DELHI EARLY MORNING 25 FEBRUARY STOP HE WILL STAY AT BANJARA HOTEL STOP PLEASE CABLE YOUR AGREEMENT

Rodger

TWO INDIA AGRICULTURAL EDUCATION PROJECT REYOURTEL 15 CONFIRM BAGSHAW ARRIVING WASHINGTON MONDAY 15 FEBRUARY LEAVING FRIDAY 19 FEBRUARY STOP GRATEFUL RESERVE ACCOMMODATION ANTHONY HOUSE AND CONFIRM

Rees
Nottidge
Demetriou
Melder

THREE BURMA PADDYLANDS III PROECT PREPARATION FURTHER TO CONVERSATIONS BAKER-ZAGNI TELEX YESTERDAY FROM FAO REPRESENTATIVE RANGOON STATES MISSION ACCEPTABLE TO GOB 14 FEBRUARY OR ANY DAY THEREAFTER STOP ACCORDINGLY PLANNING START 18 FEBRUARY STOP ZAGNI WILL CALL VAKER TOMORROW

Yoon

Shibusawa

Paddyland-3

FO 4/82

FOUR BANGLADESH BARISAL III PROJECT ON BASIS ARRANGEMENTS WITH SETH PLANNING ZAGNI VISIT DACCA 13 FEBRUARY EN ROUTE TO BURMA

Yoon

PLEASE WOULD APPRECIATE POUCHING COPY OF PAPUA NEW GUINEA THIRD AGRICULTURAL CREDIT PROJECT APPRAISAL REPORT 1981 FOR SPINKS

O.K.

SIX PAKISTAN AGRICULTURAL TRAINING PROJECT FOR NOTTIDGE CONFIRMING CONVERSATION TODAY ARRANGING BEAL ARRIVE ISLAMABAD 21 OR 22 FEBRUARY FOR FOUR DAYS IN ANTICIPATION REES ARRIVAL 23 OR 24 FEBRUARY (FENN FOODAGRI ROME)

NoHidge



INBAFRA

613286 FAO IO

INBAFRA

BA-Issue Seat (Paddy-3)

Jan 29/82

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

S20.C

# OFFICE MEMORANDUM

TO: Mr. C.P.R. Nottidge, Acting Asst. Director, ASP DATE: January 29, 1982

FROM: Stanley J. Baker, Acting Chief, ASPAA

SUBJECT: BURMA - Lower Burma Paddylands Development III Project
Pre-Project Brief

Attached for your information is the pre-project brief for the Lower Burma Paddylands Development III Project. Queries and comments should be addressed to Mr. D.J.W. Berkoff (Ext. 7-4735).

Attachment

Disbribution:

Messrs. Hopper, Holsen, Abbott (ASNVP)
Wiehen (ASADR)
Thalwitz (o/r), Rowe (o/r), Saeed (ASADR)
Shibusawa, Johri (ASADC)
Yoon (o/r) (ASPAA)
Parsons (ASPAB)
Lee (ASPAD)
Tibor (ASPAC)
Jehani (LEG)

DJWBerkoff/km

BURMA

LOWER BURMA PADDYLANDS DEVELOPMENT III PROJECT

Pre-Project Brief

## Background

1. Two preceding projects in this series, Paddylands I and II, are already well advanced and are proving to be productive, low-cost, and quick maturing. Both are financed by IDA. Paddylands I commenced in 1976 and is estimated to cost US$54.0 million, of which US$30.0 million is provided under Credit 642-BA. Completion is likely to be delayed about two years from the original target date to May 1984, due to initial procurement problems. Paddylands II commenced in 1978, and is estimated to cost US$56.0 million, of which US$34.5 million is provided under Credit 835-BA. Completion should be in May 1985 as planned.

2. The areas to be empoldered by the Paddylands I and II projects are estimated at 247,000 ac and 216,000 ac, respectively. Many of these lands lie in the lower Irrawaddy delta and are subject to tidal innundation; thus, the primary purpose of the projects is to prevent saline contamination in addition to flooding. The remaining areas are in the middle delta, where the principal problem is deep flooding by fresh water from the swollen Irrawaddy derivative channels. In some cases improved internal drainage will be provided. In addition, in the middle delta the provision of inlet structures will admit fresh water in the dry season to permit irrigation by low lift pumps, also provided under the projects. The major works are being carried out by the Irrigation Department.

3. It is anticipated that some 57,000 ac and 42,000 ac of abandoned or marginally productive paddyland will be reclaimed under the two projects, respectively. Provision is made in the Credits for the Agricultural Mechanization Department to assist the reclamation work with heavy equipment. The extension services under the Agricultural Corporation are being improved and the T&V system is being introduced. The Myanma Agricultural Bank is providing necessary credit to sustain the increased production stimulated by the project. Significant increases in the areas grown to HYV rice are noted annually.

## Proposed Paddyland III Project

4. The Irrigation Department, assisted by their consultants under the Paddylands I project, have identified some 500,000 ac of lower delta lands suitable for development in the same mode as the previous projects. IDA has indicated that it would be prepared to finance a third project of about 250,000 ac contingent upon the project meeting minimum technical and economic criteria. The Irrigation Department has submitted its recommendations to the Ministry of Agriculture on the locations of subprojects to aggregate to this amount. A recent FAO/CP mission also

assisted in this preliminary identification, and care was exercised to ensure that existing fishery interests would not be jeopardised.

5. It is envisaged that some four or five subproject areas will be selected, mainly in the heavily populated Rangoon Division. By extrapolation, the total cost would be of the order of US$70.0 million, of which some US$40 million would be foreign exchange.

Preliminary Schedule

6. It is proposed that FAO/CP send a mission to Burma in February 1982 to commence data collection and to direct the Irrigation Department's survey programs. A second mission would return in April 1982 to finalize data collection and to clear with GOB any outstanding issues. Thereafter the preparation report would be produced in Rome for completion by the end of June 1982. Appraisal could then take place in October/November 1982, appropriate to include the project in IDA's FY83 lending program.

7. The above program is contingent upon the Ministry of Agriculture's decision to include this project in the Fourth Four Year Plan, due to be finalised by March 1982. Some doubt has been expressed on the outcome. However, the Director General of the Irrigation Department may take the decision to prepare this project as a reserve project. A decision will be made in early February 1982 as to whether to proceed further with preparation of this project.

BA - Irrig. Sect. (Paddy - 3)

Jan 28, 82

Distribution: VR
Agri. & Rural DEv.

1-2782

1982 JAN 27 PM 4:38
COMMUNICATIONS DIVISION

BA - Ag Sector (Paddy - S)

FAO/ 10635 FOR VERAART

Krishna Cleave

N. 24 ONE PHILIPPINES CREDIT SECTOR SURVEY FOR CLEAVE RECUR CONVERSATION LAST WEEK AAA INSTEAD OF POWELL CONSULTANT HAVE NOW SECURED SERVICES MALKI CP SENIOR STAFF MEMBER WHO IS WELL QUALIFIED FOR AGRONOMIST ASSIGNMENT AND HAS TWO YEARS FIELD EXPERIENCE IN PHILIPPINES BBB ALSO CONFIRM AS ECONOMIST MS LORETTA SONN INSTEAD OF LOHAVISAVAPANICH CCC PLS CONFIRM BOTH SHOULD ARRIVE MANILA 25 FEBRUARY FOR APPROXIMATELY THREE WEEKS PLUS FOUR WEEKS REPORT WRITING ROME / WASHINGTON DDD GRATEFUL TOR AND BRIEFING MATERIAL ASAP/TWO PHILIPPINES MINDANAO RAINFED AREAS PROJECT AA A PROJECT BRIEF Krishna DESPATCHED TO YOU 25 JANAURY BBB PROPOSING TO GOP MACMILLAN AND ROBERTSON ARRIVE FROM INDONESIA APPROXIMATELY 16 MARCH FOR ABOUT FOUR DAYS TO DISCUSS PRPARATION PROGRESS/

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FOUR BURMA PADDYLANDS III AND REHABILITATION PROJECTS CONFIRMING Yoon CONVERSATIONS YESTEDAY BAKER ZAGNI AND BAKER YOON WE EILEEE WILL AAEEE AWAIT YUR ADVICE BY TUEDAY 2 FEBRUARY ON WHETHER ZAGNIS MISSION TO BU A M

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SIX BURMA WOOD INDUSTRIES II FOR THORNLY THAKS YOURTEL 20 JANUARY Parsons Thornley

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REGARDS ( FENN FODAGRI ROME)E

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WORLDBANK440098

BA-Cr. 642
BA-Cr 835
BA-Irrig. Sect (Paddy-2)

# OFFICE MEMORANDUM

DATE: 28 January, 1982.

BA-Tanks Irrig.
BA-Irrig. Rehab
BD-Irrig-Basin/Basin

TO: Mr. M. Fenn,
Chief, Service II, DDC.

FROM: A.F.E. Zagni

SUBJECT: Visit to World Bank - Back-to-Office Report

1. From 11-21 January, 1982, I visited World Bank, Washington, to complete report writing for my supervision of Burma - Paddylands Development Projects I and II, to receive briefing in Paddylands III preparation, to complete my input to Burma Tanks Irrigation Project I, and to discuss the preparation of the Economic Mission report.

Supervision of Burma - Paddylands Development I and II Projects

2. The draft reports, completed in Rome prior to departure, were typed and submitted to Mr. T. H. Yoon, Chief, ASPAA. Mr. Berkoff, mission leader, will make amendments as appropriate. Mr. Yoon, who departed for Burma on 15 January, took advance copies with him to assist in his discussions with GOB.

3. The Irrawaddy delta computer study, carried out under Paddy I by Hydraulics Research Station, Wallingford, UK, and assisted by Sir William Halcrow and Partners, Consultants, has been completed to the level specified. It is felt by Bank, Irrigation Department, and myself that the studies were not adequately specified and that they should include also the trifurcation of the main stream and should predict:-

(a) Location of the saline front at various river flows for different abstraction rates upstream;

(b) the effect of empoldering on upstream and downstream flooding.

On my return through UK on 22 January, 1982, as agreed with you by telex, I visited Halcrows office in Swindon to draw up draft terms of reference for the extension study at Bank's request. At the same time, discussions were held on the preparation of Paddylands III Project.

.../...

cc: All Team Members
World Bank (8)
Docs. Unit (2)
DDC Reg. (2)

BK 103/2.9 BGD
BK 103/2.9 BUR

AZ/hl

Preparation of Burma - Paddylands Development III Project

4. The scheduling and technical aspects of this project were discussed with Mr. Yoon and Mr. Berkoff. It was agreed that Mr. Yoon would urge GOB to give a firm commitment to this project as soon as possible to permit the FAO/CP team to go to Burma as planned on 10 February to commence fieldwork. On the assumption that this would be given, final preparation report completion would be scheduled for June 1982.

Burma - Economic Mission

5. My input into this mission was minimal, but I was asked to comment on the Irrigation Department's project pipeline, staffing and equipment proposals.

Burma - Tanks I Appraisal Report

6. I was primarily concerned, as I had been during the field visit in November/December 1981, with computing flood hydrographs and reservoir routing studies. I held discussions with Mr. B. Kanchanalak, Hydrologist, CPS, on my proposed methodology and on the Bank's approach to dam safety criteria.

7. I then used the available data at my disposal to carry out flood hydrograph generation and their routing through the reservoirs of Kinmundaung and Azin dams.

Burma - Irrigation Rehabilitation I Project

8. Mr. Yoon advised that he will request FAO/CP assistance in preparing this new project for appraisal in FY'83. As presently envisaged it comprises the rehabilitation of Zawgyi Irrigation Project near Mandalay and the uprating of mechanical equipment and workshops in the Irrigation Department.

9. I agreed, subject to approval by DDC management, to carry out a reconnaissance during my forthcoming visit to Burma in February/March 1982, more detailed examination in April/May 1982, and a full preparation mission in September 1983. Report would be completed by end December 1982.

Bangladesh - Barisal/Patuakhali Project

10. This project, which is defined for preparation by consultants under FAO/CP supervision, has been delayed for over one year. During my visit to Bangladesh on 14 December, 1981, specifically to review progress, I was informed by World Bank Resident Mission that no progress had been made. I was unable to meet with Chief Engineer Planning II as arranged as he had allocated the time to another project. I departed after only one morning in Dacca under the impression that no progress had been made.

11. On arrival in Washington, I learnt that not only had the contract been signed with the consultants, but that they had mobilised in November 1981. It is proposed that I visit Bangladesh en route to Burma in February to review the consultants' programme and to advise accordingly.

12. It is now planned that FAO/CP staff assist with the report completion in the period November 1982/January 1983, and subsequent presentation to Bank for appraisal.

BA-Irrig. Sect. (Paddy-3)

Dec 22, 81

BA-Tank Irrig.
BA-Cr. 642
BA-Cr. 835
BA-Irrig Sect- (Paddy-3)
BA-Irrig-Gen.

# OFFICE MEMORANDUM

TO: Mr. Maurice Fenn
Chief, Service II, DDCB

DATE: 22 December 1981

FROM: A.F.E. Zagni

SUBJECT: BURMA: Appraisal of Tanks I Irrigation Project;
Supervision of Paddylands I and II Projects;
Preparation of Paddylands III Project;
Review of Irrigation Department with World Bank
Economic Mission - Back-to-Office Report

## A. General

1. Acting on Terms of Reference dated 8 October and 16 October 1981, signed by Mr. T.H. Yoon, Chief ASPAA Division, World Bank, and Terms of Reference dated 21 October 1981, signed by yourself, I visited Burma from 12 November through 13 December 1981. During that time, I carried out the following tasks as defined in the TOR:

(a) assisted on a part-time basis (with Mr. D.E. Campbell FAO/CP) the appraisal of Kinmundaung and Azin sub-projects as components of Tanks I Irrigation project, led by Mr. S.J. Baker, World Bank;

(b) carried out a full supervision of Lower Burma Paddylands I and II projects, led by Mr. D.J.W. Berkoff, World Bank;

(c) examined specific aspects of the Irrigation Department as part of the World Bank economic mission to Burma;

(d) carried out preliminary discussions and planning for the preparation of Paddylands III project scheduled for early 1982.

2. During the various activities involved with the above, I visited and held discussions with the following:

- Director General and senior staff of Irrigation Department;
- General Manager (Extension) and senior staff of the Agricultural Corporation;
- Director General and senior staff of the Agricultural Mechanisation Department;
- members of Township Development Committees of Wakema, Labutta, Bogale, Pyapon, Maubin and Syrian Townships.

---

cc: Veraart, WB (8)
All Team Members
Documents (2)
Registry

BK 103/2.9 BUR (Tanks)
AFEZ:jpdif

3. A courtesy call was made to the FAO Representative's office, but regrettably he was away from Burma at the time.

4. An Aide-Mémoire was left with the Director General, Irrigation Department, summarising the mission's findings and proposals for Paddylands I and II projects, and for the proposed Paddylands III project.

## B. Tanks I Irrigation Project

### Field Visits

5. The appraisal mission visited the project areas as follows:

- Kinmundaung (Magwe Division): 14/17 November;
- Azin (Mon State): 19/21 November.

6. In Kinmundaung project area, the dam site, offtake weir and service area were inspected.

7. In Azin project area, the dam site, Malmein town water supply system, irrigation service area, and existing reservoir at Kinmungyon were inspected. In addition, the proposed dam site at Wimpanon was also examined, and discussions held on its suitability for possible inclusion into future Tanks projects.

### The Proposed Projects

8. The Irrigation Department had prepared an updated feasibility report for Kinmundaung project since the visit of the previous FAO/CP mission in June 1981.

9. The mission felt that the site investigation data for the dam was weak, and requested the Irrigation Department to carry out supplementary investigations. The flood spillway design was found to be inadequate,aand recalculations were made with assistance from FAO/CP members. Further analysis will be carried out in Washington, but it is envisaged that the project will comprise an 80 ft high, 1,120 ft long homogeneous earth dam serving some 5,000 acres of irrigation. The monsoon crop of paddy will be secured, plus limited production of sesamum and cotton.

10. The Azin project had also been prepared to feasibility level by the Irrigation Department, but as it was included in the programme very recently due to political considerations, FAO/CP was not able to contribute significantly. As presented, it is envisaged that a 92 ft high and 1,350 ft long homogeneous earth dam would supply supplementary domestic water to Molmein (200,000 persons) and Mudon (40,000 persons). Residual water would serve only some 1,500 acres of paddy and gardens

11. During the course of the mission, it transpired that the GOB had also requested the Government of China to fund this project, and due to this there is some uncertainty that WB will complete the appraisal.

## C. Paddylands I and II Supervision

### Field Visits

13. I carried out field inspections of the Shwelaung, Betut, Dauntgyi I, Zimbaung, Letpanbin, Kyetpham Wezaung, Myogon, Dawnyein and Dedalu sub-projects of Paddylands I, and Labutta, Dauntgyi II, Thongwa and Bawchaung sub-projects of Paddylands II project by launch, between 22-29 November and on 2 December. Mr. Berkoff joined the supervision only on 28-29 November. I covered all aspects of project development according to the full TOR.

### Project Development

14. Both projects are making steady progress, and land reclamation is proceeding well. Of concern is the very poor standard of regulator construction, an observation made by previous supervision missions. Paddylands I project is some two years behind schedule due to early procurement delays, whereas Paddylands II is on schedule. Full supervision reports are being prepared for submission to WB.

### Economic Mission

15. The input to this activity was of lower priority than the other three described in Section 1 above, and in consequence I devoted limited time to it. It was not possible to analyse the project portfolio of the Irrigation Department, as the project activity for the forthcoming Four-Year Plan is still under review by GOB. In addition, the sensitive issue of Irrigation Department staffing establishment could not be reviewed as this is now undergoing revision, and proposals are under discussion in the Ministry of Agriculture and could not be officially divulged.

16. I was able however to examine the ID plant and equipment dispositions, and to comment thereon. In addition, I carried out a detailed inspection of the central workshops and stores in Rangoon. I have proposed that when the Four-Year Plan project programme has been finalized, a plant consultant visits Rangoon and draws up a plant usage programme in order to derive a repair and overhaul schedule. In addition, updating of workshops and stores procedures would be considered. The recommendation has been welcomed by the Irrigation Department, and the WB mission indicated that it would recommend a sector credit to support the activities arising from the consultants' recommendations. The Irrigation Department have indicated that they would wish the consultant to be supplied by FAO/CP.

## D. Preparations for Paddylands III Project

17. On arrival in Burma, I was advised that this project may be rescheduled beyond the new Four-Year Plan period. However, the Director General, Irrigation Department, has indicated that he wishes FAO/CP to prepare the project in anticipation that it may be reintroduced into the programme.

18. On this basis, I held preparatory discussions with the project directors and senior staff of Paddylands I and II projects, the Superintending Engineer (SE) (Planning), and the consultant team leader of

Paddylands I project. Emanating from these discussions was a recommended shortlist of about 500,000 acres, and following the Director General's (ID) approval these have been forwarded to the Ministry of Agriculture for final selection of 250,000 acres.

19. It has been agreed that, provided the Ministry can approve the project preparation and define areas by mid-January 1982, FAO/CP can mount its planned preparation mission in February.

248423 WORLDBANK

21318 DPBUR BM

(Burma - Ag Sect)
(Paddy - 3)

Distribution: ~~fca~~
Mr. Yoon ✓
Mr. Shibusawa

1981 DEC -8 AM 7:58
RECEIVED AND COMMUNICATIONS

12-8-81

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.RANGOON (IBRD) 08 0535Z

LTF

INTBAFRAD

WASHINGTON DC

YOON. ~~AAA FURTHER MYTEL NOVEMBER 23~~ " RE BURMA PADDY III. ZAGNI HAS AGREED WITH GOB THAT COLOMBI'S PARTICIPATION IN PROJECT PREPARATION WOULD BE FINANCED OUT OF FAO/CP'S OWN CONSULTANCY BUDGET." CONSEQUENTLY NO ACTION SEEMS REQUIRED ON OUR PART. BBB AM DEPARTING RANGOON DECEMBER 8 FOR BANGKOK. MY ETA LAHORE STILL NOT KNOWN DUE AIRLINE CONNEXION DIFFICULTIES BUT EXPECT ARRIVE LAHORE BETWEEN 9 AND 11. REGARDS (AZUMI)

COL 23 8 9 11

NNNN

248423 WORLDBANK

21318 DPBUR BM P

Kathleen please prepare a memo for me to Fenn thru Hungo & Verast's Office (to be transmitted CP/FAO) I received message from Rangoon " ". Assume there is no further action needed, unless you 12/8/81 JCM

FORM NO. 27 - OCR
(11-78)

# WORLD BANK OUTGOING MESSAGE FORM (Telegram, Cable, Telex)

IMPORTANT (PLEASE READ INSTRUCTIONS BELOW BEFORE TYPING FORM.)

Class of Service: _____ Date: Nov. 19/81

713 — Telex No.: 21502 INYAHO BM Originators Ext: 75097

12 10

BA - Irrig. Sector (Paddy-3)

BA - Cr 642

START HERE

TO MR. HATSUYA AZUMA, INYA LAKE HOTEL

CITY/COUNTRY RANGOON, BURMA

MESSAGE NO RE BURMA PADDY III - FAO/CP PREPARATION MISSION, ASSISTANCE OF MR. COLOMBI.

AAA - AS WE HAVE DISCUSSED IT IS IMPORTANT TO KNOW THE EXACT TERMS OF REFERENCE FOR MR. COLOMBI AND HOW LONG HIS SERVICES WILL ACTUALLY BE REQUIRED BEFORE DISCUSSING THE MATTER OF FUNDING WITH GOB. IF HALCROW'S REPORT ON ITS HYDROLOGICAL INVESTIGATION AND DELTA SURVEY IS SUFFICIENTLY COMPREHENSIVE AND COMPLETE, IT WOULD SEEM THAT THE NEED FOR MR. COLOMBI'S SERVICES SHOULD AT MOST BE QUITE LIMITED.

BBB - ACCORDINGLY WE ASK THAT YOU

1) HAVE MESSRS. BERKOFF, CAMPBELL AND ZAGNI DRAFT THE TERMS OF REFERENCE FOR COLOMBI AND THEN DETERMINE THE LENGTH OF TIME HIS SERVICES WILL ACTUALLY BE REQUIRED, AND THE ESTIMATED COST.

2) THEN REVIEW THE MATTER WITH D.G. IRRIGATION AND PROJECT DIRECTOR PADDY I AND SEEK THEIR CONCURRENCE THAT FUNDS AVAILABLE UNDER PADDY I WILL BE USED TO COVER THE COSTS.

CCC - IN DISCUSSIONS YOU SHOULD EMPHASIZE THE IMPORTANCE OF COMPLETING PROJECT PREPARATION PADDY III AS SOON AS

END OF TEXT /c

NOT TO BE TRANSMITTED

SUBJECT: Cr. 483-BA Paddy I
BURMA - Paddy III

DRAFTED BY: GAGreenwood

CLEARANCES AND COPY DISTRIBUTION:
cc: Messrs. Shibusawa/Shakya, Azumi o/r

AUTHORIZED BY (Name and Signature): Tae-Hee Yoon, Chief, ASPAA

DEPARTMENT: So. Asia Proj.

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CITY/COUNTRY DDD - PLEASE ADVISE US SOONEST ON BBB ABOVE.

MESSAGE NO REGARDS, YOON.

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11-11-81

VERAART

NO. 295

ONE BURMA PADDYLANDS III GRATEFUL YOUR REACTION
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287 ROBERTSON AND FENN ARRIVING WASHINGTON FROM PHILIPPINES
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WEDNESDAY 2 DECEMBER GRATEFUL ADJUST HOTEL BOOKING ACCORDINGLY
AND ARRANGE DISCUSSIONS WITH KRISHNA, ETC.
THREE THAILAND LIVESTOCK FOR PRICE GRATEFUL ADVISE IF YOUHAVE
RECEIVED GOT AGREEMENT FOR CP STAFF VISIT BEGINNING OF DECEMBER

Yoon
Shibusawa

Krishna

Price

TO DISCUSS AND INVESTIGATE ECONOMICS OF DAIRY DEVELOPMENT AS
YOU PROPOSED IN OUR OCTOBER DISCUSSIONS
FOUR BANGLADESH RURAL ROADS AND MARKETS PROJECT AAA FOLLOWING
DISCUSSIONS HERE YESTERDAY WITH SECRETARY OBAIDULLAH KHAN
DE BRICHAMBAUT WILL VISIT BANGLADESH APPROX 3 TO 12 DECEMBER
ON RETURN FROM INDONESIA AND MITRA WILL JOIN HIM TO DISCUSS
PROJECT PROBLEMS AND PROGRESS WITH GOVERNMENT AND BANK OFFICE
BBB UPDATED PROJECT BRIEF BEING SENT TO YOU THIS WEEK
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[redacted]ICULTURE SAID DUE TO ABSENCE OF KEY STAFF ON LEAVE NEXT
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MAY/JUNE STOP SUGGEST WE ACCEPT THIS ARRANGEMENT
(FENN FOODAGRI ROME)

Parsons

Ag Sects

Hussain

Rec'd 10/11/81

INBAFRA

[redacted]

616022 FAO I

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Distribution

Mr Vevaart

~~Mr.Wadsworth~~

Mr.R.Stern

N-1132

NO 287

BA - Ag Sector (Paddy-3)

11-4-81

Wadsworth

ONE INDONESIA GOMBASA IRRIGATION PROJECT STOP PLS ADVISE WHETHER RSI AND GOI HAVE ALREADY REVIEWED GOMBASA JULY 1980 DRAFT PROGRAMME STUDY REPORT OR WHETHER YOU EXPECT CP DECEMBER MISSION TO REVIEW AS BASIS OF TOR FOR FURTHER DESIGN/TWO INDIA WATER MANAGEMENT AS REQUESTED BY TIBOR BRANSCHEID ARRIVING WASHINGTON SUNDAY 13 DECEMBER STOP PLS ARRANGE HOTEL ACCOMMODATION UNTIL 16 DECEMBER AND CONFIRM

Tibor

THREE BURMA PADDYLANDS III GRATEFUL REPLY MYTEL 275 OF 20 OCTOBER/FOUR INDONESIA FORESTRY ACKNOWLEDGE YOURTEL 172 CONCERNING BROUARD STOP VISIT WOULD BE USEFUL BUT NOT ESSENTIAL

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Krishna

Rec'd 11/4/81

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Distribution:
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BA-Ag Sect)
(Paddy-3)
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118230 NO 274 FOR DELON

AAA FRP FROM ATTIG GRATEFUL YOUR OBTIAING WORLDBANK APPRAISAL REPORT ON

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10-20-81

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BA-Cr835
& BA-Cr642
& BA-Ag Sector (Paddy-3)

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

TO: Messrs. J. Kampen, D.J.W. Berkoff (ASPAA) and A. Zagni (FAO/IBRD CP)

DATE: October 16, 1981

FROM: Tae-Hee Yoon, Chief, ASPAA

SUBJECT: BURMA - Lower Burma Paddyland Development I
Credit 642-BA - Supervision
Lower Burma Paddyland Development II
Credit 835-BA - Supervision
Lower Burma Paddyland Development III - Preparation
Terms of Reference

1. During your forthcoming visits to Burma on other matters (see separate TOR) you should supervise Lower Burma Paddyland Development projects I and II. Mr. Zagni will also review the status of preparation of Paddyland Development III. In supervising the two projects you should pay particular attention to:

a. The status of construction and implementation schedules for embankments, drainage channels, structures, workshops, offices, stores and other buildings;

b. Waste land reclamation, clearance and settlement schedules;

c. Status of the agricultural credit program for farmer groups for farm machinery and pumps;

d. Effectiveness of the agricultural extension services program;

e. Monitoring programs to assess the agricultural impact of the two projects; and

f. Budget allocations for FY81/82 and 82/83;

2. Procurement issues have been recently reviewed in the context of Mr. Greenwood's mission but you should discuss any issues that have subsequently emerged.

3. Mr. Zagni should review the recently completed hydrological investigations report prepared under Credit 642-BA together with the Burmese authorities. In the light of this report and other evidence and studies, he should establish the preparation status of the proposed Paddyland Development III project and prepare proposals for its further processing.

4. In carrying out this mission you should coordinate your activities with the other missions in which you are to participate, under separate terms of reference, specifically:

a. The Economic Mission (Berkoff);

b. The Irrigation Sub-Sector Review Mission (Berkoff and Zagni);

c. The Tanks I Appraisal Mission (Kampen and Zagni).

5. On your return to Washington/Rome, you should prepare full supervision reports for the Paddylands I and II projects and back-to-office report on the proposed Paddyland III project.

Cleared with & cc: Messrs. Tadros, Kampen

cc: Messrs. Wiehen (ASADR), Rowe (ASPDR), Holsen (ASNVP), Abbott (ASNVP), Saeed (ASPDR), Shibusawa (ASADC)(3), Johri (ASADC), Pilvin (ASADR), Barker (EDC), Rajagopalan (PAS)(3), Dickerson (PAS), Yudelman (AGR), Jehani (LEG), Chang (CTR)
SAIC

DJWB

DJWBerkoff/jcj

FORM NO. 27 - OCR
(11-78)

# WORLD BANK OUTGOING MESSAGE FORM (Telegram, Cable, Telex)

IMPORTANT (PLEASE READ INSTRUCTIONS BELOW BEFORE TYPING FORM.)

Class of Service: TELEX Date: OCT. 9, 1981

Telex No.: 44844 (A/B HALWIL G) Originators Ext: 72729

12 10

R.A. Irrig Section
(Paddy III)

START HERE

TO SIR WILLIAM HALCROW, BURDEROP PARK, SWINDON

CITY/COUNTRY WILTSHIRE, UNITED KINGDOM

MESSAGE NO FOR MR. CAMACHO RE BURMA PADDYLANDS PROJECT. EARLY SEPTEMBER WE REQUESTED IRRIGATION DEPARTMENT THEIR RECOMMENDATIONS ON IDENTI FICATION OF DEFINITE AREAS FOR PADDYLAND III PROJECT BASED ON YOUR DRAFT REPORT (IRRAWADDY DELTA HYDROLOGICAL INVESTIGATIONS AND DELTA SURVEY AUGUST 1981). HOWEVER WE HAVE JUST LEARNED FROM IRRIGATION DEPARTMENT THAT THEY HAVE NOT YET RECEIVED YOUR REPORT. GRATEFUL YOUR SENDING THEM IMMEDIATELY FIVE COPIES OF REPORT. WE WONDER ALSO WHAT HAPPENED TO THE PLANNED VISIT OF SWH STAFF TO BURMA IN SEPTEMBER TO DISCUSS THE REPORT WITH IRRIGATION DEPART MENT. FOR YOUR INFORMATION FAO/IBRD COOPERATIVE PROGRAM'S FIRST PREPARATION MISSION FOR PADDY III IS SCHEDULED FOR NOVEMBER/ DECEMBER 1981. REGARDS, YOON.

END OF TEXT

NOT TO BE TRANSMITTED

SUBJECT: BURMA: Paddylands III

DRAFTED BY: HAzumi: dvgg

CLEARANCES AND COPY DISTRIBUTION: cc: Messrs. Baker, Gupta, Berkoff, Shibusawa

AUTHORIZED BY (Name and Signature): Tae-Hee Yoon

DEPARTMENT: Chief, Agric. A, ASP

SECTION BELOW FOR USE OF CABLE SECTION

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DISTRIBUTION HC

MR. YOON

MR. SHIBUSAWA

MR Baker

TO : DR YOON CHIEF SOUTH ASIA DIVISION 'A' TLX NO. ITT440098
WORLD BANK WASHINGTON DC

RECEIVED 1981 OCT -2 PM 2:15 TABLE SECTION

FM : DIRECTOR GENERAL IRRIGATION DEPARTMENT RANGOON.
TLX NO. 21217 IRRBUR BM.

BA. Irrig Sector (Paddy III)

DT : 2ND OCT 81.

10-2-81

10/5

81671/ID RE : BURMA PADDYLANDS III PROJECT.

REF YRTLX DTD SEP 06 1981. DETAILED REVIEW AND FINAL REPORTS FROM SIR WILLIAM HALCROW NOT RECEIVED YET(.) REGARDS.

Please file copy for

248423 WORLDBANK

21217 IRRBUR BM....

Telex sent 10/9

Division 'A'
Log No. 3593
Date Rec'd 10/5

MR Baker

Pls let me know what you are planning on Paddy II preparation since Burmese are not ready for Tank appraisal Oct 26 on - (When CP gets there) we may discuss what to do — perhaps work on Paddy II

FORM NO. 27 - OCR
(11-78)

# WORLD BANK OUTGOING MESSAGE FORM (Telegram, Cable, Telex)

IMPORTANT (PLEASE READ INSTRUCTIONS BELOW BEFORE TYPING FORM.)

Class of Service: TELEX /LT — Date: SEPTEMBER 1, 1981

Telex No: 773 - 21217 IRRBUR BM — Originators Ext: 72729

Burma - Ag Sector (Paddy lands-3)

START HERE

TO: U MG MG KYI, DIRECTOR GENERAL, IRRIGATION DEPARTMENT

CITY/COUNTRY: RANGOON, BURMA

MESSAGE NO:

RE BURMA PADDYLANDS III PROJECT SCHEDULED FOR BANK APPRAISAL DURING CALENDAR YEAR 1982. WISH TO DRAW YOUR ATTENTION TO BANK MISSION DISCUSSION WITH YOU IN JUNE 1981 AND WOULD APPRECIATE RECEIVING YOUR RECOMMENDATIONS AS SOON AS POSSIBLE ON IDENTIFICATION OF DEFINITE AREAS FOR THE PROJECT (RESULTING FROM DETAILED REVIEW OF PROPOSED AREAS BY CONSULTANTS SIR WILLIAM HALCROW). WOULD ALSO APPRECIATE YOUR IMMEDIATE NECESSARY STEPS FOR PROJECT PREPARATION. WE HAVE ASKED FAO/WORLD BANK COOPERATIVE PROGRAM TO ASSIST GOVERNMENT TO PREPARE THIS PROJECT, AND THEY WILL BE READY TO START WORKING IN BURMA FROM DECEMBER 1981/JANUARY 1982. REGARDS YOON.

END OF TEXT

NOT TO BE TRANSMITTED

SUBJECT: BURMA-Paddylands III Project

DRAFTED BY: HAzumi/PNGupta/km

CLEARANCES AND COPY DISTRIBUTION:

cc: Mr. Shibusawa (o/r)
cc & cleared w/ Mr. Tadros

AUTHORIZED BY (Name and Signature): Tae-Hee Yoon, Chief, Division A

DEPARTMENT: S. Asia Projects

SECTION BELOW FOR USE OF CABLE SECTION

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Mr Gupta Can we have a word on this? SAIC
copy from me. STIB

WORLD BANK / INTERNATIONAL FINANCE CORPORATION

# OFFICE MEMORANDUM

TO: Mr. Tae-Hee Yoon, Chief, ASPAA

DATE: August 18, 1981

FROM: H. Azumi, ASPAA

SUBJECT: BURMA - Lower Burma Paddyland Development III

BA. Irrig Sector (Paddy III)

1. Mr. R.F. Camacho of Sir William Halcrow (SWH) visited me on August 4, 1981 and left with me a document containing a draft summary and conclusion of the Irrawaddy Delta Reconnaisance Survey. The TOR of the survey called for identification of (a) a further 250,000 ha (625,000 ac) of drainage project, and (b) the need for further studies for the long term development of the delta. The document included part of the statistical tables and maps to be included in the final report. I understand from Mr. Camacho that, Mr. Colombi, the Project Manager for the Irrawaddy Delta Survey, would return to Burma sometime in September 1981 to discuss the draft final report with the Irrigation Department.

Projects Identified for Short-Term Development

2. SWH has identified the following areas for short-term development based on: (a) engineering feasibility, (b) agricultural potential, (c) environmental impact, and (d) fluvio-tidal interactions:

(i) Irrigation of 49,000 ha (121,000 ac) on the banks of the 570 km (910 mi) of fresh water channels in the upper and middle delta, for winter crops and pre-monsoon jute;

(ii) Drainage of 281,000 ha (694,000 ac) in three development areas on the islands flanking the Panhlaing River and the Rangoon River (areas 48, 17 and 18 in the attached map) with the first priority going to the 74,900 ha (185,000 ac) on the Panhlaing (area 48);

(iii) Expansion of the present Paddy I and Paddy II projects in the south west of the delta into further areas totalling some 29,000 ha (71,500 ac) adjacent to the existing projects and on the west of the Bassein estuary (areas 1, 2 and 3); and

(iv) Irrigation of 6,500 ha (16,000 ac) of the Natmaw plains as a pilot project for large scale irrigation in the upper delta (part of area 54).

Paddy III and Paddy IV Project Formulation

3. Paddy III and IV could be based on the above 2 (ii). SWH recommends a project identification/formulation study of the drainage potential on area 48, 18 and 17, depending on the size of the project required. It appears that the draft final report of the SWH reconnaisance survey would include TOR and cost estimates for the project formulation study. Since FAO/CP has

Mrs. Yoon/Azumi

With Reference to Bank mission discussions (June, 81), GOB/ID need be reminded for identification of Paddy III areas on priority and preparation of the project with the assistance of FAO/CP for Bank's scheduled appraisal during 1982.

PNG. 7/28

been entrusted to assist the Irrigation Department in the preparation of Paddy III, the SWH's draft report should be sent to FAO/CP as soon as it is ready.

Abstraction Study for Natmaw Plains

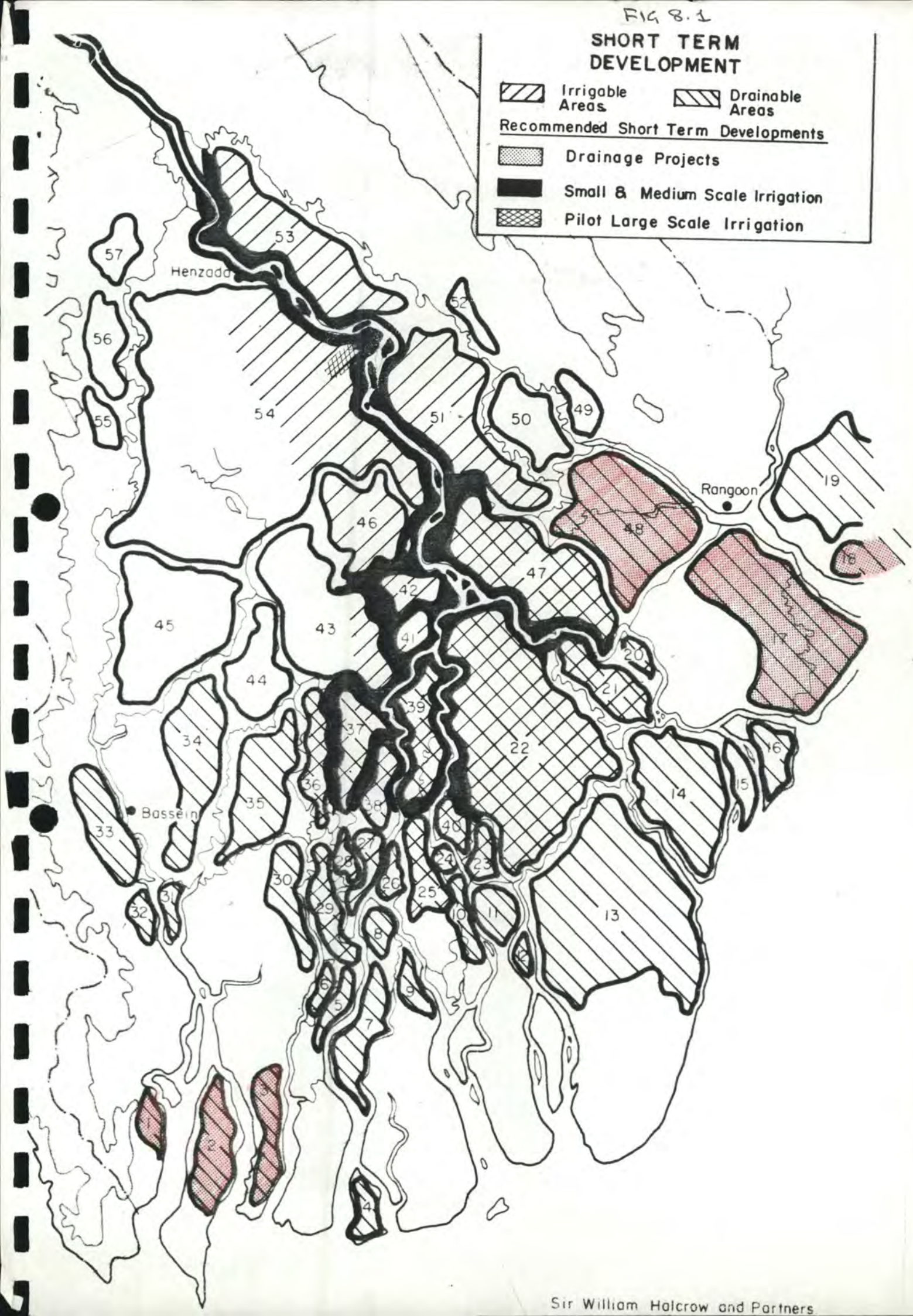
4. The SWH's recommendations include a study of engineering alternatives for lifting 9 $m^3/s$ peak requirements for a pilot irrigation project of 6,500 ha (16,000 ac) on the Natmaw Plains. This is apparently a modified version of the ULG/SWH proposal of July 16, 1981 for the Henzada Supplementary Study. The July 15 proposal assumed a command area of 64,000 ac, whereas the documentation brought by Mr. Camacho recommends a study for a smaller area as a pilot scheme. GOB is presently being consulted on the TOR for the supplementary study, main purpose of which is to determine the technically and economically optimum means of providing irrigation water for the Natmaw Scheme and to prepare definite designs and cost estimates for the best alternative. It is recommended that we carry out this supplementary study (under UNDP Umbrella II) before deciding on a pilot project.

cc: Messrs. Berkoff, Unhanand

Attachment — as

HAzumi:mg

Fig 8.1




Sir William Halcrow and Partners

BA. Iris Socta
(Paddy III)
June 10, 81

Back to office report

SAIC

# OFFICE MEMORANDUM

TO: Mr. M. Fenn,
Chief, Service II, DDC.

DATE: 10 June, 1981.

FROM: D. E. Campbell and A. Vaccari,
DDC.

SUBJECT: BURMA: Irrigation Programme Review - Back-to-Office Report.

1. In accordance with Terms of Reference dated 16 April the Mission arrived in Rangoon on 31 May 1/ to join Messrs. Rowe and Gupta (Bank). Messrs. Campbell and Vaccari departed for Rome on 6 June.

2. The agenda included the following:-

- whether any project activity in the Tenasserim coastal area (south of Moulmein), notably Azin sub-project, would be considered by the Bank;
- the make-up of a possible project for FY 1982;
- further action on Henzada, in view of the unfavourable CP report on pumping from the Irrawaddy;
- preparation schedule for Paddy Lands III;
- the pipeline beyond the above projects.

3. At a meeting with the Director General, Irrigation, on 2 June, Bank and CP participating, the following was decided:-

(a) Azin sub-project will be included in the Medium Tanks I project for FY 1982, on the understanding that it will be regarded as a pilot project for the Tenasserim area. The project will now include substantial additional diversion to the existing water supply system of the city of Moulmein (some ten miles distant). At a subsequent meeting of Bank staff and Government it is understood that decision was taken to include a study of the neighbouring Winpanon project, by consultants, with Azin.

.../...

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BK 103/2.9 BUR
DC/hl

cc: All Team Members
Veraart, WB Washington (8)
Documents Unit
DDC Reg. (3)

cc: Messrs. Yoon (2)
Shibusawa (1)
Darnell/Hotes (1)
Rowe (1)
Gupta (1)

---

1/ Campbell from India, Vaccari from Nepal.

Rec'd 6/24/81

(b) Medium Tanks Project I will now include the following:-

- Kinmundaung sub-project.
- Construction equipment for Kinmundaung and subsequent projects in Magwe area.
- Azin sub-project including supply line to Moulmein.
- Feasibility study of Winpanon sub-project (Tanasserim).
- Completion of investigation of Sadon sub-project (Magwe).

Appraisal is tentatively scheduled for October 1981. CP summary to accompany Irrigation Department project reports should reach Washington in September.

(c) A recent report by Bank consultant Brown, in Burma in the second half of May, affirms the CP view that large-scale pump lifting from the Irrawaddy in the Henzada area presents major technical difficulties due to instability of the river channel 1/. The report suggests further study of alternative systems and locations, including smaller developments. In the meantime the Henzada project (whether pump-lift or groundwater) is deferred into the FY 1983 programme. No further CP action is required at this time.

(d) A Paddy Lands III project is now scheduled for FY 1983. Selection of area will be based upon the Halcrow study which is now available in draft, with final version in the last quarter of this year. CP has been asked to coordinate preparation.

(e) Other projects in the pipeline now include the following:-

- Canal rehabilitation (including desilting), for FY 1984. This project has nominally been in the pipeline since 1979, and was the subject of an early CP reconnaissance mission. However, the Irrigation Department has not so far proceeded with the essential canal surveys. A firm programme for field work is now required. CP has been asked to coordinate preparation.

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1/ See Wyatt mission report.

- Medium Tanks II (Magwe area) including Sadon, Ngamin and possibly Sun, and Yin, for FY 1985. Feasibility studies should proceed in parallel with execution of Medium Tanks I.

4. During the course of the Mission Campbell visited the Nyaunggyat project area with Messrs. Rowe and Gupta, with particular reference to pre-casting of concrete components for hydraulic control structures. This subject was also discussed with Irrigation Department in connection with Medium Tanks I project and will be actively followed up by CP in that connection.

5. The Mission briefed the incoming FAO Representative, Mr. Oscar Lazo, on the Bank and CP activities in Burma. He expressed close interest in possible TCP or UNDP/FAO activities which might arise out of the Bank/CP programmes.

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BA-Irrig. Sect. (Paddy-3) SAIC
1 copy to Gupta Apr. 15, 81
1 copy to Zuma
1 copy to Unhanand
Discuss Paddy III mc

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Agr. & Rural Dev.

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Division 'A'

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copies given to all 4/16

4-15-81

FAO/B 103 FOR VERAART AND YOON IN PHONE DISCUSSION YESTERDAY Yoon
CONACHO OF WILLIAM HALCROW WHO HAS JUST RETURNED FROM RANGOON
ADVISED CAMPBELL THAT FIELD WORK IRAWADDY DELTA RECONNAISSANCE
STUDY NOW COMPLETE AND TEAM RETURNING UK FIRST WEEK MAY TO
COMPELTE REPORT BY END AUGUST STOP FROM SUMMARY STATEMENT
RELEASED TO GOVERNMENT AND READ OVER PHONE THERE APPEARS TOBE
AREA OF FOUR HUNDRED THOUSAND ACRES IN WESTERN DELTA ADJACENT LOWER
BASSEIN RIVER MEETING CRITERIA FOR FURTHER PADDYLANDS DEVELOPMENT
PLUS SUBSTANTIAL AREAS ELSEWHERE STOP GOVERNMENT AT SUMMIT LEVEL
REPORTED VERY INTERESTED IN FURTHER STAGE PADDYLANDS HOWEVER
CONACHO DID NOT SEE D G IRRIGATION STOP CONACHO WILL PASS THROUGH
WASHINGTON ABOUT ELEVENTH MAY ENROUTE COLOMBIA AND WILL CONTACT YOON
STOP IF YOU CONCUR CAMPBELL CAN ARRIVE RANGOON THIRYTFIRST
MAY UNLESS YOU WOULD PREFER EARLIER STOP PLS ADVISE STOP REGARDS
(FENN FOOAGRI ROME)

Rec'd 4/15/81

3-18-81

SAIC
BA - Tank Irrig.
BA - Agric. Sect. (Ag...
3
March 18, 1981
BA - Irrig. Sector (Paddyland)
BA - Irrig. Sector (Tank)
BA - Irrig. Sector (Paddyland 3)

U Maung Maung Kyi
Director General
Irrigation Department
Rangoon, Burma

Dear U Maung Maung Kyi

Re: Schedule for Preparation of Feasibility Studies for Future Projects.
Aide Memoire

Below is a summary of results of my meetings with you, U Khin Maung Latt and your staff.

I. Tank Irrigation I Project - The Director General (DG), Irrigation Department (ID) indicated that feasibility studies for Phase I project consisting of Kinmuntaung, Whiphanon and Azin Tanks, being prepared by ID, will be completed in July, 1981. Estimated total cost is about US$ 30M. Whiphanon and Azin Tanks, having more complete technical data required in feasibility studies, have been given higher priority over Ngamin, Yanmalee and Sadon Tanks and have been included in Phase I Project for possibility of an earlier implementation.

II. Integrated Agricultural Development I (Henzada) Project - Mr.W.R.M.Wyatt's FAO/CP Aide Memoire dated January 31, 1981, stated that aerial photographs and satellite imagery available indicate that there are no suitable site for the extraction of surface water on the reach of the Irrawaddy River adjacent to the proposed project area. Mr.Wyatt further suggested that ground water, possibly through deep tubewells, should be considered as the source of water supply. The DG (ID), however, has an opinion that it could be feasible using a floating type pumping station, instead of a stationery station proposed by ULG, for pumping water from the Irrawaddy River for the project area. The meeting agreed that further investigation should be considered for the feasibility of using a floating station as suggested by the DG (ID). If the result of investigation is positive, a feasibility report for the project will be prepared By ID. In this case, the DG (ID) estimated that feasibility studies may be completed by April, 1982. Estimated cost of the project is about US$ 120M.

III. Paddyland III Project - The draft final report on the Delta Hydrological Investigation will be completed in August, 1981. The draft report should identify recommended Paddyland III Project areas. Feasibility studies for the project, therefore, can begin in September 1981. The DG (ID) and U Khin Maung Latt requested that the studies should be prepared by FAO/CP. It is estimated that the feasibility report may be completed about April 1982. Estimated cost of the project, assuming the project area to be about the same as for Paddyland II Project, is about US$ 65M.

IV. Tubewell I Project - Final report for Phase I of the investigation is expected to be completed before June 1981. It is anticipated that the report would contain sufficient information for an appraisal of part or entire areas under Phase I. At this stage size and, therefore, cost of the proposed project cannot be estimated.

U Khin Maung Latt indicated that the four projects above are in the priority list.

I would like to expresse my sincere thanks for the assistance and hospitality given to me by the Irrigation Department.

Sincerely yours,

K. Unhanand
Senior Engineer
The World Bank