

F. PROPOSED AGRICULTURE

F.1 PROPOSED LAND USE AND CROPPING PATTERN

F.1.1 Basic Consideration

After reviewing the present agricultural situation, constraints and potentials, the development of agriculture on the Cholulteca plain is planned with the principal objectives to i) introduce year round irrigated farming, ii) use the land in a more productive manner, iii) increase crop production for domestic and industrial use and for export, and iv) improve the farm economy particularly for small farmers and resettlement groups.

The selection of crops and land use plan under irrigated farming will be made basically in view of the following factors:

- a) National policy and basic strategies for future agricultural development of the country, as reviewed in Annex B,
- b) Adaptability to the local conditions such as climate, soils, etc., as reviewed in Annex C and D,
- c) Productivity of crops in the area under irrigated conditions and profitableness of products,
- d) Marketability of products in domestic and international markets, and
- e) Familiarity to crop farming by the local farmers.

F.1.2 Crops

In view of the basic considerations as noted above, the major crops to be proposed for cultivation on the Cholulteca plain have been selected in the following manner:

1) Sugar Cane:

As reviewed in Annex E, there are two sugar factories on the Cholulteca plain, with a total standard milling capacity of 6,500 tons/day. Cultivation of sugar cane is basically proposed to satisfy the demand of the standard milling capacity of the factories. The net operation period of the factories is 150 days on an average, and the factories will require around 975,000 tons of sugar cane annually. Since about 117,700 tons of sugar cane are produced outside the project area, the net requirement for production in the project area is estimated to be around 857,300 tons. If the anticipated cane yield is assumed at 125 tons/ha on an average (plant cane and ratoon cane), the requirement for sugar cane cultivation area will be around 6,980 ha, inclusive of seed cane farm of 130 ha. Since the sugar factories are located on the right bank of the Cholulteca river, some existing cane fields on the left bank may be planned for cultivation shifted to other crops.

2) Cotton:

Climate and soils are favorable for cotton cultivation on the Cholulteca plain. Products are better in quality and higher in productivity in the South region, if drought and floods are controlled. As noted in Annex E.5.2, there is a cotton ginnery and a seed oil factory near the plain, which are under-utilized to less than a half of their processing capacities. The port of San Lorenzo has also been newly constructed near the ginnery plant and it is utilized for export of cotton fiber. Although the international market price of cotton fell in 1981-83, the market is open and quality is competitive internationally. As far as the cotton cultivation is comparatively profitable, the area for cotton cultivation is planned to be expanded on the Cholulteca plain.

3) Cereal Crops:

Cereal crops such as maize and rice will be planned to principally meet the growing domestic demand, or to substitute imports which are required when domestic supply is insufficient. The area for cultivation of maize is planned to meet potential demand of the South region in future.

The population in the South region is estimated to reach around 508,000 in 1990 and the regional demand for maize is preliminarily estimated at around 40,600 tons/year (about 80 kg/person/year), while the present maize production in the region is estimated at around 20,000 tons/year. Under such an estimate, it is planned that the maize cultivation area will be increased by around 4,600 ha (anticipated yield of 4.5 tons/ha).

With respect to rice, the prevailing demand in the country is relatively limited, as pointed out in Annex B.1.5. The limitation is supposed to be attributable to the low income level in rural area and relatively high price of the product. On the assumption that potential demand of rice is around 16 kg/person/year (or about 44 g/person/day which was nearly the consumption of the average income level as reviewed in Table B-13) for the population estimated for 1990 (about 5.17 million), the potential demand of the country is calculated at 83,000 tons. Since the present rice production is limited to less than 40,000 tons, it will be required to develop irrigated paddy fields over 13,000 ha (at anticipated yield of 3.25 t/ha for milled rice or 5 t/ha for paddy) by 1990. The productivity of rice on the Choluteca plain is comparatively high, if water application is secured. Under such presumption and conditions, the cultivation of rice on the Choluteca plain will be planned to be developed on the land where soil conditions are favorable (Vertisols, Molisols and Alfisols) or limitedly suitable for rice cultivation due mainly to poor drainability.

4) Melon and Water Melon

Melon has favorable and assured market for export. The exporters expect that production for export may possibly be duplicated if the production is marketed in November - March. Under such a situation, the cultivated area for melon will be planned to be increased from 1,110 ha at present to nearly 2,000 ha with the project. Water melon was once exported, but discontinued. It would therefore be planned for cultivation to meet domestic market, more or less at the present level of demand.

5) Beans:

Beans (frijoles) will be planned for cultivation in the area to meet domestic demand and exports. As noted in Annex B.1.5, Table B-15 and B-16, the National Development Plan in the agricultural sector contemplates to increase production and exports of beans to a relatively large extent. Bean cultivation is also desirable from the viewpoint of soil conservation. Under such circumstances, beans will be programmed for cultivation as second crop in rotational cropping patterns.

There would be possibilities of introduction of soybean cultivation in the area. According to the MRN study of soybean development program, a target has been set to cultivate 19,000 ha for soybeans by 1994, to substitute import of vegetable oils and concentrated feed stuff for animals. However, experiments of soybean cultivation in the project area have not been well advanced, and incorporation in the cropping patterns would be left for future possibilities. Even if soybean cultivation is introduced, it would be higher in profitability than bean cultivation and would not adversely affect the economic feasibility of the project.

6) Sesame and Vegetables:

Under the improved marketing system and the relatively favorable situation for export, sesame would continue to be cultivated in the project area. It would be cultivated as a second crop in rotational cropping patterns. Cultivation of vegetables would also be planned as rotational crops. Tomato, chili, egg-plant, okra and other vegetables would be envisaged to satisfy domestic demand and possible future exports. Vegetable exports have not been established, but are being studied by private enterprises dealing at present with exports of melon and other products. Cultivation of vegetables would also improve farmers' economy and diet.

7) Pasture:

Profitability of pasture cultivation under irrigated condition is lower than other crops, as discussed in Chapter F.3.3, Table F-12. Although livestock is important in the South region, more intensive farming will have to be proposed under irrigation on the Choluteca plain. Actually, the pasture land of about 2,400 ha on the Class I to Class III soils on the Western plain was shifted to sugar cane and other crops during the period for 1977 to 1984 even under the rainfed conditions. Pasture cultivation would therefore be planned in the area where soils are stony or classified into the Class IV land. The land of Class IV covers 130 ha on the Western plain and 2,200 ha on the Eastern plain, as noted in Annex D.4.2, Table D-02.

F.1.3 Proposed Land Use

In view of the basic consideration and prospects for each crop selected for cultivation on the Choluteca plain, a land use plan is proposed respectively for the Western plain area (22,400 ha gross) and the Eastern plain area (13,600 ha gross). The land use on the Eastern plain is further divided into two blocks; Eastern plain-A (6,700 ha gross) and Eastern plain-B (6,900 ha gross).

On the Western plain, about 16,000 ha will be used for agriculture. The land is proposed to be utilized for upland crop cultivation (11,810 ha), paddy field (4,050 ha) and pasture land (140 ha). On the other hand, upland crop cultivation is planned for 2,300 ha on the Eastern plain-A and 2,200 ha on the Eastern plain-B. Paddy field is planned for 2,300 ha and 1,000 ha respectively. The undulated and stony land on the Eastern plain-B will be used for pasture.
(Refer to Figure F-01 and Table F-01)

F.1.4 Proposed Cropping Pattern

Cropping patterns are proposed respectively for the Western plain, Eastern plain-A and Eastern plain-B in order to separately evaluate them in the light of availability of water to be stored for irrigation. The cropping patterns are studied through careful review of natural conditions in the area, particularly climatic conditions. For instance, a heavy rainfall in the rainiest months will restrict effective farm operation, like soil preparation and harvesting. Harvest season of melon and other crops has also been taken into account.

The proposed cropping pattern on the Western plain is illustrated on Figure F-02. The cropping area on the plain will total 24,880 ha, as summarized on Table F-02. The crop intensity is approximately 1.6. On the Eastern plain-A, rotation of paddy with maize or beans, as well as cotton with maize or beans, is planned with a total cropping area of 9,200 ha, as shown on Figure F-02. The Eastern plain-B is proposed to be cultivated partly by rotation and partly by pasture, with a total cropping area of 8,400 ha, as illustrated on Figure F-02. If compared with the condition of "without" project situation as forecasted in Annex E.6.1, the crop area is proposed to increase by 11,100 ha. (Refer to Table F-03)

F.2 PROPOSED FARMING PRACTICE

F.2.1 Farming Practice

With the introduction of irrigation, farming practices will be improved in various aspects, such as cropping calendar, varieties, fertilizer application, pest and disease control and mechanization. Major points of standard farming practices are proposed hereunder.

1) Sugar Cane:

Under the year round irrigation, such large stalk varieties as B34-62, CP3437, Pinder and Q51 will be recommendable for cultivation. The cropping calendar is 12-14 months for plant cane and 12 months for ratoon cane cultivation, as follows:

	<u>Plant Cane</u>	<u>Ratoon Cane</u>
Land preparation	Mid-Nov to Mid-Mar	
Planting/ratooning and basic fertilization	Mid-Nov to Mid-Mar	Mid-Nov to Mid-May
Herbicide application	Mid-Nov to Mid-Mar	
Top-dressing	Mid-Oct to Mid-Jul	Mid-Dec to Mid-Jun
Rodenticides application	Mid-Nov to Mid-Feb	Mid-Jan to Mid-Feb
Tilling & weeding	Mid-Oct to Mid-Jul	Mid-Dec to Mid-Jun
Harvest	Mid-Nov to Mid-May	Mid-Nov to Mid-May

Seed cane will be grown on a proper nursery protected from insect damage. The rate of seed cane can be reduced to 6 tons/ha under irrigation.

Furrow irrigation at a rate of 7.1 mm/day at intervals of 10-15 days is proposed, depending on soil conditions. The field will be dried up for 30 days before harvest to obtain higher sugar recovery. Fertilizer application is N 150 kg/ha : P₂O₅ 50 kg/ha : K₂O 50 kg/ha, as a standard. Land preparation, levelling and earthing are mechanized, but top-dressing and harvesting will be manual. Proper harvest scheduling by measuring Brix value is indispensable for high sugar recovery.

2) Cotton:

Stoneville 213 and other improved varieties will be practiced. A recommendable cropping calendar is as follows:

Land preparation	Early Jun to End-Jul
Seeding & basic fertilization	Early Jul to End-Aug
Thinning	Early Aug to End-Sep
Top-dressing	Early Aug to End-Sep
Tilling & weeding	Early Aug to End-Nov
Insecticides application	Mid-Jul to Mid-Dec
Harvest	Mid-Jan to Mid-Mar

The seed rate will be 25 kg/ha. Irrigation will be applied at the rate of 6.8 mm/day, at intervals of 7-14 days. The standard fertilizer application rate is N 100 kg/ha : P₂O₅ 50 kg/ha : K₂O 25 kg/ha. Herbicide of 1.5 kg/ha of planevin will be applied. Insecticides will also be applied 10 to 20 times. Land preparation, seeding, fertilization, chemical application and tilling will be mechanized.

3) Rice:

CICA 8 and other improved varieties will be cultivated under irrigation. A cropping calendar is proposed as follows:

Land preparation	Mid-Jan to Mid-Mar
Seeding & basic fertilization	Mid-Feb to Mid-Apr
Herbicide application	Mid-Feb to Mid-Apr
Top-dressing	Mid-Mar to Mid-May
Weeding	Mid-Mar to Mid-Jun
Fungicides & insecticides application	Mid-Mar to Mid-Jul
Harvest	Early Jul to End-Aug

Seeds will be sown at the rate of 70 - 80 kg/ha. The field is flooded from 20 - 25 days after seeding until one month before harvest, except for drying-up for 20 days before the young panicle formation. Deep flooding between the young panicle formation and heading is important.

Fertilizer application is made at the rate of N 100 kg/ha : P₂O₅ 50 kg/ha : K₂O 0 - 25 kg/ha. Propanil emulsion of 5 - 10 lit/ha or 2.4D emulsion of 3 lit/ha will be applied as herbicides. Spraying of Kasumin dust for blast control and Molathion emulsion for stem borer and aphid control will be contemplated.

4) Maize:

La Lujosa experimental station suggests HBL04, ICTA-85 and Honduras Planta Boja as recommendable varieties. A cropping calendar for wet season and dry season cultivation is proposed as follows:

	<u>1st Crop</u>	<u>2nd Crop</u>
Land preparation	Mid-Jan to Mid-Apr	Early Sep to End-Nov
Seeding & basic fertilization	Mid-Feb to Mid-Apr	Early Oct to End-Nov
Herbicides application	Mid-Feb to Mid-Apr	Early Oct to End-Nov
Top-dressing	Mid-Mar to Mid-May	Early Nov to Early-Jun
Tilling & weeding	Early Apr to Mid-Jun	Mid-Nov to End-Jan
Insecticides application	Early Apr to Mid-Jun	Mid-Nov to End-Jan
Harvest	Early Jun to End-Jul	Mid-Jan to Mid-Mar

Furrow irrigation is proposed at the rate of 5 mm/day at intervals of 7-14 days, depending on soil conditions. Seed rate will be 16 kg/ha. The standard fertilizer application will be N50 - 100 kg/ha : P₂O₅ 50 kg/ha : K₂O 0 - 50 kg/ha. Herbicides and insecticides will also be applied. Land preparation, seeding, fertilizer and chemical application, and tilling will be mechanized.

5) Beans:

Such varieties as Desarrural V.B, Desarrural V.R and Porillo are recommendable. (Research on soybeans has not been well developed at La Lujosa station, but it is recommended to promote it in view of the adaptability in the region and soil conservation.) A proposed cropping calendar is as follows:

	<u>1st Crop</u>	<u>2nd Crop</u>
Land preparation	Mid-Jan to Mid-Mar	Early Sep to Mid-Nov
Seeding & fertilization	Mid-Feb to Mid-Apr	Early Oct to End-Nov
Tilling & weeding	Mid-Mar to Mid-May	End-Oct to End-Dec
Insecticides application	Mid-Mar to End-May	End-Oct to Mid-Jan
Harvest	Early Jun to End-Jul	Mid-Jan to Mid-Mar

Irrigation will be applicable at the rate of 5.4 mm/day, at the intervals of 7-14 days. Seeding will be done at the rate of 45 kg/ha. Seeds will be inoculated with leguminous bacteria. The standard fertilizer application will be N 50 kg/ha : P₂O₅ 30 kg/ha : K₂O 0 - 30 kg/ha. Land preparation, seeding, fertilizer and chemical application will also be mechanized.

6) Sesame:

Institute 70 as early maturing branchless variety and Venezuela 44 as late maturing branchless variety are recommended. The cropping calendar is proposed as follows:

Land preparation	Early Sep to End-Oct
Seeding & basic fertilization	Early Oct to End-Nov
Herbicides application	Early Oct to End-Nov
Thinning	End-Oct to End-Dec
Top-dressing	Early Nov to End-Dec
Insecticides application	Early Nov to End-Feb
Harvest	Early Feb to End-Mar

Strip seeding in spaces of 60 cm will be carried out manually, at a seeding rate of 3 kg/ha. The thinning at 15 - 20 days after germination will be done at the hill spaces of 15 cm. The standard rate of fertilizer application will be N 30 - 50 kg/ha : P₂O₅ 20 kg/ha : K₂O 10 kg/ha. Herbicides and insecticides are also applied.

7) Livestock Production:

During the dry season, border irrigation practice will be introduced for cultivation of such improved pasture varieties as Estrella Africana, Guinea grass, etc. The improved pasture under irrigation will feed an average population of 3.5 heads/ha, including calves.

F.2.2 Manpower Requirement

For cultivation with the farming practices proposed in the foregoing chapter, increased input of manpower is required. On the basis of the proposed cropping pattern, the monthly requirement of manpower is estimated as shown on Table F-04 and F-05. The peak monthly requirement will occur in January-March. It is estimated that the peak demand will reach between 360,000 and 470,000 man-days/month on the Western plain and around 270,000 man-days/month on the Eastern plain (150,000 man-days on the Eastern plain-A and 120,000 man-days on the Eastern plain-B). The annual manpower requirement will reach around 2.7 million man-days (or 9,900 man-year) on the Western plain, 500,000 man-days (or 1,850 man-year) on the Eastern plain-A, and 400,000 man-days (or 1,470 man-year) on the Eastern plain-B.

By referring to the presently available manpower on the Choluteca plain, as noted in Annex E.1.2, the availability of agricultural work force in 1995 is preliminary estimated at around 12,500 persons. In case that the resettlement program is promoted as discussed in Chapter F.4 hereinafter, about 5,000 persons will be additionally made available. Consequently, the available manpower will be around 4.8 million man-days or about 400,000 man-days a month. The available manpower will almost meet the peak requirement on the Western plain, but it will be rather short to cover the peak requirement on the Eastern plain. Shortage of labor during the period of peak demand will be covered by labor force available in the urban zone of Choluteca.

F.2.3 Farm Inputs Requirement

For the farming as proposed in Chapter F.1.4 and F.2.1, various inputs such as seeds, fertilizers, herbicides, fungicides, insecticides, etc. will be required. The average dosage and total requirement of farm inputs are estimated as shown on Table F-06 and F-07. It is estimated that the requirement of fertilizers will amount to 10,700 tons in total for cultivation on the Western plain and 4,500 tons on the Eastern plain.

The proposed farming is mechanized to a substantial extent. Deep plowing and speedy operation of each step of cultivation, for instance, are desired to sustain high yield of crops. It is proposed that land preparation such as subsoiling, plowing, harrowing and ridging will be carried out by tractors with proper attachment. Seeding and basic fertilization will be done by tractors attached with seed machine and fertilizer distributors. Cultivating and mulching will also be executed by tractor-drawn cultivator. Chemicals will be mostly applied by tractors. According to the information obtained in MRN regional office, about 140 tractors are presently available in the project area. Farming tractors additionally required for the project is estimated at around 370 in number in the peak month (March), as shown in Table F-08.

F.2.4 Extension Services

Extension services by MRN are presently provided by 4 extensionists, 2 experts in cotton and 2 veterinary experts in the proposed area, as noted in Annex E.5.1. However, they are insufficient to extend proper guidance on application of improved farming techniques to farmers, particularly to small farmers, resettlement groups and cooperatives. It is therefore required to increase the number of extension workers and strengthen their technical knowledge in order to evenly spread the improved farming techniques to the individual farmers.

It is estimated that area to be covered by each extension worker will be at least 1,000 ha of farm land. Consequently, it is proposed to increase the number of extension workers to 16 in the Western plain and

9-10 in the Eastern plain. Training of extension workers and leading farmers will be particularly required for irrigation techniques, including water management. In this context, training programs are prepared by the Agricultural Development Training Center (CEDA) in Comayagua, and training is executed at the Center and at the Lujosa experimental station. For the proper extension services, improvement will also be required for equipment and instruments necessary for the extension activities, such as vehicles, soil testing apparatus, etc.

Further, it is required to execute systematic research on crop adaptation tests, variety trials, fertilizer and chemical application tests. In this context, it is proposed to expand and strengthen the staff, facilities and equipment at the Lujosa experimental station. Result of trials made in CEDA will also be transferred to the experimental station.

F.3 PRODUCTION AND RETURN

F.3.1 Anticipated Yield

With the introduction of irrigation and the farming practices as proposed in the foregoing chapters, as well as with the proper supporting services, the average yield of each crop is expected to increase substantially. The target yield of plant cane and ratoon cane is expected to increase to 145 tons/ha and 120 tons/ha, respectively, or to an average of 125 tons/ha. Productivity of cotton will be heightened to 3.5 tons/ha and stabilized with irrigation. The target yield of rice is set at 5.0 tons/ha of paddy or 3.25 tons/ha of milled rice. Production of maize and beans will also be increased to 4.5 tons/ha and 2.0 tons/ha, respectively. The average target yield of sesame will be 1.5 tons/ha. Likewise, a higher yield of melon and water melon is also expectable. An increased yield of livestock is expectable, which is estimated at 195 kg/ha of meat and 285 lit/ha of milk. (Refer to Table F-09)

The target yield will be planned, under this study, to be attainable within a build-up period of 5 years from the commencement of proposed agriculture with irrigation.

F.3.2 Anticipated Production

With the proposed cropping patterns and anticipated yield, the production "with" project will be estimated. On the Western plain, the annual production of sugar cane will reach 856,250 tons, which will satisfy the requirement by the two sugar factories. Production of cotton in the Western plain is expected to be around 16,900 tons. The expected annual production of paddy and maize is around 20,000 tons and 9,000 tons, respectively. Production of beans is also increased to around 5,700 tons/year. Production of sesame is estimated at around 380 tons/year, or triplicated if compared with the production without project. Production of melon, water melon and vegetables is also expected to increase substantially. On the contrary, livestock production on the Western plain will have to be decreased. (Refer to Table F-09).

On the Eastern plain, production of sugar cane will be ceased, as noted in Chapter F.1.2. On the Eastern plain-A, annual production of paddy and maize is planned to be increased to 11,500 tons and 10,300 tons, respectively. Production of cotton is also expected at around 8,000 tons. On the other hand, annual production of paddy, maize and beans is expected to increase to 5,000 tons, 7,200 tons and 3,200 tons, respectively on the Eastern plain-B. Production of cotton is also estimated at around 7,700 tons/year. Livestock production will be maintained at a certain level on the Eastern plain-B.
(Refer to Table F-09)

The anticipated incremental production in each area on the Choluteca plain, as calculated on Table F-10, will be utilized as a basis for economic evaluation of the project, as described in Annex J.

F.3.3 Agricultural Return with Project

On the basis of anticipated production estimated in the foregoing chapter, as well as the estimate of gross income and production cost per hectare for each crop, the net agricultural return with the project has been estimated in financial terms, as summarized on Table F-11. The net agricultural return on the Western plain is estimated at around Lp. 38.2 million, while the net return on the Eastern plain will amount to Lp. 19.7 million. The total net return will be about Lp. 57.9 million, or nearly triplicate the return under the "without" project condition as estimated in Annex E.6.3. The net financial return has been calculated by estimating such production costs as farm inputs, hired labor, machines and interest, as shown on Table F-12 and F-13.

F.3.4 Typical Farm Budget

On the basis of anticipated return with the project, a financial status of farmers has been reviewed in terms of typical farm budget. Two typical land holding sizes are evaluated; one is a small farmer with a land of 10 ha, and the other is a cooperative of 20 members with 100 ha

of land. As estimated in Table F-14, a small farmer who cultivates sugar cane, cotton or paddy as a major crop can expect substantial increase in annual net return from cultivation. In either case, the farmer will get a net return over Lp. 15,000 per annum.

In case of a cooperative resettled for cultivation in the area, it is expected that the annual net return from cultivation of sugar cane, cotton or maize as a major crop will reach Lp. 18,000 - 20,000, and the profit sharing per member family will amount to Lp. 9,000 - 10,000 per annum, as shown on Table F-15. In the estimate, water charge and amortization of irrigation facilities, as well as operation and maintenance cost of such facilities, are not counted yet, and it will be further assessed in the financial evaluation of the project in Annex J.

F.4 RESETTLEMENT

F.4.1 New Resettlement

The Agrarian Reform Law (Decreto - Ley No. 170), Article 25 stipulates that the land holding size is limited to 100 ha in the area where irrigation facilities are provided by the state, as noted in Annex B.1.3. The land exceeding over such a limitation, as well as the land inefficiently utilized, is subject to expropriation and used by INA for redistribution of land and resettlement. On the Choluteca plain, there are some large holders of land, as reviewed in Annex E.2.1. On the Western plain, there are some 19 farms having the land over 100 ha. The land expropriable by the law is estimated at around 2,430 ha. On the Eastern plain - A, about 10 farms will be affected, and the expropriable land will reach about 3,240 ha. Further, on the Eastern plain - B, some 10 farms and about 2,350 ha will be affected, if irrigation facilities are provided in these areas.

In case that the land affected by the law is redistributed to settlers at 5 ha per family, about 490 families can be newly resettled on the Western plain. Likewise, some 650 families are resettled on the Eastern plain - A and 470 families on the Eastern plain - B. Total number of families to be resettled in the project area is estimated at around 1,600.

F.4.2 Consolidation

In addition to the possibility of new resettlement as described in the foregoing chapter, it will be possible to contemplate expansion and consolidation of the existing resettlement schemes. As noted in Annex E.2.2, the Ola - Monjaras resettlement project is located mainly on the Western plain. The Ola scheme covers the land of about 3,780 ha, while the Monjaras - Buena Vista scheme covers around 2,850 ha. It is noted, however, that the presently settled area is 1,500 ha in Ola and 2,300 ha in Monjaras - Buena Vista. If the resettlement is promoted in the remaining area of some 2,830 ha, about 560 families will be additionally settled on the land and benefited by the project irrigation system.

If this settlement is promoted in addition to the new resettlement in the expropriable land, the resettlement and consolidation programs can be executed for around 2,170 families on the land of some 10,900 ha. Together with the presently resettled families, the total number of families to be possibly benefited by the project will reach 3,260 families. (Refer to Table F-16 and F-17)

It is noted that the Agrarian Reform Law, Article 39 and Regulation (Decreto) No. 263 permit exceptionally to hold the land over the limits defined under the Article 25 of Agrarian Reform Law. However, the land applicable to such regulations would be limited in the study area. The estimate of expropriable land and numbers of resettlements would remain effective for the moment in the study.

F.5 DEVELOPMENT IN MIDDLE REACH VALLEYS

F.5.1 Improvement of Existing Schemes

As reviewed in Annex E.7, there exist agricultural lands totaling 3,360 ha in the middle reach valleys of the Choluteca river. About 2,680 ha are located in the San Juan de Flores valley, about 300 ha in the Orocuina valley, and 350 ha in the Orocuina-Choluteca area to the northeast of Choluteca city. Water to be stored in the reservoir proposed in the upstream reach will have to be allocated with priority to these agricultural lands.

In the San Juan de Flores valley, ACANSA sugar factory needs much more sugar cane to improve operation efficiency which remains at present as low as 47% of annual milling capacity. The agricultural land of 2,680 ha in the valley will be principally used for sugar cane cultivation, and irrigation facilities will have to be expanded to increase productivity in the limitedly available land in the valley. A target yield of 100 tons/ha can be anticipated for sugar cane cultivation under improved irrigation, and the production is estimated to reach around 268,000 tons/year. (Refer to Table F-18 and Figure F-03)

In the Orocuina valley, irrigation facilities have been constructed for 5 small schemes with a total area of 300 ha. Although the application of irrigation is presently carried out in only 35 ha, the irrigation systems are to be rehabilitated or improved. A rotational cultivation of paddy, maize, beans and vegetables is contemplated under irrigation by water pumped up from the Choluteca river. Anticipated production in these schemes is estimated at 1,600 tons of paddy, 680 tons of maize, 300 tons of beans and 600 tons of vegetables. In the Orocuina-Choluteca area extending to the northeast of Choluteca city, there is a rice estate of 350 ha irrigated by water pumped up from the Choluteca river. With the water secured for year round irrigation and improved farming techniques, the annual production of paddy is expected at 3,500 tons. (Refer to Table F-18)

The net agricultural return from the crop production in the existing schemes is estimated at Lp. 3.5 million without the project and Lp. 6.8 million with the project. The net incremental return is thus estimated at Lp. 3.3 million. (Refer to Table F-19 to Table F-23)

F.5.2 Potential Development

If excess water is available in the reservoir to be constructed by the project, potentially irrigable land in the Morolica valley and Orocuina valley will be incorporated in the development of the middle reach valleys. In the Morolica valley, there extend lands of 300 ha irrigable by pumping up from the Choluteca river (Morolica C and Morolica D areas). Likewise, in the valley extending along the Choluteca river to the south of Orocuina, there are potentially irrigable lands of around 1,340 ha in total (Orocuina E to Orocuina H area). At present, these lands are partly cultivated by maize and sorghum, but the major part is used as pasture lands.

The land available in these valley, totalling 1,640 ha, is potentially cultivable by such crops as paddy, maize, beans and vegetables. In case that irrigation water is available and crops are cultivated in line with a cropping pattern as shown in Figure F-03, the net agricultural return from the potential area will be increased from Lp. 0.2 million at present to Lp. 3.8 million. (Refer to Table F-24 and F-25)

F.6 IRRIGATION DURING RAINY SEASON

A case study is additionally made on the effect of irrigation on the Western plain during the rainy season by water diverted from the weir, without constructing a dam and reservoir for seasonal regulation of discharge. A possible cropping pattern under such a condition is preliminarily presumed first, and yield under irrigation during the limited period is then evaluated, as described hereunder.

F.6.1 Possible Cropping Pattern

A possible cropping pattern is presumed as shown in Figure F-04, in view of the characteristics of monthly rainfall and present cropping calendar. Additionally, following conditions are also taken into account:

- a) Sugar cane cultivation area will be expanded to meet the demand for milling at the existing sugar factories (6,500 tons/day in total). In the light of possible yield to be discussed in the subsequent Chapter F.6.2, a total land of about 9,500 ha will be presumed to be cultivated by sugar cane.
- b) Cotton cultivation is presumed to follow the present cropping calendar. An area for cultivation is presumed to be expanded to a certain extent. After cultivation of cotton, vegetables are preliminarily selected as a second crop in the rainy season, for about 30% of land to be cultivated by cotton.
- c) Paddy cultivation may possibly restored under irrigation during the rainy season. Paddy field is rotationally utilized for cultivation of maize and melon by making use of soil moisture, though their productivity is lower than the cultivation under the year round irrigation.

F.6.2 Possible Yield and Production

On the basis of possible cropping pattern as presumed in the foregoing chapter, water requirement for irrigation is provisionally calculated as explained in Annex H.1.5 (Table H-28). In view of such a water requirement throughout the year, possible yield by irrigation without seasonal regulation of discharge by the reservoir is estimated as explained hereunder.

- a) For sugar cane cultivation, supplemented irrigation will be made in July - August, but water requirement for sugar cane in November - April will not be satisfied. Consequently, increase in yield will be limited to around 85 tons/ha on an average.
- b) For cotton cultivation, present yield of 2.3 tons/ha will be continuously expected since water application in November - February is hardly expectable due to lack of available water.
- c) For paddy cultivation, irrigation in May - September will not be effective. A water shortage may occur in July. A target yield of 4.5 tons/ha will be consequently expected, as in the case of yield without project. For rotational cultivation of maize and melon, an increase in yield will not be expectable, though they can be grown by the use of soil moisture in the paddy field. A yield at present level will be expected at 2.0 tons/ha for maize and 5.2 tons/ha for melon.
- d) For cultivation of vegetables, yield will be expected at 2.5 tons/ha, though slight shortage of water may occur in July. On the contrary, no improvement on productivity will be expectable in the pasture land because irrigation is hardly required in the rainy season.

On the basis of possible cropping pattern and field as explained above, production under limited irrigation in the rainy season is estimated as summarized on Table F-26. The estimated production will form a basis of economic evaluation of the case study on supplemental irrigation during the rainy season.

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TABLES

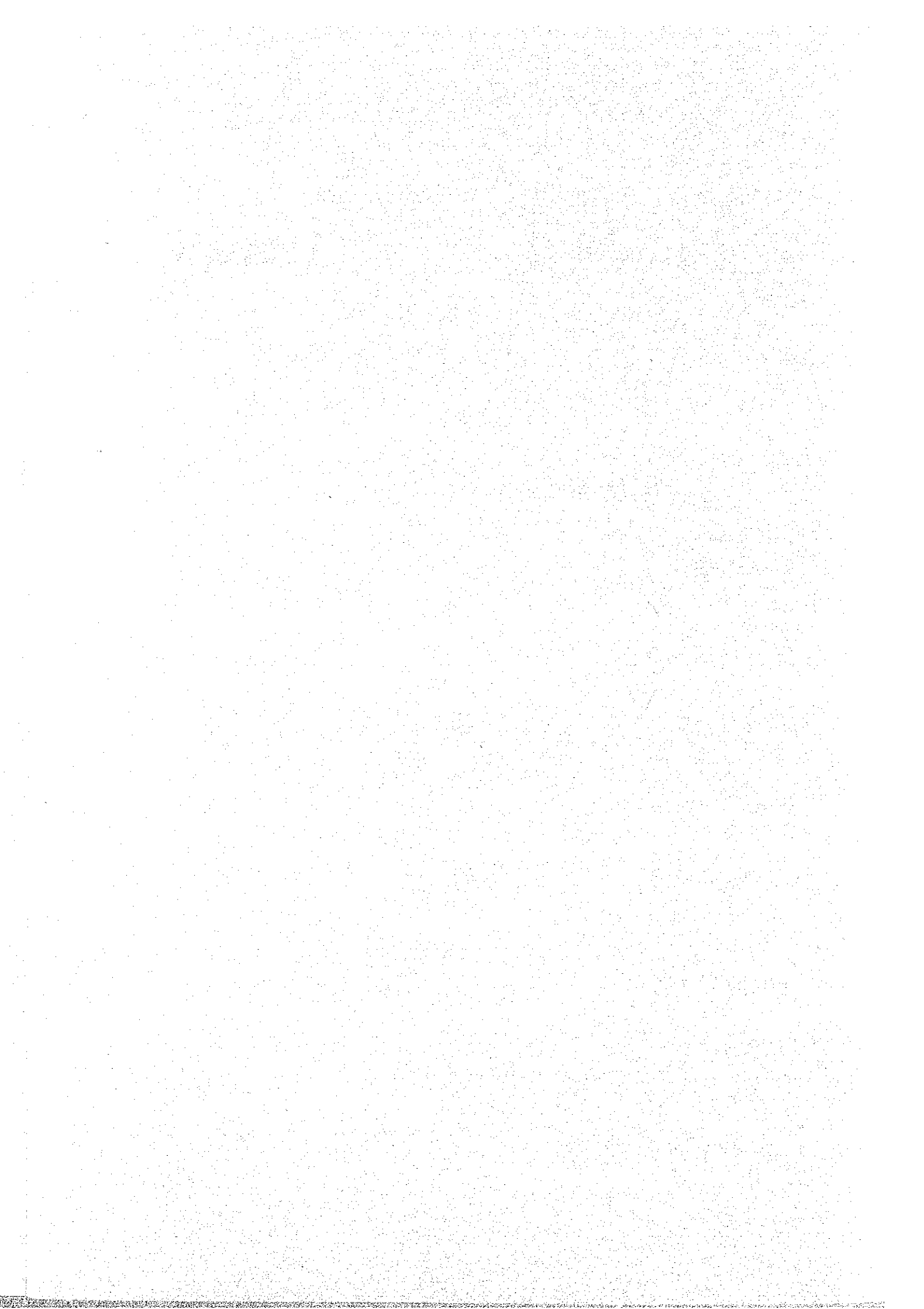


Table F-01 PROPOSED LAND USE

Land Category	Western Plain		Eastern Plain				Total			
	Area (ha)	%	A		B		Area (ha)	%		
			Area (ha)	%	Area (ha)	%				
A) Agricultural Land										
A.1) Upland field	11,810	(52.7)	2,300	(34.3)	2,200	(31.9)	4,500	(33.1)	16,310	(45.3)
A.2) Paddy field	4,050	(18.1)	2,300	(34.3)	1,000	(14.5)	3,300	(24.3)	7,350	(20.4)
A.3) Pasture/Forest	140	(0.6)	-	(-)	2,000	(29.0)	2,000	(14.7)	2,140	(5.9)
Sub-total	16,000	(71.4)	4,600	(68.7)	5,200	(75.4)	9,800	(72.1)	25,800	(71.7)
B) Non-agricultural Land										
B.1) Village yard	430	(1.9)	110	(1.6)	180	(2.6)	290	(2.1)	720	(2.0)
B.2) Road/Rivers/Others	5,970	(26.7)	1,990	(29.7)	1,520	(22.0)	3,510	(25.8)	9,480	(26.3)
Sub-total	6,400	(28.6)	2,100	(31.3)	1,700	(24.6)	3,800	(27.9)	10,200	(28.3)
Total	22,400	(100.0)	6,700	(100.0)	6,900	(100.0)	13,600	(100.0)	36,000	(100.0)

Note: All the figures are indicated in net areas.

Table F-02 CROPPING AREA UNDER "WITH" PROJECT

(Unit: ha)

Crop	Western Plain	Eastern Plain		Total	Total
		A	B		
1. Sugar cane	6,980	-	-	-	6,980
Estate	3,180	-	-	-	3,180
Outgrowers	3,670	-	-	-	3,670
Seed cane	130	-	-	-	130
2. Cotton	4,830	2,300	2,200	4,500	9,330
3. Paddy	4,050	2,300	1,000	3,300	7,350
4. Maize	2,000	2,300	1,600	3,900	5,900
5. Beans	2,830	2,300	1,600	3,900	6,730
6. Sesame	250	-	-	-	250
7. Melon	2,000	-	-	-	2,000
8. Water melon	200	-	-	-	200
9. Vegetables	1,600	-	-	-	1,600
10. Pasture	140	-	2,000	2,000	2,140
Total	24,880	9,200	8,400	17,600	42,480

Table F-03 INCREMENTAL EFFECT OF LAND USE

Category	Western Plain	Eastern Plain			Total or Average
		A	B	Total	
(Unit: ha)					
A. With Project					
Arable land	16,000	4,600	5,200	9,800	25,800
Cropping area	24,880	9,200	8,400	17,600	42,480
Crop intensity	1.6	2.0	1.6	1.8	1.6
B. Without Project					
Arable land	18,280	5,470	5,680	11,150	29,430
Cropping area	19,490	6,170	5,710	11,880	31,370
Crop intensity	1.1	1.1	1.0	1.1	1.1
C. Incremental Effect (A - B)					
Arable land	-2,280	-870	-480	-1,350	-3,630
Cropping area	5,390	3,030	2,690	5,720	11,110
Crop intensity	0.6	0.9	0.6	0.7	0.5

Table F-04 MONTHLY LABOUR REQUIREMENT WITH PROJECT

(Unit: 10³ man-days)

Crop	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
A) Labour Force Available	397	397	397	397	397	397	397	397	397	397	397	397	4,764
B) Labour Requirement													
a) Western plain													
1) Sugar cane	171	159	158	165	98	29	28	28	26	28	98	171	1,159
2) Paddy - Melon	29	14	25	16	5	5	6	16	38	90	50	78	372
3) Paddy - Vegetable	47	44	10	6	2	2	2	1	6	22	30	9	181
4) Paddy - Beans	13	14	13	8	2	2	3	1	-	2	6	5	69
5) Paddy - Sesame	2	2	3	2	1	1	1	-	-	-	1	1	14
6) Cotton - Maize	53	97	51	6	6	21	24	13	7	6	6	6	296
7) Cotton - Beans	48	89	51	11	11	20	16	12	6	6	6	6	282
8) Cotton-Vegetable	21	44	41	31	9	46	42	5	3	2	2	2	248
9) Cotton - Water melon	5	11	8	7	4	7	4	1	1	1	1	1	51
10) Pasture	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total	389	474	360	252	138	133	126	77	87	157	200	279	2,672
b) Eastern A													
1) Paddy - Maize	5	20	21	9	3	3	3	1	-	2	3	2	72
2) Paddy - Beans	15	17	14	9	3	3	3	1	-	2	6	6	79
3) Cotton - Maize	30	56	29	3	3	12	14	7	4	4	4	4	170
4) Cotton - Beans	30	56	33	7	7	12	10	7	4	4	4	4	178
5) Sub-total	80	149	97	28	16	30	30	16	8	12	17	16	499
c) Eastern B													
1) Cotton - Maize	29	53	28	3	3	12	13	7	4	4	3	3	162
2) Cotton - Beans	29	54	31	7	7	12	9	7	4	3	3	3	169
3) Paddy - Maize	2	9	10	4	1	1	1	1	-	1	1	1	32
4) Paddy - Beans	7	8	6	4	1	1	1	1	-	1	3	2	35
5) Pasture	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total	67	124	75	18	12	26	24	16	8	9	10	9	398
Total	536	747	532	298	166	189	180	109	103	178	227	304	3,569
C) Balance (A-B)	-139	-350	-135	99	231	208	217	288	294	219	170	93	1,195

Table F-05(1) LABOUR REQUIREMENT PER HA WITH PROJECT

Requirement	Sugar Cane (Estate)						Sugar Cane (Outgrowers')						(Unit: man-day)
	Plant Cane		Ratoon Cane		Sugar Cane		Plant Cane		Ratoon Cane		Sugar Cane		
	Family Hired Labour	Total	Family Hired Labour	Total	Family Hired Labour	Total	Family Hired Labour	Total	Family Hired Labour	Total	Family Hired Labour	Total	
1. Land preparation	-	26	-	-	-	26	-	26	-	-	-	-	-
2. Seeding or ratooning	-	23	-	7	7	14	9	23	7	-	-	7	-
3. Fertilization	-	2	-	2	2	2	-	2	2	-	-	2	-
4. Plant protection	-	-	-	-	-	-	-	-	-	-	-	-	-
5. Field maintenance	-	7	-	7	7	7	-	7	7	-	-	7	-
6. Weeding	-	10	-	10	10	10	-	10	10	-	-	10	-
7. Irrigating	-	12	-	12	12	12	-	12	12	-	-	12	-
8. Harvesting	-	100	-	100	100	60	40	100	60	40	60	40	100
9. Hauling and others	-	20	-	20	20	12	8	20	12	8	12	8	20
Total	-	200	-	158	158	143	57	200	110	48	158	158	-

Table F-05(2) LABOUR REQUIREMENT PER HA WITH PROJECT

Requirement	Sugar Cane (Estate)						Sugar Cane (Outgrowers')						(Unit: man-day)
	Plant Cane		Ratoon Cane		Plant Cane		Ratoon Cane		Plant Cane		Ratoon Cane		
	Family Hired Labour	Total	Family Hired Labour	Total	Family Hired Labour	Total	Family Hired Labour	Total	Family Hired Labour	Total	Family Hired Labour	Total	
1. Land preparation	5	5	-	-	-	-	-	-	-	-	-	-	-
2. Seeding or ratooning	5	5	1	1	3	3	-	-	1	1	-	-	1
3. Fertilization	-	-	-	-	-	-	-	-	-	-	-	-	1
4. Plant protection	-	-	-	-	3	3	-	-	-	-	-	-	-
5. Field maintenance	7	7	5	5	5	5	-	-	-	-	5	5	5
6. Weeding	-	-	-	-	-	-	-	-	-	-	-	-	-
7. Irrigating	12	12	5	5	5	5	-	-	-	-	7	7	7
8. Harvesting	25	78	8	8	10	10	-	-	-	-	2	2	2
9. Hauling and others	15	15	7	7	6	6	-	-	-	-	4	4	4
Total	69	53	122	26	26	32	32	-	26	26	32	20	20

Table F-05(3) LABOUR REQUIREMENT PER HA WITH PROJECT

Requirement	Sugar Cane (Estate)						Sugar Cane (Outgrowers')					
	Plant Cane		Ratoon Cane		Plant Cane		Ratoon Cane		Plant Cane		Ratoon Cane	
	Family Labour	Total	Family Labour	Total	Family Labour	Total	Family Labour	Total	Family Labour	Total	Family Labour	Total
1. Land preparation	8	-	8	21	-	21	21	-	21	21	-	21
2. Seeding or ratooning	15	-	15	23	-	23	40	-	40	18	-	18
3. Fertilization	2	-	2	2	-	2	2	-	2	2	-	2
4. Plant protection	-	-	-	54	-	54	15	-	15	40	-	40
5. Field maintenance	7	-	7	15	-	15	10	-	10	15	-	15
6. Weeding	-	-	-	-	-	-	-	-	-	-	-	-
7. Irrigating	3	-	3	6	-	6	6	-	6	6	-	6
8. Harvesting	-	-	-	23	-	23	25	65	90	23	-	23
9. Hauling and others	2	-	2	5	-	5	5	-	5	5	-	5
Total	37	-	37	149	-	149	124	65	189	130	-	130

Table F-06 FARM INPUTS REQUIREMENT

Inputs ^{/1}	Western Plain	Eastern Plain			Total
		A	B	Total	
Seed/Seedling (ton)					
Sugar cane	8,220	-	-	-	8,220
Cotton	120	58	55	113	233
Paddy	284	160	70	230	514
Maize	32	37	26	63	95
Beans	127	104	72	176	303
Sesame	0.75	-	-	-	0.75
Melon	3	-	-	-	3
Water melon	0.3	-	-	-	0.3
Vegetables	1.6	-	-	-	1.6
Fertilizers (ton)					
Urea	4,490	1,400	910	2,310	6,800
12-24-12	2,100	460	960	1,420	3,520
15-15-15	4,090	460	320	780	4,870
Agro-chemicals (ton)					
Insecticides	180	70	60	130	310
Fungicides	100	-	-	-	100
Herbicides	70	20	10	30	100
Rodenticides	20	-	-	-	20

Note: ^{/1}: Refer to Table F-07

Table F-08 MONTHLY TRACTOR REQUIREMENT

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
A) Available Tractor	140	140	140	140	140	140	140	140	140	140	140	140
B) Tractor Requirement												
1) Western Plain	117	274	328	248	131	162	177	183	146	157	134	68
2) Eastern Plain												
A	31	87	107	73	25	52	62	56	59	60	50	15
B	21	63	81	59	20	46	58	52	39	33	22	6
(Sut-total)	52	150	188	132	45	98	120	108	98	93	73	21
Total	169	424	516	380	176	260	297	291	244	250	206	89
C) Balance (A-B)	-29	-284	-376	-240	-36	-120	-157	-151	-104	-110	-66	51

Table F-09 PRODUCTION UNDER "WITH" PROJECT

Crop	Average Yield (t/ha)	Western Plain				Eastern Plain				Total			
		A		B		A		B		Total			
		Area (ha)	Production (ton)	Area (ha)	Production (ton)	Area (ha)	Production (ton)	Area (ha)	Production (ton)	Area (ha)	Production (ton)		
1. Sugar Cane													
Estate	125.0	3,180	397,500	-	-	-	-	-	-	-	-	6,850	856,250
Outgrowers	125.0	3,670	458,750	-	-	-	-	-	-	-	-	3,180	397,500
												3,670	458,750
2. Cotton	3.5	4,830	16,910	2,300	8,050	2,200	7,700	4,500	15,750	9,330	32,660		
3. Paddy	5.0	4,050	20,250	2,300	11,500	1,000	5,000	3,300	16,500	7,350	36,750		
4. Maize	4.5	2,000	9,000	2,300	10,350	1,600	7,200	3,900	17,550	5,900	26,550		
5. Beans	2.0	2,830	5,660	2,300	4,600	1,600	3,200	3,900	7,800	6,730	13,460		
6. Sesame	1.5	250	380	-	-	-	-	-	-	250	380		
7. Melon	8.0	2,000	16,000	-	-	-	-	-	-	2,000	16,000		
8. Water melon	12.0	200	2,400	-	-	-	-	-	-	200	2,400		
9. Vegetables	30.0	1,600	48,000	-	-	-	-	-	-	1,600	48,000		
10. Livestock													
Meat	0.195	140	30	-	-	2,000	390	2,000	390	2,140	420		
Milk (k λ)	0.285	140	40	-	-	2,000	570k λ	2,000	570k λ	2,140	610k λ		

Table F-10(1) INCREMENTAL PRODUCTION

(1) Western Plain		(Unit: ton)	
Crop	With Project	Without Project	Increment
Sugarcane	856,250	723,810	132,440
Cotton	16,910	1,700	15,210
Paddy	20,250	360	19,890
Maize	9,000	2,100	6,900
Sorghum	-	230	-230
Beans	5,660	-	5,660
Sesame	380	110	270
Melon	16,000	6,240	9,760
Water melon	2,400	560	1,840
Vegetables	48,000	-	48,000
Livestock			
Meat	30	890	-860
Milk (k/)	40	1,300	-1,260

Table F-10(2) INCREMENTAL PRODUCTION

Crop	(Unit: ton)								
	A		B		Total				
	With Project	Without Project	With Project	Without Project	With Project	Without Project			
Sugar cane	-	15,390	-15,390	-	21,060	-21,060	-	36,450	-36,450
Cotton	8,050	-	8,050	7,700	350	7,350	15,750	350	15,400
Paddy	11,500	6,300	5,200	5,000	-	5,000	16,500	6,300	10,200
Maize	10,350	40	10,310	7,200	360	6,840	17,550	400	17,150
Beans	4,600	-	4,600	3,200	-	3,200	7,800	-	7,800
Sesame	-	-	-	-	10	-10	-	10	-10
Melon	-	-	-	-	160	-160	-	160	-160
Livestock									
Meat	-	590	-590	390	660	-270	390	1,250	-860
Milk (k)	-	870	-870	570	960	-390	570	1,830	-1,260

Table F-11 ESTIMATED RETURN FROM AGRICULTURAL PRODUCTION (WITH PROJECT)

Crop	Net Return (Rp./ha)	Western Plain		Eastern Plain				Total Return (Rp.103)
		A		B		Total		
		Area (ha)	Return (Rp.103)	Area (ha)	Return (Rp.103)	Area (ha)	Return (Rp.103)	
Sugar cane			<u>12,146</u>	-	-	-	-	<u>12,146</u>
Estate farm	1,658	3,180	5,272	-	-	-	-	5,272
Outgrowers'	1,873	3,670	6,874	-	-	-	-	6,874
Cotton	1,601	4,830	7,733	2,300	3,682	2,200	3,522	7,204
Maize	597	2,000	1,194	2,300	1,373	1,600	955	2,328
Beans	1,279	2,830	3,620	2,300	2,942	1,600	2,046	4,988
Paddy	1,448	4,050	5,864	2,300	3,330	1,000	1,448	4,778
Sesame	902	250	226	-	-	-	-	226
Melon	2,789	2,000	5,578	-	-	-	-	5,578
Water melon	1,035	200	207	-	-	-	-	207
Vegetables	998	1,600	1,597	-	-	-	-	1,597
Livestock	189	140	26	-	-	2,000	378	2,000
Total			<u>38,191</u>		<u>11,327</u>		<u>8,349</u>	<u>19,676</u>
								<u>57,867</u>

Table F-12 SUMMARY OF FINANCIAL BALANCE OF CROP PRODUCTION WITH PROJECT

Crop	(Unit: Lps./ha)		
	Gross/ ¹ Income	Production/ ¹ Cost	Net/ ¹ Return
Sugar cane (average)			
- Estate farm	3,500	1,842 ^{/2}	1,658
(Plant cane)		(2,679)	
(Ratoon cane)		(1,633)	
- Outgrowers farm	3,500	1,627 ^{/2}	1,873
(Plant cane)		(1,966)	
(Ratoon cane)		(1,542)	
Cotton	4,190	2,589	1,601
Paddy	2,775	1,327	1,448
Maize	1,598	1,001	597
Beans	2,164	885	1,279
Sesame	1,542	640	902
Melon	5,344	2,555	2,789
Water melon	2,508	1,473	1,035
Vegetables	4,140	3,142	998
Pasture	320	131	189

Note: ^{/1}: Refer to Table F-13(1) to F-13(13)

^{/2}: Weighted average of 1-Plant cane and 4-Ratoon cane

Table F-13(1) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(1) SUGAR CANE: ESTATE FARM(PLANT CANE)

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	125.00	28.00	3500
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(TON)	6.00	25.00	150
-UREA	(KG)	220.00	0.65	143
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	330.00	0.68	224
-INSECTICIDES	(KG)	-	35.00	0
-FUNGICIDES	(KG)	12.00	34.04	408
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	3.00	9.40	28
2) LABOR				
-FAMILY LABOR	(M/D)	-	-	0
-HIRED LABOR	(M/D)	200.00	5.00	1000
3) MACHINERY				
-SUBSOILING	(TIMES)	1	75.00	75
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	2	30.00	60
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	1	27.00	27
-MULTING	(TIMES)	1	27.00	27
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	1	26.00	26
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			117
5) INTEREST *				175
6) TAX **				43
TOTAL				2679
C) NET RETURN (A-B)				821

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST(13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(2) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(2) SUGAR CANE: ESTATE FARM (RATOON CANE)

DESCRIPTION	UNIT	QTY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	125.00	28.00	3500
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(TON)	-	25.00	0
-UREA	(KG)	220.00	0.65	143
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	330.00	0.68	224
-INSECTICIDES	(KG)	-	35.00	0
-FUNGICIDES	(KG)	-	34.04	0
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	3.00	9.40	28
2) LABOR				
-FAMILY LABOR	(M/D)	-	-	0
-HIRED LABOR	(M/D)	158.00	5.00	790
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	-	53.00	0
-HARROWING	(TIMES)	-	30.00	0
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	-	40.00	0
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	-	27.00	0
-MULTING	(TIMES)	2	27.00	54
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	1	26.00	26
-RATOONING	(TIMES)	1	40.00	40
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			69
5) INTEREST *				78
6) TAX **				98
TOTAL				1633
C) NET RETURN (A-B)				1867

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)
** : ((A - (B.1 + B.2 + B.3 + B.4 + B.5))) * 0.05

Table F-13(3) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(3) SUGAR CANE: OUTGROWERS FARM (PLANT CANE)

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	125.00	28.00	3500
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(TON)	6.00	25.00	150
-UREA	(KG)	220.00	0.65	143
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	330.00	0.68	224
-INSECTICIDES	(KG)	-	35.00	0
-FUNGICIDES	(KG)	12.00	34.04	408
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	3.00	9.40	28
2) LABOR				
-FAMILY LABOR	(M/D)	143.00	-	0
-HIRED LABOR	(M/D)	57.00	5.00	285
3) MACHINERY				
-SUBSOILING	(TIMES)	1	75.00	75
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	2	30.00	60
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	1	27.00	27
-MULTING	(TIMES)	1	27.00	27
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	1	26.00	26
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			81
5) INTEREST *				175
6) TAX **				81
TOTAL				1966
C) NET RETURN (A-B)				1534

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)
** : ((A - (B.1 + B.2 + B.3 + B.4 + B.5))) * 0.05

Table F-13(4) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(4) SUGAR CANE: OUTGROWERS FARM (RATOON CANE)

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	125.00	28.00	3500
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(TON)	-	25.00	0
-UREA	(KG)	220.00	0.65	143
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	330.00	0.68	224
-INSECTICIDES	(KG)	-	35.00	0
-FUNGICIDES	(KG)	12.00	34.04	408
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	3.00	9.40	28
2) LABOR				
-FAMILY LABOR	(M/D)	110.00	-	0
-HIRED LABOR	(M/D)	48.00	5.00	240
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	-	53.00	0
-HARROWING	(TIMES)	-	30.00	0
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	-	40.00	0
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	-	27.00	0
-MULTING	(TIMES)	2	27.00	54
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	1	26.00	26
-RATOONING	(TIMES)	1	40.00	40
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			62
5) INTEREST *				131
6) TAX **				103
TOTAL				1542
C) NET RETURN (A-B)				1958

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(5) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(5) COTTON

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	3.50	1197.00	4190
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(KG)	25.00	0.88	22
-UREA	(KG)	200.00	0.65	130
-12-24-12	(KG)	210.00	0.67	141
-15-15-15	(KG)	-	0.68	0
-INSECTICIDES	(KG)	24.00	35.00	840
-FUNGICIDES	(KG)	-	34.04	0
-HERBICIDES	(KG)	1.80	15.13	27
-RODENTICIDES	(KG)	-	9.40	0
2) LABOR				
-FAMILY LABOR	(M/D)	69.00	-	0
-HIRED LABOR	(M/D)	53.00	5.00	265
3) MACHINERY				
-SUBSOILING	(TIMES)	1	75.00	75
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	3	30.00	90
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	1	27.00	27
-CULTIVATING	(TIMES)	3	27.00	81
-MULTING	(TIMES)	1	27.00	27
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	12	26.00	312
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			108
5) INTEREST *				245
6) TAX **				84
TOTAL				2589
C) NET RETURN (A-B)				1601

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST(13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(6) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(6) MAIZE

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	4.50	355.00	1598
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(KG)	16.00	1.10	18
-UREA	(KG)	170.00	0.65	111
-12-24-12	(KG)	210.00	0.67	141
-15-15-15	(KG)	-	0.68	0
-INSECTICIDES	(KG)	2.40	35.00	84
-FUNGICIDES	(KG)	-	34.04	0
-HERBICIDES	(KG)	1.40	15.13	21
-RODENTICIDES	(KG)	-	9.40	0
2) LABOR				
-FAMILY LABOR	(M/D)	26.00	-	0
-HIRED LABOR	(M/D)	-	5.00	0
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	2	30.00	60
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	1	27.00	27
-CULTIVATING	(TIMES)	1	27.00	27
-MULTING	(TIMES)	1	27.00	27
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	3	26.00	78
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	4.5	25.00	113
4) MISCELLANEOUS	(5%)			41
5) INTEREST *				107
6) TAX **				31
TOTAL				1001
C) NET RETURN (A-B)				597

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(7) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(7) PADDY

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	5.00	555.00	2775
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(KG)	70.00	1.32	92
-UREA	(KG)	200.00	0.65	130
-12-24-12	(KG)	160.00	0.67	107
-15-15-15	(KG)	-	0.68	0
-INSECTICIDES	(KG)	2.00	35.00	70
-FUNGICIDES	(KG)	-	34.04	0
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	-	9.40	0
2) LABOR				
-FAMILY LABOR	(M/D)	37.00	-	0
-HIRED LABOR	(M/D)	-	5.00	0
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	3	30.00	90
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	-	40.00	0
-SEEDING	(TIMES)	1	27.00	27
-CULTIVATING	(TIMES)	-	27.00	0
-MULTING	(TIMES)	-	27.00	0
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	3	26.00	78
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	5	66.00	330
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			53
5) INTEREST *				138
6) TAX **				76
TOTAL				1327
C) NET RETURN (A-B)				1448

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST(13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(8) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(8) BEANS

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	2.00	1082.00	2164
B) PRODUCT				
1) FARM INPUT				
-SEED	(KG)	45.00	1.98	89
-UREA	(KG)	40.00	0.65	26
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	200.00	0.68	136
-INSECTICIDES	(KG)	2.00	35.00	70
-FUNGICIDES	(KG)	-	34.04	0
-HERBICIDES	(KG)	1.00	15.13	15
-RODENTICIDES	(KG)	-	9.40	0
2) LABOR				
-FAMILY LABOR	(M/D)	32.00	-	0
-HIRED LABOR	(M/D)	-	5.00	0
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	2	30.00	60
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	1	27.00	27
-CULTIVATING	(TIMES)	1	27.00	27
-MULTING	(TIMES)	-	27.00	0
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	3	26.00	78
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	2	25.00	50
4) MISCELLANEOUS	(5%)			35
5) INTEREST *				90
6) TAX **				67
TOTAL				885
C) NET RETURN (A-B)				1279

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(9) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(9) SESAME

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD (T/HA)		1.50	1028.00	1542
B) PRODUCTION COST				
1) FARM INPUT				
-SEED (KG)		3.00	3.30	10
-UREA (KG)		70.00	0.65	46
-12-24-12 (KG)		80.00	0.67	54
-15-15-15 (KG)		-	0.68	0
-INSECTICIDES (KG)		2.00	35.00	70
-FUNGICIDES (KG)		-	34.04	0
-HERBICIDES (KG)		1.00	15.13	15
-RODENTICIDES (KG)		-	9.40	0
2) LABOR				
-FAMILY LABOR (M/D)		20.00	-	0
-HIRED LABOR (M/D)		-	5.00	0
3) MACHINERY				
-SUBSOILING (TIMES)		-	75.00	0
-PLOWING (TIMES)		1	53.00	53
-HARROWING (TIMES)		2	30.00	60
-FERTILIZING (TIMES)		1	22.00	22
-RIDGING (TIMES)		1	40.00	40
-SEEDING (TIMES)		1	27.00	27
-CULTIVATING (TIMES)		1	27.00	27
-MULTING (TIMES)		-	27.00	0
-IRRIGATING (MONTHS)		-	35.00	0
-CHEMICAL APP (TIMES)		3	26.00	78
-RATOONING (TIMES)		-	40.00	0
-HARVESTING (TONS)		-	66.00	0
-THRESHING (TONS)		-	25.00	0
4) MISCELLANEOUS (5%)				25
5) INTEREST *				65
6) TAX **				48
TOTAL				640
C) NET RETURN (A-B)				902

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(10) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(10) MELON

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	8.00	668.00	5344
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(KG)	1.50	48.50	73
-UREA	(KG)	180.00	0.65	117
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	250.00	0.68	170
-INSECTICIDES	(KG)	12.00	35.00	420
-FUNGICIDES	(KG)	22.70	34.04	773
-HERBICIDES	(KG)	3.00	15.13	45
-RODENTICIDES	(KG)	-	9.40	0
2) LABOR				
-FAMILY LABOR	(M/D)	149.00	-	0
-HIRED LABOR	(M/D)	-	5.00	0
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	3	30.00	90
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	1	27.00	27
-CULTIVATING	(TIMES)	3	27.00	81
-MULTING	(TIMES)	-	27.00	0
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	5	26.00	130
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			102
5) INTEREST *				265
6) TAX **				147
SUB-TOTAL				2555
C) NET RETURN (A-B)				2789

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST(13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(11) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(11) WATER MELON

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	12.00	209.00	2508
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(KG)	1.50	48.50	73
-UREA	(KG)	120.00	0.65	78
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	200.00	0.68	136
-INSECTICIDES	(KG)	11.00	35.00	385
-FUNGICIDES	(KG)	2.80	34.04	95
-HERBICIDES	(KG)	3.00	15.13	45
-RODENTICIDES	(KG)	-	9.40	0
2) LABOR				
-FAMILY LABOR	(M/D)	130.00	-	0
-HIRED LABOR	(M/D)	-	5.00	0
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	3	30.00	90
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	1	27.00	27
-CULTIVATING	(TIMES)	3	27.00	81
-MULTING	(TIMES)	-	27.00	0
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	3	26.00	78
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(%)			60
5) INTEREST *				156
6) TAX **				54
SUB-TOTAL				1473
C) NET RETURN (A-B)				1035

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(12) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(12) VEGETABLE

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	30.00	138.00	4140
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(KG)	1.00	76.00	76
-UREA	(KG)	220.00	0.65	143
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	450.00	0.68	306
-INSECTICIDES	(KG)	15.00	35.00	525
-FUNGICIDES	(KG)	24.00	34.04	817
-HERBICIDES	(KG)	3.00	15.13	45
-RODENTICIDES	(KG)	-	9.40	0
2) LABOR				
-FAMILY LABOR	(M/D)	124.00	-	0
-HIRED LABOR	(M/D)	65.00	5.00	325
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	3	30.00	90
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	2	27.00	54
-MULTING	(TIMES)	1	27.00	27
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	5	26.00	130
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			133
5) INTEREST *				303
6) TAX **				53
TOTAL				3142
C) NET RETURN (A-B)				998

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST(13%)
** : ((A-(B.1+B.2+B.3+B.4+B.5)))*0.05

Table F-13(13) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(13) PASTURE/FOREST (CATTLE RAISING)

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-BEEF	(KG)	195.00	1.10	215
-MILK	(LT.)	285.00	0.37	105
TOTAL				320
B) PRODUCTION COST				
1) RECOVERY OF INITIAL INVESTMENT	*			42
2) RAISING COST				
-LABOUR COST	**			65
(A*B*C)				
A (HEAD/HA)		3.50		
B (MAN/HEAD)		0.01		
C (LPS/MAN/YEAR)		1850.00		
-VETERINARY COST				
(A*B)				8
A (HEAD)		3.50		
B (LPS/HEAD)		2.40		
3) MISCELLANEOUS (5%)				6
4) TAX				10
TOTAL				131
C) NET RETURN (A-B)				189

NOTE * :

-LAND PREPARATION BY MACHINERY	LPS.	113.00
-SEEDING BY MACHINERY	LPS.	27.00
-SEED	LPS.	55.00
-FENCES	LPS.	150.00
-MISCELLANEOUS (INCLUDING MAINTENANCE)	LPS.	70.00
TOTAL	LPS.	415.00
-USEFUL LIFE	YEARS.	10
RECOVERY OF INITIAL INVESTMENT	LPS/YEAR	41.5

** : OPPORTUNITY COST IS NOT APPLIED FOR COWBOYS

Table F-14(1) TYPICAL FARM BUDGET WITH PROJECT

Small Farm in Sugar Cane Area (Holding size: 10 ha)

A) Gross Income			
	Area (ha)	Gross Return (Lp./ha)/ ¹	Total Return (Lps.)
Sugar cane	8	3,500	28,000
Cotton	2	4,190	8,380
Maize	1	1,598	1,598
Beans	1	2,164	2,164
Total			<u>40,142</u>
B) Gross Expenditures			
	Area (ha)	Production/ ¹ Cost (Lp./ha)	Total Pro. Cost (Lps.)
1) Production Cost			
Subar cane	8	1,627	13,016
Cotton	2	2,589	5,178
Maize	1	1,001	1,001
Beans	1	885	855
Sub-total			20,050
2) Domestic Consumption			
Maize: 0.5 t/family x Lp. 355			178
Beans: 0.2 t/family x Lp. 1,082			216
3) Living Expenses/ ²			
			4,550
Total			<u>24,994</u>
C) Net Reserve (A-B)			<u>15,148</u>

Note: ¹: Refer to Table F-12

²: Increased in the living expenses is assumed to be 30% from the present (Lp. 3,500 x 1.3 = 4,550).

Table F-14(2) TYPICAL FARM BUDGET WITH PROJECT

Small Farm in Cotton Area (Holding size: 10 ha)

A) Gross Income			
	Area (ha)	Gross Return (Lp./ha) ^{/1}	Total Return (Lps.)
Cotton	10	4,190	41,900
Maize	5	1,598	7,990
Beans	5	2,164	10,820
Total			<u>60,710</u>
B) Gross Expenditures			
	Area (ha)	Production ^{/1} Cost (Lp./ha)	Total Pro. Cost (Lps.)
1) Production Cost			
Cotton	10	2,589	25,890
Maize	5	1,001	5,005
Beans	5	885	4,425
Sub-total			35,320
2) Domestic Consumption			
Maize:	0.5 t/family	x Lp. 355	178
Beans:	0.2 t/family	x Lp. 1,082	216
3) Living Expenses ^{/2}			
			4,550
Total			<u>40,264</u>
C) Net Reserve (A - B)			<u>20,446</u>

Note: ^{/1}: Refer to Table F-12

^{/2}: Increased in the living expenses is assumed to be 30% from the present (Lp. 3,500 x 1.3 = 4,550).

Table F-14(3) TYPICAL FARM BUDGET WITH PROJECT

Small Farm in Paddy Area (Holding size: 10 ha)

A) Gross Income			
	Area (ha)	Gross Return (Ip./ha)/ ¹	Total Return (Lps.)
Paddy	10	2,775	27,750
Maize	5	1,598	7,990
Beans	5	2,164	10,820
Total			<u>46,560</u>
B) Gross Expenditures			
	Area (ha)	Production/ ¹ Cost (Ip./ha)	Total Pro. Cost (Lps.)
1) Production Cost			
Paddy	10	1,327	13,270
Maize	5	1,001	5,005
Beans	5	885	4,425
Sub-total			22,700
2) Domestic Consumption			
Paddy: 0.3 t/family x Ip. 555			167
Maize: 0.5 t/family x Ip. 355			178
Beans: 0.2 t/family x Ip. 1,082			216
3) Living Expenses/ ²			
			4,550
Total			<u>27,811</u>
C) Net Reserve (A - B)			<u>18,749</u>

Note: ¹: Refer to Table F-12

²: Increased in the living expenses is assumed to be 30% from the present (Ip. 3,500 x 1.3 = 4,550).

Table F-15(1) TYPICAL FARM BUDGET WITH PROJECT

Cooperative in Sugar Cane Area (20 members with 100 ha)

A) Gross Income			
	Area (ha)	Gross Return (Lp./ha) ^{/1}	Total Return (Lps.)
Sugar cane	70	3,500	245,000
Cotton	30	4,190	125,700
Maize	15	1,598	23,970
Beans	10	2,164	21,640
Vegetables	5	4,140	20,700
Total			<u>437,010</u>
B) Gross Expenditures			
	Area (ha)	Production ^{/1} Cost (Lp./ha)	Total Pro. Cost (Lps.)
1) Production Cost			
Sugar cane	70	1,627	113,890
Cotton	30	2,589	77,670
Maize	15	1,001	15,015
Beans	10	885	8,850
Vegetables	5	3,142	15,710
Sub-total			231,135
2) Domestic Consumption			
Maize: 0.5 t/family x 20 families x Lp. 355			3,550
3) Repayment of Land Procurement Cost			
Lp. 710/ha x 100 ha/20 years			3,550
4) Management Cost (20% of A-B.1-3)			
			39,755
Total			<u>238,530</u>
C) Net Profit (A-B)			<u>198,480</u>
(Profit sharing per family)			(9,924)

Note: ^{/1}: Refer to Table F-12

Table F-15(2) TYPICAL FARM BUDGET WITH PROJECT

Cooperative in Cotton Area (20 members with 100 ha)

A) Gross Income			
	Area (ha)	Gross Return (Lp./ha) ^{/1}	Total Return (Lps.)
Cotton	100	4,190	419,000
Maize	50	1,598	79,900
Beans	50	2,164	108,200
Total			<u>607,100</u>
B) Gross Expenditures			
	Area (ha)	Production ^{/1} Cost (Lp./ha)	Total Pro. Cost (Lps.)
1) Production Cost			
Cotton	100	2,589	258,900
Maize	50	1,001	50,050
Beans	50	885	44,250
Sub-total			353,200
2) Domestic Consumption			
Maize:	0.5 t/family x 20 families x Lp. 355		3,550
Beans:	0.2 t/family x 20 families x Lp. 1,082		4,328
3) Repayment of Land Procurement Cost			
	Lp. 710/ha x 100 ha/20 years		3,550
4) Management Cost (20% of A-B.1-3)			
			48,494
Total			<u>413,122</u>
C) Net Profit (A-B)			<u>193,978</u>
(Profit sharing per family)			(9,699)

Note: ^{/1}: Refer to Table F-12

Table F-15(3) TYPICAL FARM BUDGET WITH PROJECT

Cooperative in Paddy Area (20 members with 100 ha)

A) Gross Income			
	Area (ha)	Gross Return (Lp./ha)/1	Total Return (Lps.)
Paddy	100	2,775	277,500
Maize	50	1,598	79,900
Beans	50	2,164	108,200
Total			<u>465,600</u>
B) Gross Expenditures			
	Area (ha)	Production/1 Cost (Lp./ha)	Total Pro. Cost (Lps.)
1) Production Cost			
Paddy	100	1,327	132,700
Maize	50	1,001	50,050
Beans	50	885	44,250
Sub-total			227,000
2) Domestic Consumption			
Paddy:	0.3 t/family x 20 families	x Lp. 555	3,330
Maize:	0.5 t/family x 20 families	x Lp. 355	3,550
Beans:	0.2 t/family x 20 families	x Lp. 1,082	4,328
3) Repayment of Land Procurement Cost			
	Lp. 710/ha x 100 ha/20 years		3,550
4) Management Cost (20% of A-B.1-3)			
			44,768
Total			<u>286,526</u>
C) Net Profit (A-B)			<u>179,074</u>
(Profit sharing per family)			(8,954)

Note: /1: Refer to Table F-12

Table F-16 RESETTLEMENT POSSIBILITIES

		Exist. Resettlement Scheme			Area to be Expropriated	Total
		Manjuras - Buena Vista	Ola	Total		
Western Plain						
Area	(ha)	550	2,120	2,670	2,430	5,100
Settlers	(No.)	110	420	530	490	1,020
Eastern Plain						
A						
Area	(ha)	-	-	-	3,240	3,240
Settlers	(No.)	-	-	-	650	650
B						
Area	(ha)	-	160	160	2,350	2,510
Settlers	(No.)	-	30	30	470	500
Sub-total						
Area	(ha)	-	160	160	5,590	5,750
Settlers	(No.)	-	30	30	1,120	1,150
Total						
Area	(ha)	550	2,280	2,830	8,020	10,850
Settlers	(No.)	110	450	560	1,610	2,170

Table F-17 FARMERS TO BE ORGANIZED INTO COOPERATIVES

	(Unit: persons)								
	Present Cooperative Member/ <u>1</u>	Monjaras - Buena Vista		Ola		Settlers in Expropriated Area/ <u>3</u>	Total		
		Present/ <u>2</u> Settlers	New/ <u>3</u> Settlers	Present/ <u>2</u> Settlers	New/ <u>3</u> Settlers				
Western Plain	270	450	110	560	280	420	700	490	2,020
Eastern Plain									
A	10	-	-	-	-	-	-	650	660
B	60	-	-	-	20	30	50	470	580
Sub-total	70	-	-	-	20	30	50	1,120	1,240
Total	340	450	110	560	300	450	750	1,610	3,260

Note: 1: Refer to Table E-4, out of 381 family members, about 340 families are settled in the project area

2: Refer to Section E.2.2

3: Refer to Table F-16

Table F-18 CROP PRODUCTION IN MIDDLE REACH VALLEYS

	Area (ha)	Yield (t/ha)	Production (ton)
1) San Juan de Flores:			
Sugar cane	2,680	100.0	268,000
2) Orocuina:			
Paddy			1,600
Wet season	160	5.0	800
Dry season	160	5.0	800
Maize	150	4.5	680
Beans	150	2.0	300
Vegetables	20	30.0	600
3) Orocuina - Choluteca:			
Paddy			3,500
Wet season	350	5.0	1,750
Dry season	350	5.0	1,750
4) Total			
Sugar cane			268,000
Paddy			5,100
Maize			680
Beans			300
Vegetables			600

Table F-19 ESTIMATED FINANCIAL RETURN FROM AGRICULTURAL PRODUCTION

	Present			Proposed			Incremental (10 ³ Lp.)
	Area (ha)	Net/1 Return (Lp./ha)	Total Return (10 ³ Lp.)	Area (ha)	Net/2 Return (Lp./ha)	Total Return (10 ³ Lp.)	
1) San Juan de Flores:							
Sugar cane							
Irrigated	1,630	1,060	1,728	2,680	1,881	5,041	
Non-irrigated	1,020	1,060	1,081	-	-	-	
Maize	30	152	5	-	-	-	
Sub-total			<u>2,814</u>			<u>5,041</u>	<u>2,227</u>
2) Orocuina:							
(Irrigated)							
Paddy							
Wet season	-		-	160	1,448	232	
Dry season	-		-	160	1,448	232	
Maize	-		-	150	597	90	
Beans	-		-	150	1,279	192	
Vegetables	-		-	20	998	20	
Sorghum	15	156	2	-		-	
Sesame	10	323	3	-		-	
Melon	10	1,122	11	-		-	
(Non-irrigated)							
Maize	120	152	18	-		-	
Livestock	175	132	23	-		-	
Sub-total			<u>57</u>			<u>766</u>	<u>709</u>
3) Orocuina - Choluteca							
Paddy							
Wet season	350	997	349	350	1,448	507	
Dry season	350	997	349	350	1,448	507	
Sub-total			<u>698</u>			<u>1,014</u>	<u>316</u>
Total			3,569			6,821	3,252

Note: /1: Refer to Table F-20
/2: Refer to Table F-21

Table F-20 SUMMARY OF FINANCIAL BALANCE OF CROP
PRODUCTION IN MIDDLE REACH VALLEYS
(PRESENT CONDITION)

(Unit: Lps./ha)

	Gross Income	Production Cost	Net Return
Sugar cane ^{/1}	1,624	564 ^{/3}	1,060
(Plant cane)		(1,671)	
(Ratoon cane)		(455)	
Paddy ^{/2}	2,498	1,501	997
Maize ^{/2}	462	310	152
Sorghum ^{/2}	616	460	156
Sesame ^{/2}	720	397	323
Melon ^{/2}	3,474	2,352	1,122
Pasture ^{/2}	213	81	132

Note: ^{/1}: Refer to Table F-22

^{/2}: Refer to Table E-24 and E-25

^{/3}: Weighted average of 1-Plant cane, 5-Ratoon cane and 1-Fallow

Table F-21 SUMMARY OF FINANCIAL BALANCE OF CROP PRODUCTION IN MIDDLE REACH VALLEYS (PROPOSED CONDITION)

	(Unit: Lps./ha)		
	Gross Income	Production Cost	Net Return
Sugar cane ^{/1}	2,800	919 ^{/3}	1,881
(Plant cane)		(1,849)	
(Ratoon cane)		(916)	
Paddy ^{/2}	2,775	1,327	1,448
Maize ^{/2}	1,598	1,001	597
Beans ^{/2}	2,164	885	1,279
Vegetables ^{/2}	4,140	3,142	998

Note: ^{/1}: Refer to Table F-23

^{/2}: Refer to Table F-13

^{/3}: Weighted average of 1-Plant cane, 4-Ratoon cane and 1-Fallow

Table F-22(1) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITHOUT PROJECT

(1) SUGAR CANE IN THE SAN JUAN DE FLORES AREA
(PLANT CANE)

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	58.00	28.00	1624
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(TON)	10.00	25.00	250
-UREA	(KG)	170.00	0.65	111
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	110.00	0.68	75
-INSECTICIDES	(KG)	-	35.00	0
-FUNGICIDES	(KG)	12.00	34.04	408
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	2.00	9.40	19
2) LABOR				
-FAMILY LABOR	(M/D)	130.00	-	0
-HIRED LABOR	(M/D)	10.00	5.00	50
3) MACHINERY				
-SUBSOILING	(TIMES)	1	75.00	75
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	2	30.00	60
-FERTILIZING	(TIMES)	-	22.00	0
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	1	27.00	27
-MULTING	(TIMES)	1	27.00	27
-IRRIGATING	(MONTHS)	4	35.00	140
-CHEMICAL APP	(TIMES)	1	26.00	26
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			71
5) INTEREST *				178
TOTAL				1671
C) NET RETURN (A-B)				-47

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)

Table F-22(2) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITHOUT PROJECT

(2) SUGAR CANE IN THE SAN JUAN DE FLORES AREA
(RATOON CANE)

DESCRIPTION	UNIT	Q/TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	58.00	28.00	1624
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(TON)	-	25.00	0
-UREA	(KG)	170.00	0.65	111
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	110.00	0.68	75
-INSECTICIDES	(KG)	-	35.00	0
-FUNGICIDES	(KG)	-	34.04	0
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	2.00	9.40	19
2) LABOR				
-FAMILY LABOR	(M/D)	110.00	-	0
-HIRED LABOR	(M/D)	-	5.00	0
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	-	53.00	0
-HARROWING	(TIMES)	-	30.00	0
-FERTILIZING	(TIMES)	-	22.00	0
-RIDGING	(TIMES)	-	40.00	0
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	-	27.00	0
-MULTING	(TIMES)	2	27.00	54
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	1	26.00	26
-RATOONING	(TIMES)	1	40.00	40
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			19
5) INTEREST *				50
TOTAL				455
C) NET RETURN (A-B)				1169

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)

Table F-23(1) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(1) SUGAR CANE IN THE SAN JUAN DE FLORES AREA
(PLANT CANE)

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	100.00	28.00	2800
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(TON)	6.00	25.00	150
-UREA	(KG)	220.00	0.65	143
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	330.00	0.68	224
-INSECTICIDES	(KG)	-	35.00	0
-FUNGICIDES	(KG)	12.00	34.04	408
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	3.00	9.40	28
2) LABOR				
-FAMILY LABOR	(M/D)	125.00	-	0
-HIRED LABOR	(M/D)	50.00	5.00	250
3) MACHINERY				
-SUBSOILING	(TIMES)	1	75.00	75
-PLOWING	(TIMES)	1	53.00	53
-HARROWING	(TIMES)	2	30.00	60
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	1	40.00	40
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	1	27.00	27
-MULTING	(TIMES)	1	27.00	27
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	1	26.00	26
-RATOONING	(TIMES)	-	40.00	0
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			80
5) INTEREST *				175
TOTAL				1849
C) NET RETURN (A-B)				951

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)

Table F-23(2) FINANCIAL BALANCE OF CROP PRODUCTION
PER HECTARE WITH PROJECT

(2) SUGAR CANE IN THE SAN JUAN DE FLORES AREA
(RATOON CANE)

DESCRIPTION	UNIT	Q'TY	UNIT PRICE (LPS)	AMOUNT (LPS)
A) GROSS INCOME				
-AVERAGE YIELD	(T/HA)	100.00	28.00	2800
B) PRODUCTION COST				
1) FARM INPUT				
-SEED	(TON)	-	25.00	0
-UREA	(KG)	220.00	0.65	143
-12-24-12	(KG)	-	0.67	0
-15-15-15	(KG)	330.00	0.68	224
-INSECTICIDES	(KG)	-	35.00	0
-FUNGICIDES	(KG)	-	34.04	0
-HERBICIDES	(KG)	4.00	15.13	61
-RODENTICIDES	(KG)	3.00	9.40	28
2) LABOR				
-FAMILY LABOR	(M/D)	100.00	-	0
-HIRED LABOR	(M/D)	40.00	5.00	200
3) MACHINERY				
-SUBSOILING	(TIMES)	-	75.00	0
-PLOWING	(TIMES)	-	53.00	0
-HARROWING	(TIMES)	-	30.00	0
-FERTILIZING	(TIMES)	1	22.00	22
-RIDGING	(TIMES)	-	40.00	0
-SEEDING	(TIMES)	-	27.00	0
-CULTIVATING	(TIMES)	-	27.00	0
-MULTING	(TIMES)	2	27.00	54
-IRRIGATING	(MONTHS)	-	35.00	0
-CHEMICAL APP	(TIMES)	1	26.00	26
-RATOONING	(TIMES)	1	40.00	40
-HARVESTING	(TONS)	-	66.00	0
-THRESHING	(TONS)	-	25.00	0
4) MISCELLANEOUS	(5%)			40
5) INTEREST *				78
TOTAL				916
C) NET RETURN (A-B)				1884

NOTE *: (COSTS OF FARM INPUTS + MACHINERY) * INTEREST (13%)

Table F-24 CROPPING AREA AND PRODUCTION IN
MIDDLE REACH VALLEYS
(POTENTIAL AREA: 1,640 HA)

	Present			Proposed			Incremental Production (ton)
	Area (ha)	Yield (t/ha)	Produc. (ton)	Area (ha)	Yield (t/ha)	Produc. (ton)	
1) Morolica C-D							
Paddy			--			<u>1,500</u>	1,500
Wet season	-		-	150	5.0	750	
Dry season	-		-	150	5.0	750	
Maize	60	1.3	80	135	4.5	610	530
Beans	-		-	135	2.0	270	270
Vegetables	-		-	15	30.0	450	450
Livestock							
Meat	240	0.13	30	-		-	-30
Milk (k ℓ)	240	0.19	50	-		-	-50
2) Orocuina E-H							
Paddy			--			<u>6,700</u>	6,700
Wet season	-		-	670	5.0	3,350	
Dry season	-		-	670	5.0	3,350	
Maize	290	1.3	380	600	4.5	2,700	2,320
Beans	-		-	600	2.0	1,200	1,200
Vegetables	-		-	70	30.0	2,100	2,100
Sorghum	190	1.0	190	-		-	-190
Livestock							
Meat	860	0.13	110	-		-	-110
Milk (k ℓ)	860	0.19	160	-		-	-160
3) Total							
Paddy			-			8,200	8,200
Maize			460			3,310	2,850
Beans			-			1,470	1,470
Vegetables			-			2,550	2,550
Sorghum			190			-	-190
Livestock							
Meat			140			-	-140
Milk (k ℓ)			210			-	-210

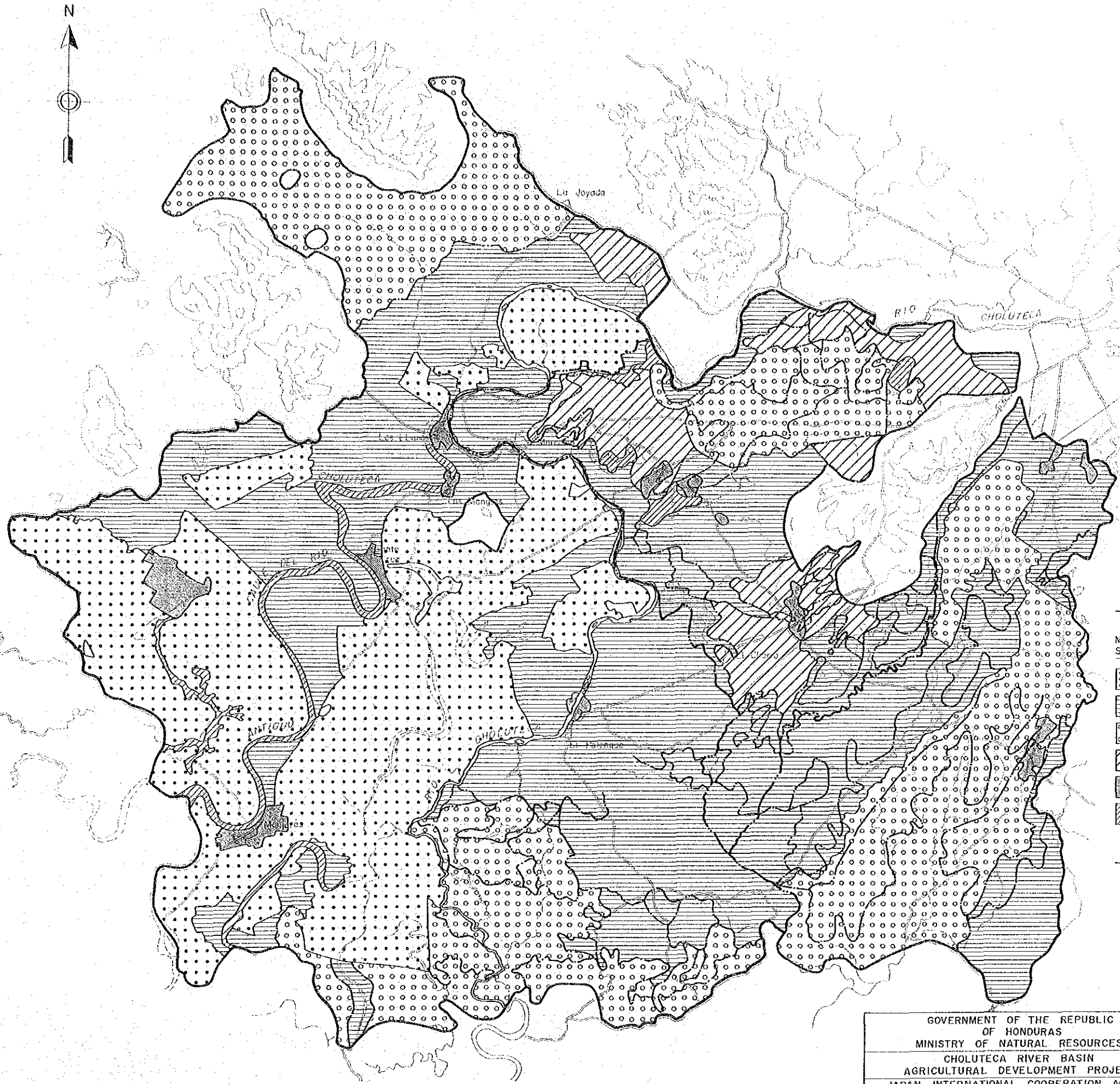
Table F-25 ESTIMATED FINANCIAL RETURN AND INCREMENTAL
FROM AGRICULTURAL PRODUCTION
(POTENTIAL AREA: 1,640 HA)

	Present			Proposed			Incre- mental (10 ³ Lp.)
	Area (ha)	Net Return (Lp./ha)	Total Return (10 ³ Lp.)	Area (ha)	Net Return (Lp./ha)	Total Return (10 ³ Lp.)	
1) Morolica C - D							
Paddy	-	-	-	300	1,448	434	
Maize	60	152	9	135	597	81	
Beans	-	-	-	135	1,279	173	
Vetetables	-	-	-	15	998	15	
Pasture	240	132	32	-	-	-	
Sub-total	300		41			703	662
2) Orocuina E - H							
Paddy	-	-	-	1,340	1,448	1,940	
Maize	290	152	44	600	597	358	
Beans	-	-	-	600	1,279	767	
Vegetables	-	-	-	70	998	70	
Sorghum	190	61	12	-	-	-	
Pasture	860	132	114	-	-	-	
Sub-total	<u>1,340</u>		<u>170</u>			<u>3,135</u>	<u>2,965</u>
Total	<u>1,640</u>		<u>211</u>			<u>3,838</u>	<u>3,627</u>

Table F-26 CROPPING AREA AND PRODUCTION FOR WESTERN PLAIN
UNDER LIMITED IRRIGATION DURING RAINY SEASON

	Area (ha)	Yield (t/ha)	Production (ton)
Sugar cane	9,510	85.0	808,350
Cotton	3,350	2.3	7,710
Paddy	3,000	4.5	13,500
Maize	1,000	2.0	2,000
Melon	2,000	5.2	10,400
Vegetable	1,100	25.0	27,500
Livestock			
Meat	140	0.13	20
Milk	140	0.19 kℓ	30 kℓ

FIGURES



Mapping Symbol	Land Category	Western Plain		Eastern Plain				Total			
		ha	%	A	B	Total	ha	%			
	Sugar cane	6,980	31.1	-	-	-	-	6,980	19.4		
	Other Upland crops	4,830	21.6	2,300	34.4	2,200	31.9	4,500	33.1	9,330	26.0
	Paddy Field	4,050	18.1	2,300	34.3	1,000	14.5	3,300	24.3	7,350	20.4
	Pasture/Forest	140	0.6	-	-	2,000	29.0	2,000	14.7	2,140	5.9
	Village Yard	430	1.9	110	1.6	180	2.6	290	2.1	720	2.0
	Road/Rivers/others	5,970	26.7	1,990	29.7	1,520	22.0	3,510	25.8	9,480	26.3
Total		22,400	100.0	6,700	100.0	6,900	100.0	13,600	100.0	36,000	100.0

LEGEND
 Project Boundary



GOVERNMENT OF THE REPUBLIC OF HONDURAS
 MINISTRY OF NATURAL RESOURCES
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 JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. F-01 PROPOSED LAND USE MAP

- EASTERN PLAIN - A -

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Paddy - Maize 1,150 ha	Paddy											
Paddy - Beans 1,150 ha	Paddy											
Cotton - Maize 1,150 ha	Maize											
Cotton - Beans 1,150 ha	Beans											

- EASTERN PLAIN - B -

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Cotton - Maize 1,100 ha	Maize											
Cotton - Beans 1,100 ha	Beans											
Paddy - Maize 500 ha	Paddy											
Paddy - Beans 500 ha	Paddy											
Pasture 2,000 ha	Pasture											

- WESTERN PLAIN -

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
	Plant Cane											
Sugar cane 6,980 ha	1st Ratoon											
	2nd Ratoon											
	3rd Ratoon											
	4th Ratoon											
Paddy - Melon 2,000 ha	Paddy											
Paddy - Vegetables 800 ha	Paddy											
Paddy - Beans 1,000 ha	Paddy											
Paddy - Sesame 250 ha	Paddy											
Cotton - Maize 2,000 ha	Maize											
Cotton - Beans 1,830 ha	Beans											
Cotton - Vegetables 800 ha	Vegetables											
Cotton - Water melon 200 ha	Water melon											
Pasture 140 ha	Pasture											

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Fig.
F-02

PROPOSED CROPPING PATTERN
FOR CHOLUTECA PLAIN

San Juan de Flores Area

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Sugar Cane 2,680ha	Fallow											
	Plant cane											
	1st Ratoon											
	2nd Ratoon											
	3rd Ratoon											
	4th Ratoon											

Middle Reach (Existing Area)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Paddy 510ha												
Beans - Maize 150ha	<div style="display: flex; justify-content: space-around;"> Beans Maize </div>											
Vegetables 20ha	Vegetables											

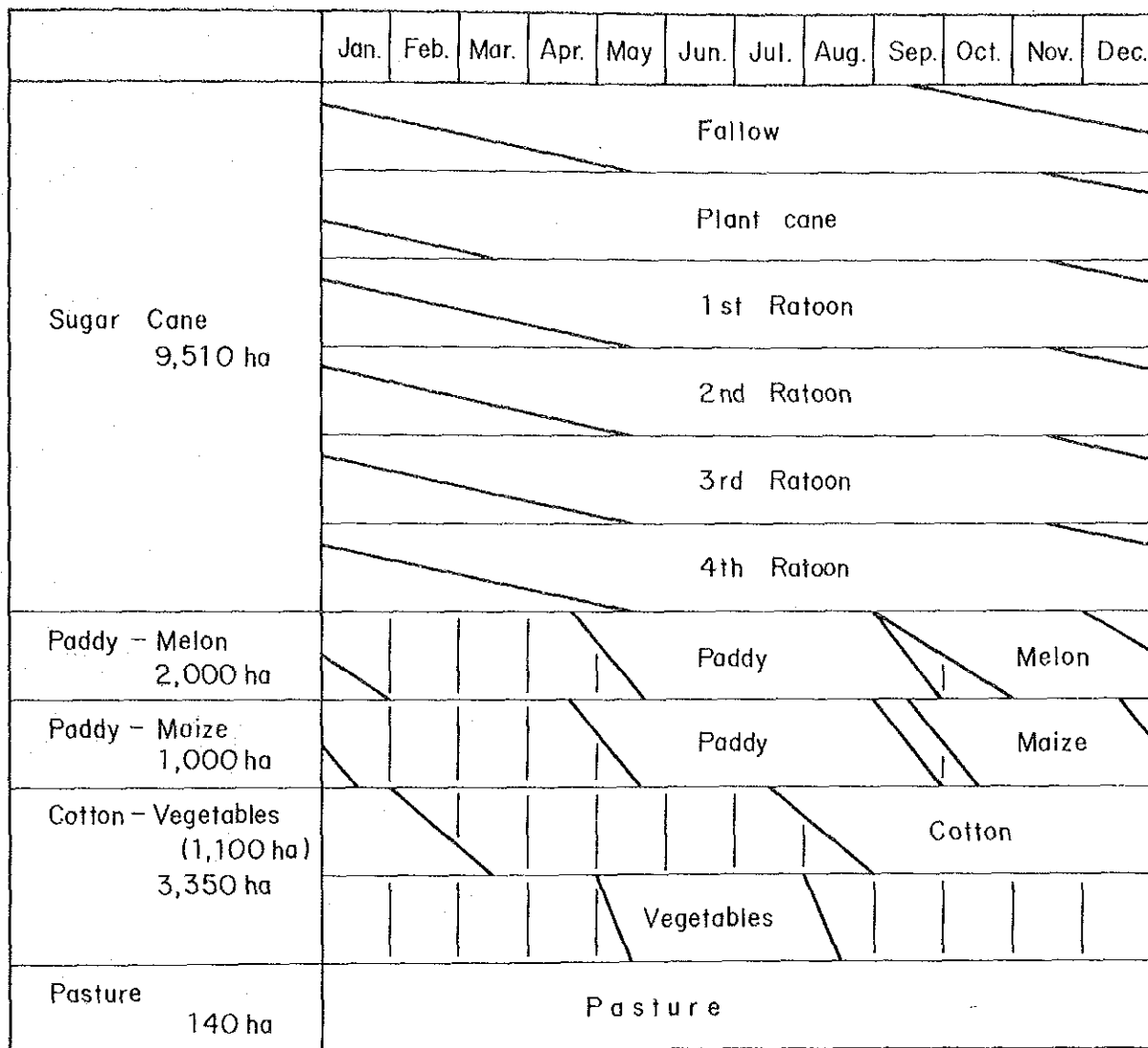
Middle Reach (Potential Area)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Paddy 820ha												
Beans - Maize 740ha	<div style="display: flex; justify-content: space-around;"> Beans Maize </div>											
Vegetables 80ha	Vegetables											

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Fig.
 F-03

PROPOSED CROPPING PATTERN
 FOR MIDDLE REACH



GOVERNMENT OF THE REPUBLIC OF HONDURAS MINISTRY OF NATURAL RESOURCES CHOLUTECA RIVER BASIN AGRICULTURAL DEVELOPMENT PROJECT JAPAN INTERNATIONAL COOPERATION AGENCY	Fig.	PROPOSED CROPPING PATTERN UNDER LIMITED IRRIGATION DURING RAINY SEASON
	F-04	

