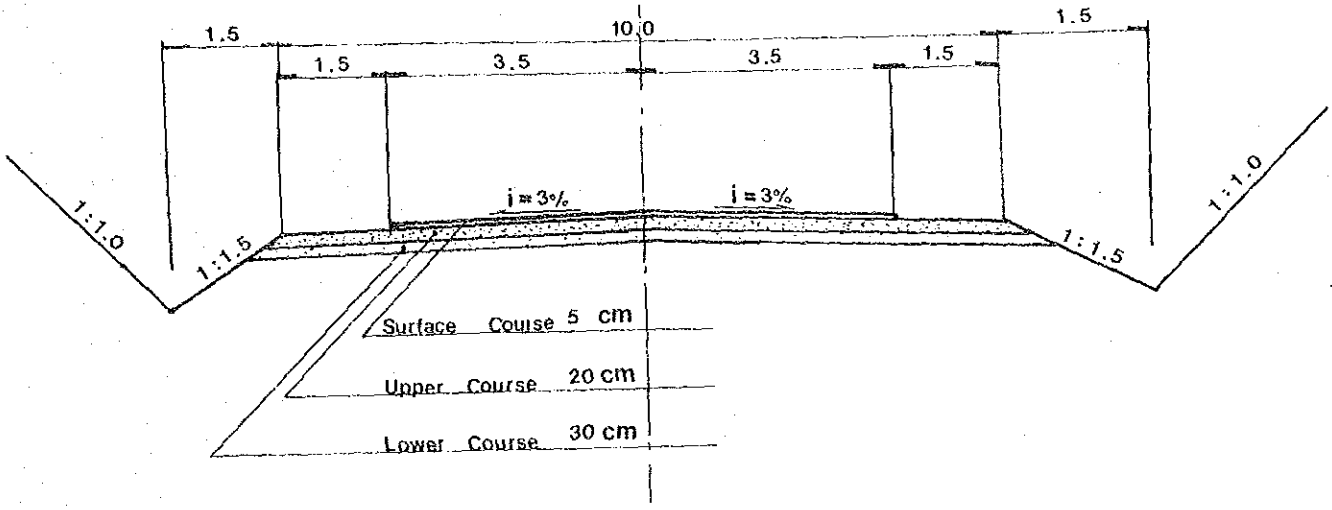
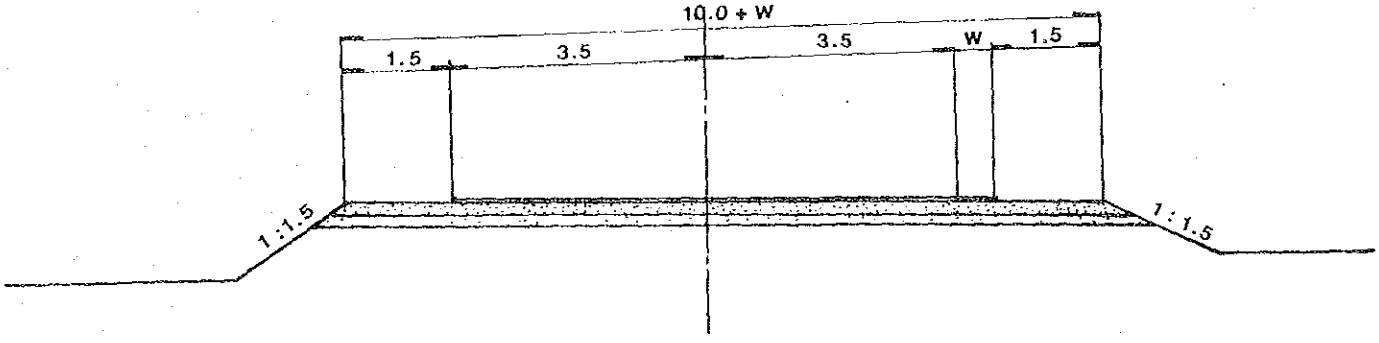
APPENDIX J: THE PAVEMENT OF SABA-OLANCHITO HIGHWAY

I. PAVEMENT OF SABA - OLANCHITO HIGHWAY

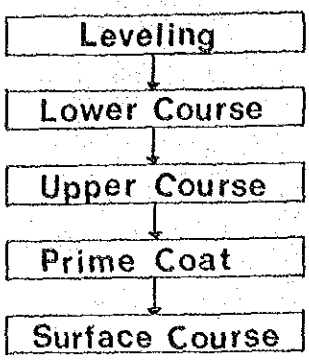
1. The construction of Saba-Olanchito highway was completed up to the finishing of road bed. In this sense, no retaining wall and box culvert work will be considered.

Cross-section area of the proposed pavement work is as illustrated below.





The total length of the work will be 40.6 km including the length of 0.79 km of bridges. Construction of pavement work will be carried out in the following procedure:



2. Construction cost to cover this work has been estimated as follows:

(1) Civil Works (A)

Unit: Lps.

Work Description	Unit	Quantity	Unit Price		Amount		Total Amount in Local Currency
			Foreign Portion	Local Portion	Foreign Portion	Local Portion	
Levelling	m^2	442,000	0.34	0.28	150,280	123,760	274,040
Lower Course (15 cm)	m^2	433,000	4.54	1.30	1,965,820	562,900	2,528,720
Upper Course (20 cm)	m^2	412,000	5.99	1.70	2,467,880	700,400	3,168,280
Prime Coat	m^2	400,000	0.78	0.03	312,000	12,000	324,000
Surface Course	m^2	280,000	12.94	0.36	3,623,200	100,800	3,724,000
Total					8,519,180	1,499,860	10,019,040

(2) Temporary and Other Works (B)

(A) x 10% = 1,001,900

(3) Administration Cost (C)

[(A) + (B)] x 35% = 3,857,330

(4) Contingency (10%) (D)

[(A) + (B)] x 10% = 1,102,090

(5) Preparatory Works

[(A) + (B) + (C) + (D)] x 0.4% = 63,640

Sub-total (E) 16,044,000

(6) Detail Design and Topographic Survey

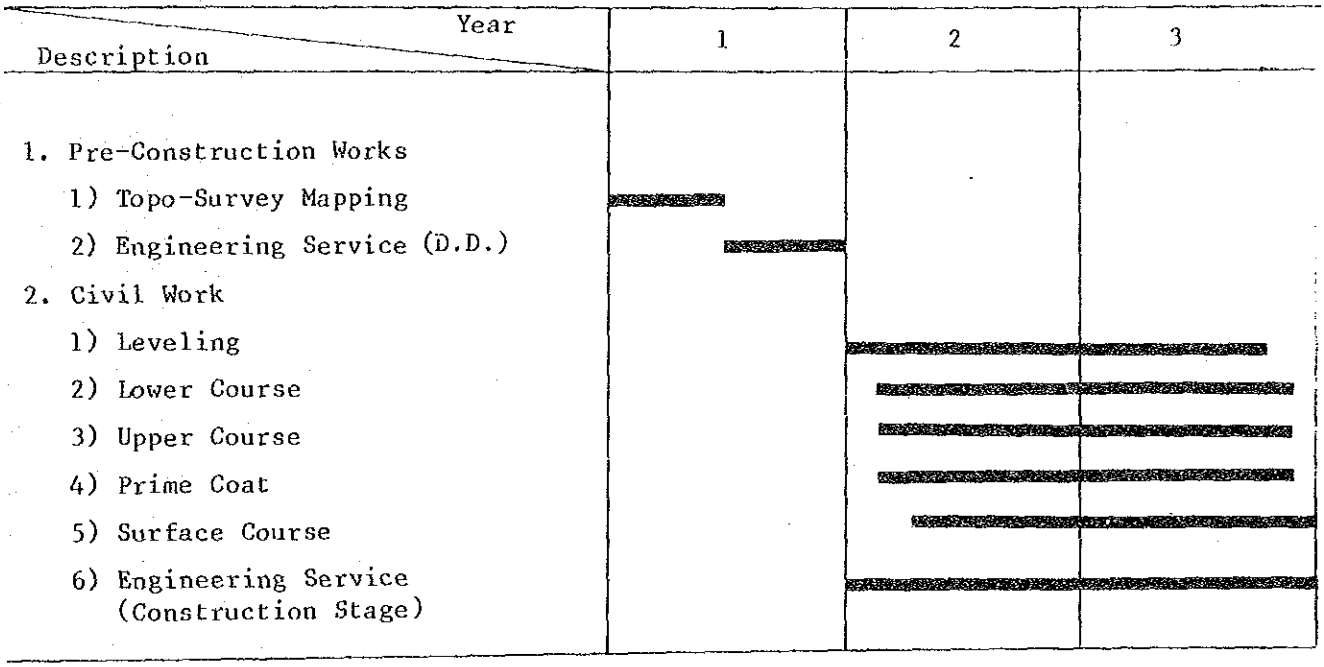
(E) X 10% = 1,600,000

(7) Supervision of Construction Works

(E) x 8% = 1,280,000

Total Project Cost: 18,924,000

3. Tentative work schedule is proposed as follows:



APPENDIX K: MISCELLANEOUS

I. MEMBERS OF THE SUPERVISORY COMMITTEE

During the length of the Feasibility Study, the Supervisory Committee, organized by JICA, has given the necessary advices to the F/S Study Team in executing the Study and formulating the development concepts of the Project.

The supervisory committee comprises of five (5) members as follows:

Name (field in Charge)	Present Post
Mr. Yasuo Ichikawa (Chairman)	Ministry of Agriculture, Forestry and Fisheries (M.A.F.F.)
Mr. Ryuhei Funano (Irrigation and Drainage)	M.A.F.F.
Mr. Tamio Ito (Agro-economy)	Hokkaido Development Bureau
Mr. Koichiro Yukawa (Crops and Soils)	M.A.F.F.
Mr. Yasunobu Matoba (Economic Appraisal)	Overseas Economic Cooperation Fund (O.E.C.F.)

II. MEMBERS OF THE FEASIBILITY STUDY TEAM

This Report has been prepared by the Japanese Feasibility Study Team in collaboration with the counterpart personnel of the Government of the Honduras. The followings are specialists participated in the Feasibility Study in Honduras and prepared the Report.

Name	Field of Specialization	Duration of the Study in Honduras
Prof. Shoji Kanatsu	Team leader, General Co-ordination	Feb. 12 - Mar. 16, 1984 Jul. 3 - Jul. 29, 1984 Oct. 3 - Oct. 29, 1984
Mr. Kunio Takagaki	Deputy Team Leader Irrigation & Drainage	Feb. 12 - Mar. 16, 1984 Jul. 3 - Oct. 29, 1984
Dr. Kiyoyuki Niiuchi	Agricultural Operation & Cropping	Aug. 4 - Oct. 29, 1984
Mr. Yukio Hoshino	Geology & Groundwater	Aug. 4 - Oct. 29, 1984
Mr. Fumiaki Onoda	Agro-economy & Economic Appraisal	Jul. 3 - Sep. 28, 1984
Mr. Toshikazu Nagamitsu	Livestock production	Aug. 18 - Sep. 28, 1984
Mr. Gunjiro Ozawa	Water Resources & Facilities	Feb. 25 - Mar. 16, 1984 Jul. 3 - Oct. 29, 1984
Dr. Michiaki Hosono	Soils	Aug. 4 - Oct. 29, 1984
Mr. Tamio Ota	Social Infrastructure	Feb. 12 - Mar. 16, 1984 Jul. 3 - Oct. 29, 1984
Mr. Atsushi Kishi	Roads and Structures	Jul. 20 - Oct. 29, 1984
Mr. Yujiro Itakura	Meteorology & Hydrology	Jul. 20 - Oct. 29, 1984
Mr. Tetsuro Suzuki	Boring Operation	Sep. 9 - Oct. 20, 1984

III. MEMBERS OF THE GOVERNMENT OFFICIALS AND COUNTERPART PERSONNEL OF THE REPUBLIC OF HONDURAS

The Study in Honduras has been completed owing to the valuable support and cooperation extended by the counterpart personnel, and the advices and observations of the governmental officials at the meetings and other opportunities have been very useful for the Study Team.

The followings are list of governmental officials and counterpart personnel who have supported the Study.

Governmental Officials

Lic. Gustavo Adolfo Alfraro, Executive Director - INA

Lic. Guadalupe Jerezano, Manager of Planning Dept. - INA

Ing. Marco A. Aguero, Advisor, INA

Ing. Celio Pozas, Agricultural Planner, CONSUPLANE

Ing. Roberto Romero Laines, Advisor for Agrarian Reform, CONSUPLANE

Lic. Donaldo Madrid, International Technical Cooperation, CONCUPLANE

Ing. Orlando Aviles, Manager, Irrigation and Drainage Dept. D.G.R.H. - MRN

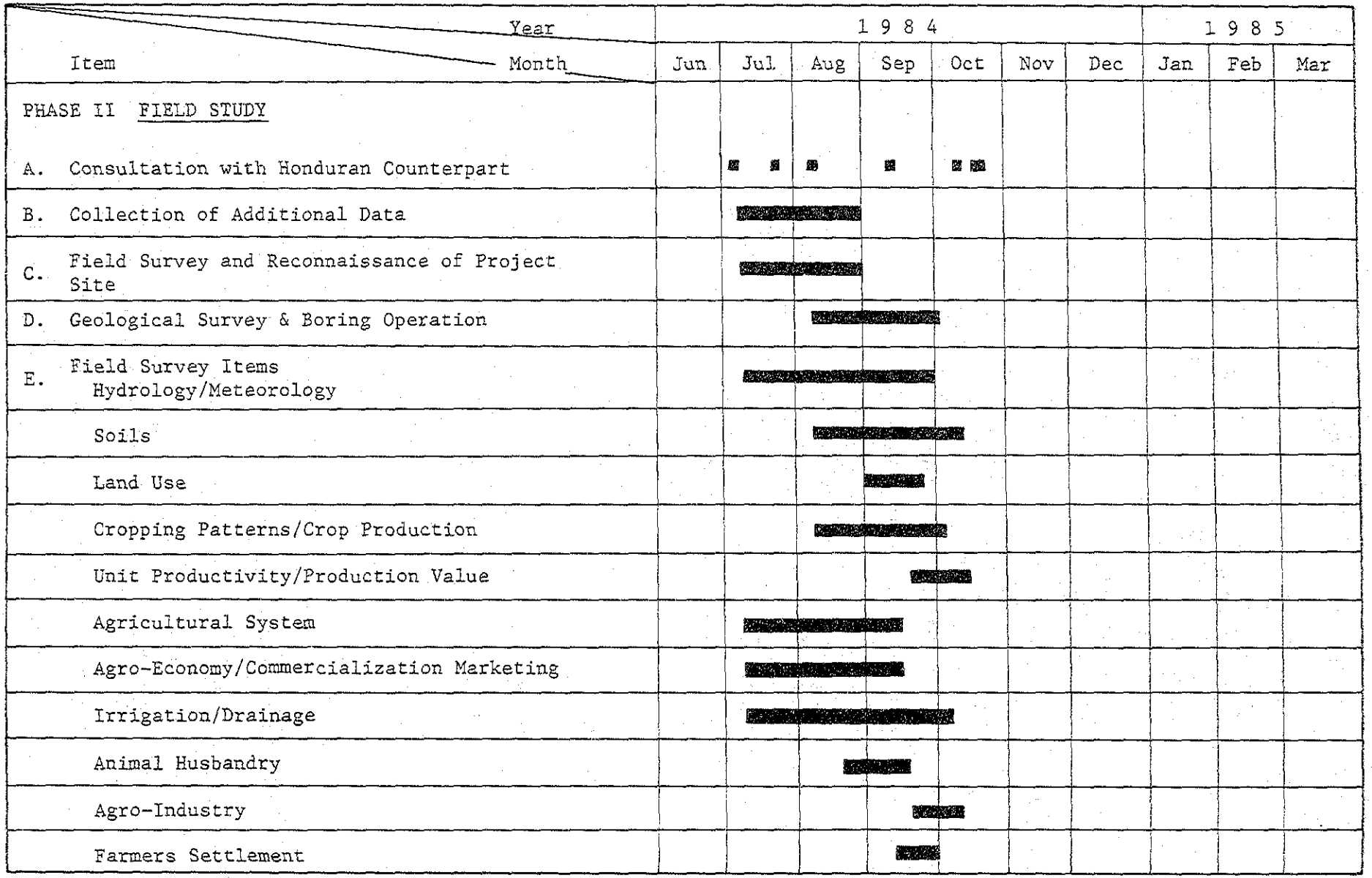
Ing. Jaime Lanza F., Manager, Planning Dept., D.G.R.H. - MRN

Ing. Jorge A. Salgado, Deputy Manager, Irrigation and Drainage Dept., D.G.R.H. - MRN

Counterpart Personnel

Lic. Godofredo Siercke A.	Coordinator for the Japanese Mission, INA
Ing. Jose A. Martinez	Agro-Economy, INA
Ing. Reynaldo Diaz	Crops, INA
Lic. Guillermo Mccarthy	Marketing, INA
Ing. Claudio Delgado	Geology and Groundwater, INA
Agron. Mauro Zelaya S.	Livestock Husbandry, INA
Ing. Angel P. Alcantara	Soils, INA
Ing. Carlos Rivera	Irrigation and Drainage, D.G.R.H. - MRN
Ing. Peter Hearne	Hydrology, D.G.R.H. - MRN

IV. SCHEDULE OF THE STUDY



Item \ Year / Month	1984 Jun	Jul	Aug	Sep	Oct	Nov	Dec	1985 Jan	Feb	Mar
Groundwater/Water Resources										
Survey for Proposed Construction Site of Main Structures										
Road/Social Infrastructure										
Construction Materials and Machineries										
F. Formulation of Basic Development Concept										
G. Elaboration of Interim Report										
PHASE II OFFICE STUDY IN JAPAN										
A. Analysis of Collected Data and Information										
B. Data Analysis by Electronic Computer										
C. Reconnaissance of the Present Conditions of the Area										
D. Formulation of Development Plan										
E. Preliminary Design										
F. Implementation Scheme										
G. Maintenance Programme										
H. Estimation of Project Cost										
I. Economic and Financial Analysis										
J. Evaluation of the Project										
K. Conclusions and Recommendations										

Item \ Year / Month	1984 Jun	Jul	Aug	Sep	Oct	Nov	Dec	1985 Jan	Feb	Mar
L. Elaboration of Draft Final Report							=			
EXPLANATION OF DRAFT FINAL REPORT										■
SCHEDULE OF REPORT SUBMISSION	▲ Plan of Operation				▲ Interim Report				▲ Draft Final Report	

* Final Report: Within two months after receiving the comments of the Government of Honduras on the Draft Final Report.

APPENDIX L: ANSWERS TO THE OFFICIAL COMMENTS AND OBSERVATIONS ON THE D.F.R

COMMENTS	ANSWERS
March 29,1985 Office No. DE-199-85 His Excellency Ambassador of Japan Mr. Goro Nakasone Dear Mr. Ambassador: In accordance with the terms of minutes signed on March 12, 1985 between this Directorate and the Leader of the Japanese Mission representing the Japan International Cooperation Agency (JICA), and in accordance with item 3 of the same minutes, we are pleased to send to your honorable office the final observations and comments on the Draft Final Report of the Feasibility Study on the Aguan Valley Agricultural Development Project (Saba-Olanchito Area). After analyzing the Feasibility Study Report, we observe that the same covers basically the aspects and requirements defined in the Scope of Works agreed upon for the aforementioned study. We hope that the observations and comments attached herewith will be considered, analyzed and revised with a view that they would be incorporated in the Final Report of the aforementioned Study; if, for one or other reasons, some concepts will not have been incorporated, it is desired that they be contemplated in the final design stage. We reiterate that the feasibility sutdy carried out by the Japanese Mission thru their study team makes a valuable contribution of information and technology for the Saba-Olanchito area of the Aguan Valley.	

COMMENTS	ANSWERS
CHAPTER I GENERAL CONCEPT The Government of Honduras, thru the National Agrarian Institute, received from the Japanese Mission on March 15, 1985 the Draft Final Report for the Feasibility Study on the Aguan Valley Agricultural Development Project (Saba-Olanchito Area) consisting of: 20 volumes of Volume I - Main Report, Spanish and English , 20 volumes of Volume II - Appendices, English and 20 volumes of Volume III - Drawings. The co-executive organizations for the Feasibility Study received copies of that study for analysis and to prepare comments and observations with the objective that the National Agrarian Institute would submit in official form the comments and observations on the Draft Final Report. The organizations which received copies are: the Executive Secretariate of CONSUPLANE; Office of projects, CONSUPLANE. The General Directorate of Hydraulic Resources, MNR; the Aguan Valley Integrated Development Office, ONU/CONSUPLANE; the Executive Directorate and Planning Department of INA. The Feasibility Study comprises the integrated agricultural development of the area located between Saba and Olanchito, in which the development of 21,000 hectares of land on both banks of the Aguan River is included. After analyzing the document and taking into account the meetings held with the Japanese Mission, the Government of Honduras remits the following comments and observations so that these may be considered in the document of the Final Report.	

COMMENTS	ANSWERS
The comments and observations are as follows: CHAPTER II OBSERVATIONS AND COMMENTS On the documents presented by the Japanese Mission, we make the following observations and comments: CHAPTER III. The Actual Situation of the Study Area 3.4 Hydrogeology and Groundwater 3.4.1 General Description of the Study In the document it is not explained clearly about the criterion employed for the reconnaissance of the geological section of the valley nor was it decided whether there are changes in the section along the Valley. 3.4.2 Topography and Hydrogeology The deailed hydrogeological map is not prepared nor the process to determine the differentiation of soils between upper and lower areas described. 3.4.3 Groundwater Examples of tests carried out with resistance meter of Yokogawa type 3344 are not included.	CHAPTER III. The Actual Situation of the Study Area 3.4 Hydrogeology and Groundwater 3.4.1 General Description of the Study (Refer to 3.4.2) 3.4.2 Topography and Hydrogeology Generally speaking, the components required for the hydrogeology and groundwater study at the feasibility study level of agricultural development project are: Collection of necessary data and information, investigation on existing wells, geological survey, electrical conductivity study, etc. Boring is very rarely conducted as preparatory works to the next step of the Project. One of the principal purposes of our geology and groundwater study is, apart from the utilization of superficial river water, to evaluate the potentiality of groundwater as a resource for the irrigation system. In line with this purpose, focus of our study had been put on the investigation of shallow groundwater and river bed water. In our study, profiles on geological sections of the area have been prepared in view of disclosing the quarterary underground geology and underground flow. Consequently, two sections with general geological features of the area were selected and their profiles across the valley have been included in our Report. The reason why two sections were selected is to examine the difference of quaternary sediment between the upper and lower Aguan. As a result of our survey, it has been noted that no specific variation was recognised in the geological features along the valley. A geological profile to cover the whole study area is included in Appendix C-II (Fig. C-2). This profile has been prepared based on our comprehensive studies composed of field survey, interpretation of aerial photography, analysis of collected data and information, and investigation of boring and electrical conductivity. 3.4.3 Groundwater Results of electrical geophysical survey for 23 examples are summarized in Fig. C-5, Appendix C-II. In addition, the relation between resistance and geology is included in Table C-3, Appendix C-3.

COMMENTS	ANSWERS
3.4.4 Hydrogeological Profile The procedure employed for calculating the water volume in the area where the existence of great aquifer is confirmed is not disclosed. In the minutes signed on October 25, 1984, it was mentioned that the study of groundwater was accepted after explantions were made by the Japanese Mission to Honduran counterpart personnel and after considering that such requirements as established for the feasibility study, we do not begrudge due respect on this minutes but we make the following observations. In the submitted documents (Draft Final Report) two figures (3-10 and 3-11) are prepared with resistance curve drawn beyond the capacity of the equipment (Yokogawa, type 3244) - the capacity of the equipment is 70 m and the profile curve is drawn to 100 m - . We, therefore, believe that the balance of 30 m is drawn as an estimate. Besides, in the document, the reason why piecemetric wells were not perforated are not given. Also the investigations on wells by pump, river flow and groundwater level were not conducted frequently enough to determine more precisely the existing flow of aquifer. Therefore, we consider that the methodology employed for the goundwater study was not appropriate leaving uncertainty in the results obtained to evaluate the potentiality of groundwater. Nor, by any means is the comparison of alternatives for the utilization of groundwater versus superficial water established.	3.4.4 Hydrogeological Profile Procedure employed for calculating groundwater flow is shown in Appendix C-II. Supplemental information is to be added in the Final Report. Groundwater flows in Section A-B and C-D are estimated to be 0.0092 m^3/s and 0.0082 m^3/s, the average value being 0.0087 m^3/s to be unexpectedly smaller due to poor permeability prevailing in the area. Judging from this value, it has been assessed that there exists no major aquifer in the study area. Due to lack of flow from the upper area, groundwater within the study area is depending mainly on the percolation from rainfall and river water. This supply volume (groundwater reserve) has been calculated to be 37,000 m^3/day. The profiles deeper than 70 m have been drawn by estimation due to the following reasons as briefly mentioned below. Within the feasibility study, the principal objective of the groundwater study is to evaluate the potentiality to be used for irrigation purpose. In this regard, the study in this field focused on the shallow groundwater, especially river bed water and the object of the study was attained when the boring penetrated to 20 m in depth. It is a generally accepted study methodology that the planning of a large scale irrigation system is make based mainly on the evaluation of potentiality of river bed water. The survey on deep groundwater was made only for supplemental purpose and, without carrying out boring, features of deep groundwater were disclosed collecting and analysing data from existing wells in the study area and in the banana plantation of the Standard Fruits Co. (refer to Table C-4, Appendix C-2). Number of wells investigated for groundwater survey - 13 in total; 11 for boring and 2 for pumping test - meets the requirements specified in the guideline of Ministry of Construction, Japan (on well per 5-30 km^2) enabling the assessment of groundwater reserves at the feasibility study level. The water discharge volume per well with 8-10 inches in diameter has been estimated based on studies on permeability and thicknes of aquifer. The results are shown in Fig. C-9, Appendix C. In view of water balance, the total volume of discharge in alluvium plain should not exceed the available volume of 37,000 m^3/day, which is far from satisfying the water requirements for a large scale irrigation system. The comparison of utilization between river surface water and groundwater is presented in Appendix F-I-4.

COMMENTS	ANSWERS
3.5 Soils The inventory of soils and their scientific information are foundamental passage for the territorial ordering and economic planing in any country in the world, adopting for these purposes standards and methods for the different development studies in accordance with the existing potentialities in areas to be carried out the study. In the preparation of a feasibility sutdy for the development study, it is required that a soil study be conducted at a detailed level in order to make a description of characteristics both internal and external (under physical and chemical projection, both in the field and in the laboratory) of the classification of soils existing in the area. Likewise, the study at a detailed level will permit the land classification for consumative use; for soils and lands classification (irrigation, drainage etc.) the manual of the US Department of Agriculture is to be used and, for cropping patterns, that of the US Bureau of Reclamation. In line with these considerations, we observe as follows:	3.5 Soils The soils survey was completed referring basically to the Manual prepared by the U.S. Bureau of Reclamation. In addition, taking into acount of the purpose and level of the study, existing soil maps on a scale of 1:100,000 prepared by OEA and 1:250,000 by CONSUPLANE/UN and aerial photographies were consulted and actual vegetation and cutting face of road were studied. In the course of the feasibility study, chemical and physical analyses of soils were conducted to determine the degree of suitability of lands and to prepare basic information for evaluating the feasibility of agricultural development of the study area. The factors basically considered in the study include: 1) Negative components to check the growth of crops 2) Flexibility of land to adapt to improvement through fertilization, etc. 3) Planning of irrigation system 4) Necessity and degree of drianage improvement Surveys on vegetation and growing condition of crops in the Aguan Valley have revealed no specific factors that might impede the growth of crops and we assert that this area is suited for the agricultural development. Results of chemical analysis of soil confirm this conclusion. With respect to the physical analysis, the following aspects had to be taken into account, as specified below. 1) Survey of plow layer connected with crop rotation The subjects of this investigation are limited to the examination of soil texture and thickness of plow layer, since plowing and cultivation will be practiced within this layer once the irrigation system will has been installed. Regarding permeability of soils which is closely related with the determination of the method of irrigation, we have fixed the water application efficiency at the rate of 0.6. However, in adopting furrow irrigation which has wide range of applicability, this rate of 0.6 can be adjusted by the length of furrows on the farm.

COMMENTS	ANSWERS
	2) Survey to identify mechanical characteristics of soil The mechanical survey is rather more directly related to the construction phase, and since the main purpose of our study is to determine the technical, economic and financial feasibility of this agricultural development project, we believe that is is sufficient, at this stage of the project, to learn the mechanical characteristics of soil by making assumption based on the results of soil texture analysis. We can thus conclude that our survey has covered all the necessary characteristics, in both chemical and physical terms, of the soil in the study area.
3.5.1 Field Investigation Method Scale The scales of soil maps used as a base were those prepared by OEA and The Hydraulic Master Plan by ONU/CONSUPLANE, the former, being a 1:250,0000 and the latter a 1:100,000, scales suitable for a study at the reconnaissance level and not at the detailed level; at the detailed level, it is required to conduct the study with a maximum scale of 1:20,000 so as to investigate the study area in more detail. Field Investigation It was carried out 200 observations of which only 19 were profile pit and the deepest boring reached was no more than 76 cm. It is noted that the obsevation should be conducted at a deeper level for determining physical and chemical characteristics of sub-soil. The required depth is that 1.5 m; actual and non-estimated data can only be obtained when the depth reached is this depth. On the other hand, for considering sub-soils, 181 observations were carrie out with respect to each soil limit. (from 0 to 50 cm). Consequently, those data actually collected from the soil and subsoil do not constitute major information for making a better land classification and preparing edaphic population existing in the investigation area.	3.5.1 Field Investigation Method Scale Our survey was based on a topographic map drawn to a scale of 1/25,000, which was photo-reduced from a 1/5,000 sale topographic map produced in March, 1984 by JICA. Accordingly, contour lines and classifications of land category in 1/25,000 map have the same level of accuracy as those originally appeared in the 1/5,000 scale map. It therefore follows that the 1/25,000 - scale map we used duly qualifies the purpose of our investigation, containing for more detailed geographical information than the 1/20,000 suggested in the comments and observations. Field Investigation The boring investigation for soil analysis was carried out in the following manner : nineteen (19) profile pits, 1.0 m deep were excavated, terminating at the point where C horizon or BC horizon appeared. Although 1.5 m deep profile pits are suggessted in comments, we believe that it is possible to assume the characteristics of soil texture reaching down 1.5 m deep, if the parent material, that is C or BC horizon, is discovered at a depth of 60 to 80 cm, in which case the changing rate of effective water requirement is assumed to remain fixed (in the event that the parent material does not appear at this depth, pits have to be deepend).

COMMENTS	ANSWERS
	Simple boring was excavated down to 50 cm deep, for its main objective was to anlayse A and B horizons. Since crops are cultivated within these layers, we have concluded that no deeper borings were necessary in this study. This was also ascertained by the vegetation analysis we conducted. In short, our boring investigation was conducted in such a manner as to reach the outcrop of C or BC horizon, and we therefore are certain that borings were pitted deep enough to fulfill the requirements demanded by this Feasibility Study. In correction with the'Description of Typical Soil Profile' that was included in Appendix D-1, figures affixed on the right side of the classification of parent materials indicate the depth range of each horizon. In the case of C horizon, for example, the description 'C 76 cm - ' means that this layer extends deeper than 76 cm, not that the pit was 76 cm deep. Where soil classification refers only to B3 but not to C horizon, the implication here is that the same B3 horizon was found to exist at the depth of 1 m without interruption. Location of test pit of profile pit and boring were selectee by utilizing existing soil maps, aerial topographic maps, and results of the field studies (incl. vegetation analysis and serveys on opencuts and outcrop soil). In order to make our survey more effective, we conducted intense research in bordering areas of different soil conditions and rough research in areas with uniform soil condition. We thus conclude that the number of test pit was enough to qualify the requirements of this Feasibility Study.

COMMENTS	ANSWERS
3.5.3 Chemical Analysis Samples for Laboratory Analysis For analysis in the laboratory, only 100 samples were picked up from the depth between 0 and 40 cm. These samples can serve as the determination of soil fertility and not for land use, irrigation, drainage, farm management etc. (consumable use). In Honduras, experience in the Study of alluvial soils as in the Aguan Valley has demonstrated to have found an average of 5 horizons per profile pit, one sample being taken for each horizon for physical and chemical analyses. In the physical analysis, an intake rate test was conducted only for seven samples taken from 8 series specified in the study; for a study at the detailed level, the adequate number of tests is to be 2 samples x 3 times for each existing soil series.	3.5.3 Chemical Anaysis The major objectives of the chemical anlysis are to evaluate the fertility of soil and to learn about the existence or non-existence of any impeding factors for crops growth. This information will help farmers plan how to practice the fertilization and planting in this area. It follows that the chemical characteristics of soils where irrigation and drainage works will be carried out will not be studied, except in such special cases as where the need arises to eliminate the pollution from salt and the like, and where the conversion of soil texture takes place due to the action of swamp development. Thus the focus of the chemical analysis was placed on the study of the conditions of plow layer through the examination evaluation organic and material contents and through the measurement of pH-CEC of the soil. We believe that the analysis should be directed to those layers whose soil conditions could be improved by means of upside down plowing and fertilization. The plow layer was devided into top soil and sub soil each of which consisted of a horizon, abundant in organic content, and B horizon, the main rooting zone, respectively. The purpose of the physical analysis of soil, connected with the installation of irrigation system, is to know whether the furrow irrigation was applicable or not in the project area. We are of the opinion that the land of permeability of soil and the stability of cutting face after the installtion of canals are to be estimated by the characteristics of soil texture we have found out in our Feasibility Study. In the feasibility study level it is of importance that, from global viewpoint, design conditions will be established in such a manner as not to be affected greatly by future charges in circumstances of the Project. In our study, the furrow irrigation has been employed as irrigation method and field application efficiency (Ea) is adopted to be 0.6% to comply with FAO's guideline (Refer to Table F-II-15, Appendix F-II). An intake rate test was conducted within the scope of physical investigations and its objective was to confirm whether proposed irrigation method and field application efficiency are appropriate for the project area or not; three intake rate tests were practiced per test site, each located in a single soil series. The selection of test site was made in accordance with the following principles;

COMMENTS	ANSWERS
3.5.5 Land Classification In the doucment it is mentioned that the land classes have been tentatively defined based principally on the system employed by the U.S. Bureau of Reclamation; nevertheless, the parameters established by the Bureau for land classification were not observed , because those parameters to be followed are as mentioned below: a) land classes b) defects in soils c) defects in topography d) defects in drainage if there are defects or not defects; then e) land use f) land productivity g) cost for land development h) water requirement for the farm i) draining capacity of lands The soil study conducted by the Consultant did not attain the degree required for the feasibility study, because the number of samples and observations and the depth of the latter were not sufficient for the studied area and the level of study.	Fine, Coarse - those points where the extreme values were monitored Medium - Representative points The test results confirmed the technical feasibility of furrow irrigation method and, in addition, the suitability of Ea of 0.6. On the other hand, the permeability of soils with farm will not be maintained regularly but be affected by reclamation works, farming practice (fertilization, etc.), kinds of crops, etc. When farmland is consolidated and crops are planted, the field application effiiency can be adjusted according to length, interval and slope of furrow; nevertheless it should be adjusted in order to attain the elevated field application efficiency. In conclusion, we assert that the soil study we conducted meets the requirements of the feasibility study. 3.5.5 Land Classification There are several guidelines for land classification and the most appropirate one should be chosen in accordance with the purpose of the Study. Here, since the land classification will be utilized to establish the land use plan, we have adopted a method in which the land is classified according to soil and topography - related information. Land is classified into 8 classes as mentioned in the Main Report. Expressions that appered in the Main Report reflects the fact that Class VIII was excluded at the planning stage of this agricultural development project, Class VII at elaborating process of 1/5,000 map and Class V, VI also from the results of soil texture analysis.

COMMENTS	ANSWERS
3.10 AGRICULTURAL MARKET	3.10 Agrocultural Market
3.10.2 International Market	3.10.2 International Market
The document does not present a series of statistics and projections for at least 10 years regarding external demands and price of principal ,markets as well as geographical location for agroindustrial products and crops considered in the study. The documents does not include analyses of requirements in principal markets in relation to quality standards quality and characteristics of export-oriented products for these markets.	Additional information is included in Appendix E-III.
3.10.4 Local Market	3.10.4 Local Market
The document does not present strategies and structures of market and quantification of offer and demand of main products considered within the Project. As an example, it is not recommended market strategy for a great quantity of cheese which are piled during winter season in the warehouse of SAGO in Olanchito, Yoro and in other centers of retail and processing plants. This question was put to the Japanese Mission who revised it jointly with national engineers in the social-economic field of the Draft Final Report; the answer which was made by the Japanese Mission is that cheese is sold at a higher price in the summer season. This answer is unreasonable, because national personnel had the opportunity to see a great quantity of cheese thrown out beause of decompoition and this stituation can not be compensated by the benefit that could be gained by selling at a higher price in summer.	Basic ideas about the central theme of the comments is given in 3-10-3, Domestic Market. In 3-10-4, Local Market, where only the present market situation of the Aguan Valley is described, we add section (5) future prospect, in which emphasis is placed on the future function of the Middle Aguan with reference to the development of the Aguan Valley. The context is limited to the region in which the project area is located. As to local market strategies of livestock industry, a number of recommendations have been proposed in our study. For instance, the section 'New Livestock Processing Facilities' of 4-4-8 of the Main Report lists the following recommendations for the strengthening of the existing cheese plants, to which the comments refrred. 1) Processing of milk 2) Diversification of dairly products 3) Improvement of quality control Futhermore, we believe that the promotion of the improvement of quality, diversification of procesing techniques and quality control at the processing stage can slove the problem of corruptibility of dairly products, which was also pointed out in comments.

COMMENTS	ANSWERS
	To be more specific about the diversification of dairly products' processing techniques, we have found out that there exists only two kinds of heese, soft and hard (the latter in small quantity), that are currently produced in the study area, in spite of the fact that cheese takes a variety of processed form. To add to this, non-operationalization of smokehouse was also observed in the study area. We therefore conclude that the problem of corruptibility of dairly products will be solved by means of promoting diversification of cheese products, upon investigating the preference and consumption tendency of the Honduran people. Extension of the storage period of dairly product would be accerelated by the fact that hard-cheese and extra hard cheese normally take 3 to 6 months or sometimes more than a year for aging. Further diversification of dairly product can be realized by producing these kinds of cheese. For extra hard cheese can be ground and made into powdered cheese, and hard cheese can be made into processe cheese and cheese spread. These products would go a long way in extending the storage period and increasing the amount of cheese consumption.

COMMENTS	ANSWERS
CHAPTER IV: FORMULATION OF BASIC DEVELOPMENT CONCEPT	CHAPTER IV:FORMULATION OF BASIC DEVELOPMENT CONCEPT
4.3 FARM MANAGEMENT PLAN	4.3 FARM MANAGEMENT PLAN
4.3.1 Land Use and Cropping Patterns	4.3.1 Land Use and Cropping Patterns
Within the proposed cropping plan, production of basic grains is considered to be the most important having estimated considerable expansion in the available land under irrigation system. This situation should be revised in view of the fact that basic grains are actually cultivated without any technology, and depending on rainfall, and even under these circumstances, the production of basic grains, especially that of corn, is capable of satisfying domestic demand with the provision of a suitable system for commercialization and storage. Therefore, proposed area allocated to basic grains should be reduced with the exception of rice and, in turn, that distributed to orange should be expanded (from 130 ha to 1,100 ha in the Sector 5) palm oil also should be cultivated in the Sector 5. These area allocations comply with actual plan for the Development of the Aguan Valley. On the other hand, proposed area for cacao has to be reduced through lack of financial assistance for beneficiaries and agroindustrial procesing plants. In the Interim Report, it was proposed that rice and pasture be introduced in sandy loam soil series; this was refuted by the Honduran technical group; at the time of discussing once again this concept in the analysis of document, the national technical team does not share that view considering that the sandy loam soils are not consistent enough as to support for cultivation of rice without conserving humidity because of its high infiltration. It is our consideration that crops to be cultivated under irrigation should have high profitability being exported and transformed to agroindustry.	This project seeks to improve and develop the agricultural infrastructures of the Middle Aguan Basin between Saba and Olanchito, so that the area would be made into the modernized agriculture zone. The implementation of this project will realize: - the stabilization of seeding and harvesting season; - the free choice of crops; - the increase and stabilization of the yield to tackle the drought; and - the improvemet of crop quality control; through which the modern agriculture and the planned farm management would be introduced into this area. These objectives will be achieved only when the settled farmers have established stable a economic basis and aquired basic techniques of farming. Our study team therefore believes that basic grains will have to be introduced in the project area, in order to facilitate the establishment of farmers' stable livelihood and their aquisition of advanced cropping techniques. The cropping pattern which we have conceived is set forth as one of the examples that would promote the accomplishment of the above stated agricultural development. (We believe that our scheme is the safest and the highest yield-producing method.) A cropping pattern with oranges and african palms that suggested in comments and observations has newly been considered with cost-benefit calculation, and is added in Tables E-1 and E-13 to E-25 of the Appendix. Each case conceived in this Study is proposed as a tentative plan, and in this sense the actual farming, which should optimize the crop's marketability, farmers' skill and their economic strength, need not be pursued strictly along the lines of the proposed plan. It is, therefore, advised that the land use plan that is currently proposed be made highly flexible to change of crop cultivation in the future. In view of the above, it is feared that the establishment of orchards over extensive areas from the very beginning of the project would be attended by some danger.

COMMENTS	ANSWERS
	The presentation of the Study that we performed in March this year referred to the effects that the irrigation would bring about and discussed the possibility of rice farming in the sandy loam area. It should, however, be noted that the present Project has no plan for rice farming in this area (see the Tables of soil classification and land use). Climate and soil conditions of the project area are judged to be suited for agricultural activities, comparatively speaking, and, therefore, no restrictions have been set for the crop selection we have conducted. We have included basic grains, to a substantial degree, among the crops to be introduced in the Project area. We believe that this cropping pattern would greatly work in the sense of farmers' capital saving and their aquisition of farming techniques, which would function as a first step toward the realization of high-productivity agriculture in this area. It is, however, advised that once the stable economic basis has been established and farming techniques acquired by the farmers, basic grains be changed over to more profitable crops in the future. It is in this sense, too, that the formulation of a land use plan entailing great flexibility is very much desired at this moment.

COMMENTS	ANSWERS
4.5 IRRIGATION AND DRAINAGE PLAN	4.5 Irrigation and Drainage Plan
4.5.1 Irrigation System	4.5.1 Irrigation System
The study analyses very superficially all the sites proposed for locating head works in the Aguan River. However, the selected site limits the area under irrigation. It is important to know in detail the analysis for other alternative plans in case of head works being located in the upper Aguan.	As mentined in the Main Report, the idea to install head works in the upper stream of Pte. Olanchito to attain the expansion of area under irrigation has disadvantages in both economic and social aspects. Nevertheless, in order to respond comments and observations, we have made a case study in view of expanding irrigable area by installing head works at 17 km upper stream of Pte. Olanchito (Case 5) and at 5 km (Case 6). The results, presented in Appendix F-I-I, conclude that these plans are not acceptable due to their being economically less feasible than other plans (Case 1 - Case 4) we proposed.
In the study, the lining of canals was not analyzed precisely nor was the profile of canal disclosed the lack of these informations will prevent the determination of actual cost for construc-tion.	Appendix F-IV-6 explains the length of canlas for each soil series in which the lining will be applied and the cost estimation for lining works (by earth). Within he project area, the lining of canal will be required if canal is to be installed in soil series of Ab and/or 01 and its share reaches 13% of the total canal length. Cost allocated to lining works is estimated to be approximately L. 230,000 corresponding 3% of the total project cost. In our feasibility study, an amount equal to 5% (L. 412,000) of the total cost for canal works is included in cost estimation for such contingency items as partial lining works etc. The sum allocated contingency items covers the estimated cost for lining of canal; this supports our cost estimation. If lining will be made with concrete materials. the cost for that works is to be estimated as high as L. 2,008,000 (41.3 L/M^2). Cost for earth lining, if materials are to be transported from a distance of 100 km from the construction site, will increase to L. 1,100,000* (22.8 L/M^2); still far cheaper than concrete lining works (See Appendix E-IV, Table G-IV-36 or G-IV-38). * Cost estimation shown in Appendix F-III-6 is prepared with consideration of transportation cost for 10 km, for lining materials are easily available near the construction site. Each cost component is included in Appendix G-III.

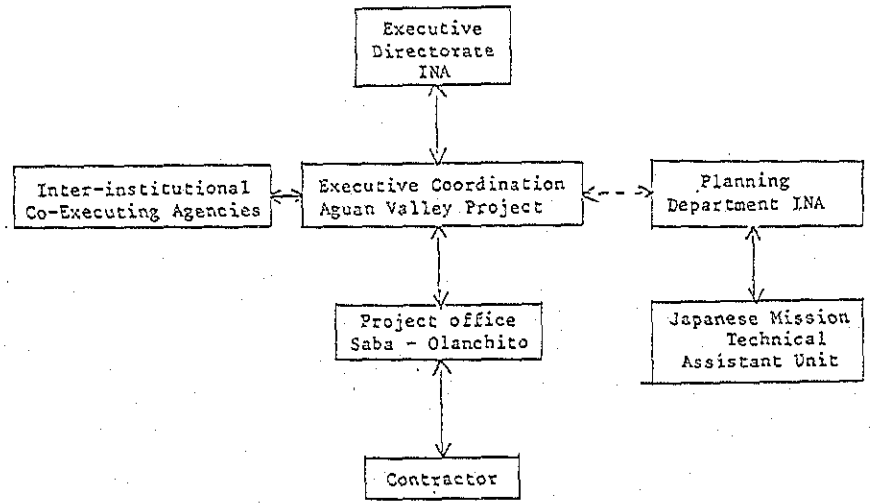
COMMENTS	ANSWERS
The management of water flow is the technical information what we eagerly wish to know; we consider it is convenient for the interest of Honduras that the study team should incorporate in the final report the operation program for the irrigation system and prepare more rational technical plan regarding the structure of the principal canal. There are no evidence either in the draft final report nor in the event of its explanation in relation to the investigtion of physical conditions of soils en route for canal installation. In deciding whether a canal should be lined or not, it is important that a study on permeability test and physical analysis on soils should be conducted. Transporting materials from farther than 100 km and compacting such areas as to be easily percolated is to be considered, besides being expensive, it is technically inappropriate. In the Final Report the Mission should clarify the concept on the comparison of methods between earth and concrete lining on the proposed route for main irrigation canal. Also, in the same report, it is expected that an operation plan will be included.	Generally speaking, the operation program for irrigation system should be established after completion of construction works. An example of such a program is included in Appendix F-V, which should be revised to comply with actual operation of irrigation system. <u>Examination of Canal Dimensions in correction with the Nature of Soil</u> The conveyance efficiency of the main canal is fixed at the rate of 0.8 (conveyance loss is set at 20%) in our study, in accordance with FAO's Standards (See Appendix F-II, Table F-II-15). Here, we shall review the amount of conveyance loss in connection with the nature of soil. Appendix F-IV-4 illustrates the amount of conveyance loss in relation to the nature of soil at the Aguan Mid-Stream Block, No. 6 Canal and at No.7 Canal. To take No.6 canal and No. 7 Canals for example, we have made the following estimate: Overall Intake Water : 3.90 m^3/S Water Requirement (excluding conveyance loss in the main canal) : 3.12 m^3/s Conveyance Loss : 0.78 m^3/s On the other hand, the amount of conveyance loss in No. 6 and No. 7 Canals in relation to the nature of soil is estimated as follows: in case of sandy loam canal - 0.7 m^3/sec in case of sand canal - 1.0 m^3/sec In the prject area, the main canal is comprised of 85% of sandy loam and 15% of sand, and therefore the average conveyance loss would amount to 0.75 m^3/s - 19% of the overall intake water. This result justified our calculation presented above. If the proportion of sand in the main canal fluctuates at the rate of 0 - 50%, the proportional change of conveyance loss against the estimated intake water flow (3.90 m^3/s) would be limited to some 2%. It is known that such level of change would not affect the dimensions of waterway seriously (depth of water charges at the range of 1.468 m - 1.503 m in a single dimension, in accordance with which the depth of water and freeboard are changeable).

COMMENTS	ANSWERS
	We thus conclude that the influence of the nature of soil to the dimensions of waterway can be counted so small and this factor is negligeable in calculating the cost of this feasibility study. We, however, recognize the necessity in selectiong the final canal route in the implementation process, to carry out the detailed survey of proposed waterway and also the detailed analysis of the nature of soil to confirm the conditions of soil and to increase the precision of cost estimation. <u>Comparison of Soil Canal and Concrete Canal</u> Appendix F-I-5 shows the comparative analysis of No. 6 canal and No. 7 canal in terms of dimensions, quantity of construction works, construction cost, maintenance cost and the average amount of depreciation per year. Results of the examination suggest that by lining the main canal with concrete, dimensions of waterway would decrease some 60%, and accordingly, the amount of excavated earth and related construction costs would be reduced. It is, however, to be noted that the overall construction costs would see a great increase in this case. Seen also from the viewpoint of maintenance cost and amount of depreciation per year, it is obvious that the adoption of concrete canal would prove economically unfeasible.

COMMENTS	ANSWERS
The Consultants stand by that the potential of groundwater to be considered for domestic and industrial use is not sufficient to supply the irrigation system covering 9,100 ha. On the other hand, it is expected that the technical and economical analysis on irrigation system utilizing as resources river surface water vs. groundwater be offered in the final report. With this analysis, the Government of Honduras could agree to the supply system to be offered.	<u>Utilization of Groundwater for Irrigation</u> As mentioned in the section 3-4 of the Main Report and "Hydrogeology and Groundwater" of Appendix C, the volume of groundwater that might be available for the purpose of irrigation is estimated to reach 37,000 m^3/day within the entire alluvium plain in the project area. The maximum volume of groundwater that can be pumped up per well is estimated to be 2,000 m^3/day in alluvium plain and 500 m^3/day in diluvial terrace, judging from the analysis of soil nature and of wells' recovering capability. On the other hand, it is estimated that 77.1 m^3/day irrigation water will be required per hectare to conduct modern and stable farming in the future. It follows that only 480 ha will be irrigated by the systematic irrigation system using groundwater. In this case, it is assumed that 20 wells will have to be perforated to irrigate 480 ha area (25 ha per well), and increase of construction cost per unit area is deemed unavoidable. The target area of this project encompasses the area of 9,100 ha and the volume of water required to irrigate this entire area would amount to more than 700,000 m^3/day. It is then obviously impossible to rely for the source of this amount of water solely on the groundwater. Even if the reserved groundwater is deposited enough in volume, more than 350 wells will have to be perforated to raise the needed amount of water. Thus, on the basis of all the considerations given above, we conclude that it is impossible or extremely unfeasible, in both technical and economic terms, to seek the source of irrigation water in the groundwater in this project area. A comparison is made, just for the purpose of reference, between a case in which the source of irrigation water is sought in the groundwater and a case where the surface water of river is appropriated for irrigation in Appendix F-I-4. Both cases have proved to be unfavourable to the utilization of groundwater for irrigation. This comparison, however, studies on an assumption that there exists enough volume of reserved groundwater, and it therefore does not account for the actual circumstances surrounding this project.

COMMENTS	ANSWERS
4.7 FACILITY PLAN With reference to road infrastructure, in the meeting on October 22, 1984 held between the representatives of SECOPT and the Consultants, it was agreed that the following three alternatives would be studied. - To consider the construction of roads with a uniform crown width of 5 meters. - To consider the same with the exception of such roads as to connect residential areas with the highway between Saba and Olanchito which will have a crown width of 6 meters. - To consider the access road with a crown width of for 6 meters and in-farm road of 4 meters. Once the index of profitability for different alternatives is determined, these indexes should be presented to SECOPT for their future discussion and/or approval. The Consultants are presenting only a comparison based on the construction cost in the document of Volume II, Appendices pages F-5 and F-6. It is logical that at this level of analysis the first two alternatives would be more costly in view of their width of crown being larger. Within the analysis made by the Consultants it would be necessary to take into acount other costs (operation, maintenance etc.) as well as intial cost. In conclusion, the analysis made by the Consultant does not constitute that of profitability.	4.7 Facility Plan In the meeting that was held on 22nd of October, 1984 between SECOPT and our Study Team, the following view of SECOPT were presented toward our study team's proposals: - the interval of in-farm roads should be 5 km; and - the structure of in-farm roads should be fortified. Upon acknowledging these views, both parties came to agreement on the following points. - As to the interval of infarm roads, the original proposal of the surveyer country will be accepted and agreed upon by both parties, on the ground that adequate length of infarm roads is indispensable for the promotion of modern farming in the studies area. - As to the structure of infarm roads, the idea of SECOPT, which is more suitable to the local circumstances, will be accepted and agreed upon by both parties. - As to the width of roads, two alternative ideas were proposed for further consideration. They were: a) access roads and those road that connect villages with Saba-Olanchito trunk road should be of 6 m in width, and infarm roads should be of 4 m in width. b) all roads to be constructed in the project area should be of 5 m in width. This project is formulated as an agricultural development project, and in this sense, the increase of agricultural production is the main subject of benefit aimed by this project. Unlike road projects where calculation of IRR is conducted in independent terms of route selection and road standards, in an agricultural development project like this, the IRR is computed on the sole basis of the increase of agricultural production, that is realized by the comprehensive farm land improvement including irrigation, drainage and infarm roads. Route and structure of road facilities, namely as to the second alternative plan described in Appendix F-I-3, were decided by comparing the costs of construction and maintenance. These considerations have led to the conclusion that plan a would be more profitable in both terms of construction and maintenance costs.

COMMENTS	ANSWERS
CHAPTER V. PROJECT IMPLEMENTATION PLAN	CHAPTER V. PROJECT IMPLEMENTATION PLAN
5.2 PROJECT COST	5.2 Project Cost
Within the construction cost for roads, the elements for the lining of slope on the canal side is not indicated; in the cost elements presented, there is no item to correspond to the lining of slope.	The maximum velocity of water flow in the secondary canal is fixed, in our plan, to be under 0.6 m/sec and the average velocity at around 0.4 m/sec, so that the canal that extends along the in-farm road would not be damanged by the water flow.
We care about that, when the construction work begins the cost will be large by virture of the lining of slope being indispensable for road preservation.	Replacement method is applied to the subgrade course of roads, using materials of better quality, to the depth of 50 cm, for the safety of road traffic.
The document does not present a detailed breakdown of cost for each component of the project; this will prevent the appraisal for the technical and economic feasibility of the project.	In addition, the fact that the waterway concerned here is designed for the irrigation purpose, but not for drainage purpose, would make the repair and maintenance work easy to carry out. This is because the water that flows in this canal would be controlled and there would exist a period when the waterway is drived up.
	In view of the above, we have concluded that it is not necessary to make lining all the slopes that extends along the infarm road. We, however, recognize the necessity of the slope lining at those points where the diversion works would be provided and at bent-up points where water flow is likely to fluctuate.
	The costs connected with this slope lining/pavement have already been included in our cost estimates in the category of 'Other Works', and thus do not affect the economic analysis.
	* The cost estimated in the category of 'Other Works' including those of waterway lining amounts to about L.99,000. If the canal slope at the diversion works point is lined with coarse stones (t=20 cm) and with 5 m intervals, the expected cost incurred would amount to around L.70,500, which is well within the limit of cost estimates.
	Specifications of project cost is given in Appendix G-IV.

COMMENTS	ANSWERS
5.3 PROJECT EXECUTING AND MANAGEMENT ORGANIZATION 5.3.2 Project Operation and Maintenance Organization We advise that the proposed chart in page 5-6 would be revised on the inter-institutional scheme of the Government of Honduras and the interior of National Agrarian Institute as illustrated.  The organization charts in pages 5-8 and 5-11 should be also modified based on this proposal.	5.3 Project Executing and Management Organization 5.3.2 Project Operation and Maintenane organization project implementation, opertion and maintenane organization are revised a shown in the Main Report.

COMMENTS	ANSWERS
CHAPTER VI PROJECT EVALUATION 6.3.3 Financial Evaluation The study, within financial scheme, does not present a cash flow at the farm model level integrated with all components of the Project in such a manner as to enable the establishment of financial demands for achieving the proposed production plans.	CHAPTER VI PROJECT EVALUATION 6-3-3 Economic Bakground of the Cooperatives (Farm Economy) The average income of the unit household of cooperatives of the irrigated section in the project area, after all the tree crops reach their full grown stage, is now calculated in the 6-3-2. We add a case study of the tree crop growers' cooperarative in order to determine the requirement of the initial investment.

COMMENTS	ANSWERS
CHAPTER III GENERAL ASPECTS Generally speaking, it can be concluded that the Draft Final Report of the Feasibility Study for the Agricultural Development on the Aguan Valley (Saba-Olanchito Area) presented by the Japanese Mission is congruent with local policies for the Valley, the outline of the Hydrauic Master Plan of the Aguan Valley and the National Development Plan. The Study comprises the construction of such works as irrigation and drainage systems, road infrastructures and land reclamation; with these works, the conditions for agricultural development will be created, but the Government of Honduras, at the same time, has to conduct additional studies which could define clearly such conditions as to realize the continuous and efficient execution of agricultural plans at the farm level such as: agricultural credit, agricultural promotion, training, storage and market facilities and commercialization of products, etc. In this way, the development apportunity to be generated by the feasibility study carried out by the Government of Japan will be made use of. After reading and analyzisg the Draft Final Report of the Feasibility Study for the Agricultural Development on the Aguan Valley (Saba - Olanchito Area), we observe that the Report complies with the items approved in the plan of operations agreed on between the Government of Honduras and the Government of Japan and, therefore, it can be confirmed that the aforementioned study is at the level of feasibility study.	

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