付　表

表-1　計画地区の現状 (1/2)

Description	Ashaiman	Aveyime	Kpando-Torkor
1 Administration			
(1) Region	Greater Accra	Volta	Volta
(2) District	Tema	Tongu	Kpando
2 Planned command area*	148 ha	150 ha	356 ha
3 Actually developped area*	130 ha	63 ha	40 ha
4 Area to be expanded	18 ha	87 ha	316 ha
5 Construction activities			
(1) Commencement	1966	1962	Not available
(2) Completion	1968	1975	1976
6 Water source	Ashaiman reservoir	Volta river	Volta lake
7 Intake method	Butterfly valve	Pumps	Pumps
8 Irrigation and drainage facilities (Details are given in Table H.3.1)	Dam (5.8 million m3) Main canal (unlined, L=4.8 km) Laterals (unlined, L=11.0 km) Main drain (unlined, L=3.0 km) Lateral drains (unlined, L=6.0 km) Structures (577 nos.)	Main canal (concrete, L=0.4 km) Lateral canals (concrete, L=3.0 km) Main drain (unlined, L= 1.0 km) Lateral drains (unlined, L= 3.0 km) Structures (43 nos.)	2 movable centrifugal pumps Main pipeline (L=0.6 km) Lateral pipeline (L= 0.2 km) 60 sprinkler system 30 rain guns
9 Project organization	Site officer (1 no.) Extension officer (1 no.) Gate operator (1 no.) Watchman (1 no.)	Project manager (1 no.) Agri. extension worker (1 no.) Agronomist (1 no.) Mechanics (1 no.) Watchman (2 nos.) Cleaner (1 no.)	Project manager (1 no.) Pump attendant (1 no.) Watchman (1no.)
10 Irrigation period	April to December	April to July	November to January
11 Water distribution method	10.5 hrs. per day and Continuouse supply	8 hrs from 7:00 to 15:00 per day and 10 days interval	6 hrs. per day and 2 to 3 days rotation
12 Irrigated crops	Paddy, Okra, Tomato	Paddy	Okra
13 Major problems on irrigation drainage	(a) Deterioration of canals and structures. (b) Water shortage. (c) Much sediment and grasses in drains. (d) Concentration of salinity in parts of the project area. (e) Lack of rice mill, dry yard and storage facilities. (f) Insufficient space of of O & M office. (g) No vehicle for O & M.	(a) Deterioration of pumps (b) Leakage of canals (c) No measuring device (d) Much grasses and sediments in drains. (e) No water supply record.	(a) Deterioration of pumps and sprinkler system. (b) No water management manual. (c) No O & M manual. (d) No definite irrigation schedule based on cropping pattern and water requirement. (e) No water supply record. (f) Insufficient number of O & M staff. (g) Poor O & M office. (h) No vehicle/motor cycle for O & M. (i) Deteriortion of tractor for carring movable pumps.

表-1　計画地区の現状 (2/2)

Description	Mankessim	Okyereko
1 Administration		
(1) Region	Central	Central
(2) District	Mfantsiman	Gomoa
2 Planned command area*	256 ha	111 ha
3 Actually developped area*	17 ha	40 ha
4 Area to be expanded	239 ha	71 ha
5 Construction activities		
(1) Commencement	1974	1976
(2) Completion	1981	1988
6 Water source	Apropong reservoir	Okyereko reservoir
7 Intake method	Intake valve and pumps	Intake valve
8 Irrigation and drainage facilities (Details are given in Table H.3.1)	Dam (5.7 million m3) Intake gate/valve 2 pumps Main pipeline (L = 0.9 km) Lareral pipeline (L = 0.4 km) 45 sprinkler system	Dam (2.71 million m3) Main canal (lined,L=1.3 km) Laterals and sub-laterals (L=2 8 km) Main drain (unlined, L=2.0 km) Lateral drain (unlined, L=2.0 km) Structures (74 nos.)
9 Project organization	Project manager (1 no.) Topo-surveyor (1 no) Driver/Mechanic (1 no) Pump Attendant (1 no) Watchman (1 no)	Project manager (1 no.) Gate operator (1no.)
10 Irrigation period	December to April	September to January
11 Water distribution method	6 hrs. per day for 3.4 ha and 5 days rotation	12 hrs. for 2 laterals 10 days rotation
12 Irrigated crops	Okra, watermelon, garden egg	Paddy
13 Major problems on irrigation drainage	(a) Deterioration of pumps and sprinkler system. (b) Severe innundation by flood every year. (c) No water management manual. (d) No O & M manual. (e) No definite irrigation schedule based on cropping pattern and water requirement. (f) No water supply record. (g) Deterioration of O & M office. (h) Damage of bridge for spillway. (i) Much grasses in spillway drain.	(a) Deterioration of canals and structures. (b) Water shortage. (c) Much sediment and grasses in drains. (d) Concentration of salinity in parts of the project area. (e) No water management manual. (f) No O & M manual. (g) No definite irrigation schedule based on cropping pattern and water requirement. (h) Insufficient number of O & M staff. (i) Deterioration of O & M office. (j) No vehicle for O & M.

表-2 改修計画の概要

Facilities	Ashaiman	Aveyime	K.-Torkor	Mankessim	Okyereko
1 Pump station					
(1) Pump	- no(s)	5 no(s)	6 no(s)	5 no(s)	2 no(s)
(2) House	- no(s)	2 no(s)	2 no(s)	2 no(s)	1 no(s)
2 Irrigation system					
(1) Canal					
(a) Head race	- km	0.4 km	- km	km	- km
(b) Main	1.8 km	3.4 km	- km	- km	2.5 km
(c) Secondary	- km	0.3 km	- km	- km	0.3 km
(d) Lateral	4.6 km	7.8 km	- km	- km	6.7 km
(2) Pipeline system					
(a) Main	- km	1.3 km	2.9 km	1.7 km	- km
(b) Secondary	- km	- km	2.5 km	1.5 km	- km
(c) Lateral	- km	- km	10.8 km	6.3 km	- km
(e) Sprinkler	- sets	7 sets	66 sets	36 sets	- sets
3 Drainage system				-	
(1) Main	3.5 km	1.3 km	- km	- km	1.8 km
(2) Secondary	- km	1.8 km	- km	- km	1.7 km
(3) Lateral	7.2 km	12.3 km	- km	- km	7.6 km
(4) Collector	- km	- km	4.7 km	4.9 km	- km
4 Related structure					
(1) Outlet	- no(s)	1 no(s)	no(s)	no(s)	- no(s)
(2) Distribution box	- no(s)	1 no(s)	- no(s)	- no(s)	- no(s)
(3) Inlet	- no(s)	1 no(s)	- no(s)	- no(s)	- no(s)
(4) Division structure	1 no(s)	1 no(s)	- no(s)	- no(s)	- no(s)
(5) Turnout	11 no(s)	36 no(s)	- no(s)	- no(s)	19 no(s)
(6) Check	11 no(s)	25 no(s)	- no(s)	- no(s)	19 no(s)
(7) Measuring device	13 no(s)	38 no(s)	- no(s)	- no(s)	19 no(s)
(8) Syphon	- no(s)	- no(s)	- no(s)	- no(s)	1 no(s)
(9) Drop	130 no(s)	3.0 no(s)	- no(s)	- no(s)	73 no(s)
(10) Energy dissipator	1 no(s)	- no(s)	- no(s)	- no(s)	- no(s)
(11) Culvert	8 no(s)	15 no(s)	- no(s)	- no(s)	6 no(s)
(12) Field outlet	140 no(s)	238 no(s)	- no(s)	- no(s)	203 no(s)
(13) Cross drain	11 no(s)	14 no(s)	20 no(s)	28 no(s)	6 no(s)
(14) Causeway	2 no(s)	- no(s)	5 no(s)	- no(s)	2 no(s)
(15) Drop for drain	1 no(s)	- no(s)	- no(s)	- no(s)	- no(s)
(16) Protection for spillway	700 m2	- m	- m2	- m2	1,200 m2
5 Farm road					
(1) Main	1.6 km	2.9 km	3.3 km	0.9 km	2.2 km
(2) Lateral	4.0 km	6.0 km	10.1 km	8.9 km	7.6 km
(3) Access road	- km	- km	4.3 km	- km	- km
6 Project building					
(1) Office	- no(s)	1 no(s)	1 no(s)	1 no(s)	1 no(s)
(2) Store	- no(s)	1 no(s)	2 no(s)	1 no(s)	1 no(s)
(3) Garage	- no(s)	1 no(s)	2 no(s)	1 no(s)	1 no(s)
(4) Dry yard	- no(s)	1 no(s)	2 no(s)	1 no(s)	1 no(s)
(5) Sorter house	1 no(s)	1 no(s)	2 no(s)	1 no(s)	1 no(s)
(6) Dormitory for officer	2 no(s)	- no(s)	- no(s)	no(s)	- no(s)
(7) Lecture hall	- no(s)	- no(s)	- no(s)	- no(s)	1 no(s)
(8) Dormitory for farmers	1 no(s)	- no(s)	- no(s)	- no(s)	- no(s)
(9) Fence for office	500 m	- no(s)	- no(s)	- m	- m
7 Electric line	- km	2.6 km	8.0 km	3.5 km	8.0 km
8 Green belt	- km	- km	9.6 km	2.5 km	- km
9 Supplymentary water supply facilities					
(1) Weir	- no(s)	- no(s)	- no(s)	- no(s)	1 no(s)
(2) Head race	- km	- km	- km	- km	0.2 km
(3) Pipe line	- km	- km	- km	- km	0.8 km
(4) Outlet	- no(s)	- no(s)	- no(s)	- no(s)	1 no(s)
(5) Chute	- km	- km	- km	- km	0.3 km

表-3 移管後の実施機関要員計画

	Present Condition			Proposed Staffing after Handing-over			
	Department	No. of Staff		Department	No. of Staff		Remarks
GIDA Head Office	Department of Project Operations	- Director	1	Department of Project Operations	- Director	1	
	- Project Management Division	- Agronomist	2	- Extension Division	- SMO (Training)*1	1	
	- Project Accounting Division		0		- SMO (Crops)*1	1	
	- Plant & Equipment Division	- Deputy Director	1		- SMO (Co-op., Marketing & Credit)*1	1	
	- Agricultural Division	- Deputy Director	1		- SMO (Women's Activities)*1	1	
	- Soil Division	- Deputy Director	1	- O&M Division	- Irrigation Engineer	1	
					- Civil Engineer	1	
					- Mechanical Engineer	1	
					- Mechanic	1	
				- Project Monitoring and Evaluation Division	- Agro-economist	1	
					- Irrigation Engineer	1	
					- Book Keeper	1	
					- Computer Operators	2	
	Total		6	Total		14	

PM Offices	Irrigation	Develop-ment Area (ha)	No. of Staff		Irrigation	Develop-ment Area (ha)	No. of Staff		Remarks
Ashaiman	Gravity	130	- PM (Production Officer)	1	Gravity	56	- O&M Officer	1	- O&M is carried out by the society.
			- Technical Officer	1			- Extension Officer	1	
			- Water Bailiff	1			- Monitor	1	
			- Watchman	1			- Operator of Heavy Equipment	1	
							- Watchman	1	
Aveyime	Pump/ Gravity	63	- PM (Production Officer)	1	Pump/ Gravity	95	- O&M Officer	1	- All facilities are operated and maintained by the society.
			- Senior Production Officer	1			- Extension Officer	1	
			- Pump Attendant	1			- Monitor	1	
			- Watchmen	2			- Watchman	1	
			- Cleaner	1					
Kpando-Torkor	Sprinkler	40	- PM (Senior Technical Officer)	1	Sprinkler	155	- O&M Officer	1	- The PM Office operates two pump stations, and the farmers are responsible for O&M of sprinkler irrigation systems below pump stations. The PM Office employs two pump attendants, and the society employs several assistant pump attendants for assisting operation of pump stations by the PM Office.
							- Extension Officer	1	
			- Pump Attendant	1			- Monitor	1	
			- Watchman	1			- Pump Attendants	2	
							- Watchmen	3	
Mankessim	Sprinkler	17	- PM (Production Officer)	1	Sprinkler	86	- O&M Officer	1	- The society employs two pump attendants and several assistant pump attendants for operation of two pump stations. The PM office has no such operators.
			- Driver (Mechanic)	1			- Extension Officer	1	
			- Pump Attendant (Mechanic)	1			- Monitor	1	
			- Watchman	1			- Watchman	1	
			- Surveyor	1					
Okyereko	Pump/ Gravity	40	- PM (Production Officer)	1	Pump/ Gravity	81	- O&M Officer	1	- All facilities are operated by the society.
			- Labourer	1			- Extension Officer	1	
							- Monitor	1	
							- Watchman	1	
Total		290		20		473		25	

*1 SMO = Subject Matter Officer

表-4 運営・維持管理及び農民組織育成に関する教育・訓練計画

Training Course	Period of Course (day)	Persons/ Course (Person)	Times/ Year (Time)	Trainees	Contents of Training
Course-A	2	4 - 5	1	Senior officers of GIDA and other agencies involved in O&M (Director, Deputy Director, department heads, etc.)	- Outline of O&M and strengthening of the societies, - Outline of agricultural support services, - Farmers' participant management system, - Role of women in development
Course-B	6	20	2	Officers involved in O&M (Regional managers, officers of head office, PM, production officers, technical officers, etc.)	- Estimation of water requirement - Preparation of irrigation schedule, - O&M of facilities and handing over process, - Strengthening of the farmers' societies, - Duties of GIDA and the farmers' societies for O&M - Monitoring system, measuring and surveying methods, - Administrative services to the farmers, - Promoting women in development, etc.
Course-C	12	20 - 30	3	Farmer's level including leaders of the farmers' societies, gate keepers, pump attendants, mechanics, key farmers and informal rural leaders.	- O&M of facilities, water requirement, water delivery, etc. - Irrigation schedule and cropping calendar, - Management of the farmers' societies such as accounting, book keeping and auditing, - Articles and by-laws for O&M - Duties of GIDA and the farmers' society for O&M - Monitoring system, measuring and surveying methods, - Group loan, cooperative purchasing of farm inputs, etc.
Course-D	2	20	2	Officials involved in irrigation management in other agencies (extension officers of MOFA, officers of the Department of Cooperative at district level, Banks, etc.)	- Objectives and outline of O&M by the farmers' society, - Activities of farmers' society, - Required agricultural supporting services, - Promoting women in development, etc.
Course-E	2	20 - 30	1	Village chiefs, elder people in the village, etc.	- Outline of O&M by the farmers' society, - Organization and activities of the society, - Duties of GIDA and the farmers' societies, etc.

Note: The following-up training for specific items is conducted occasionally after handing over of O&M.

表-5　予想される環境影響 (1/5)

(1) Ashaiman 地区

Probable / Potential Impacts	Stage				Comments / Recommended Mitigation Measures
	Construction		Operation		
	without	with *1	without	with *1	
1 Soil erosion in and around the construction sites	3N	-	-	-	• No fresh cut and embankment which can introduce the effect are not in the project works.
2 Alternation or destruction of the habit of flora and fauna	-	-	-	-	• Unlikely
3 Damage to historic, cultural or religious area	-	-	-	-	• No such site exists
4 Effects on farm land, existing facilities, houses, due to project works	3N	-	-	-	• Quality and quantity of water flowing into the fish pond near dam wall might be effected. • This effect will be eliminated by undertaking the proper management of waste water.
5 Deterioration of water quality in downstream	2N a-c-e	3N	2N a-c-e	3N	• Liquid waste from concrete preparation works might be effused. • Proper disposal of the liquid waste the shall be enforced thoroughly. • IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • Proper water management taking agro-chemical input into consideration will be undertaking.
6 Health hazard from agro-chemical	-	-	2N a-c-e	3N	• IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • The hazard will be minimized by proper handling way of chemical under proposed extension works.
1 Reduction of downstream flows that affect users of water	-	-	-	-	• Present flow from project site into drain is quite low.
2 Increase of downstream flows affecting downstream ecology and/or community	-	-	2P a-d	2P a-d	• Water quality of downstream will be improved by diffusion effect of the polluted water.
3 Land degradation in the project area due to erosion hazard	-	-	-	-	• No such site exists
4 Land degradation in the project area due to salt-accumulation	-	-	2N a-d-e	2P a-d	• Present salt-effected area will be reclaimed by irrigation farming because of establishment of proper drainage system.
5 Increased incidence of water borne diseases	-	-	3N	-	• The infection from paddy field is hardly observed at present. Cropping intensity of paddy will not be increased with project. • O&M works such as weeding canal and bund, and pesticide application which make snail's habitat decrease will be undertaken by farmers.
6 Increase of constructed-related employment opportunity	2P a-c	2P a-c	-	-	• The construction works will provide temporary job opportunity to the villagers nearby.
7 Increase of crop production	-	-	1P a-d	1P a-d	• The biggest positive effect of the project. • This will be lead to higher living standard of the population.
8 Increase of agricultural-related employment opportunity	-	-	1P b-d	1P b-d	• Employment opportunity in marketing of inputs and outputs, processing, etc. will be increased substantially.

Remarks : *1 "with" indicates future condition with conservation measurements.

Significance of impact
1 : Significant
2 : Moderate
3 : Minor

Feature of impact
P : Positive
N : Negative

Characteristics of impact
a : Direct
b : Indirect
c : Short term
d : Long term
e : Reversible
f : Irreversible

The feature of impacts is indicated as follows:

1N a-c-e　Negative impact would be significant, direct, short term, and reversivle.

1P a-c-e　Positive impact would be significant, direct, short term, and reversivle.

The characteristics of insignificant impacts are not identified.

表-5　予想される環境影響 (2/5)

(2) Aveyime 地区

Probable / Potential Impacts	Stage				Comments / Recommended Mitigation Measures
	Construction		Operation		
	without	with *1	without	with *1	
1 Soil erosion in and around the construction sites	3N	-	-	-	• No fresh cut and embankment which can introduce the effect are not in the project works.
2 Alternation or destruction of the habit of flora and fauna	-	-	-	-	• Unlikely
3 Damage to historic, cultural or religions area	-	-	-	-	• No such site exists
4 Deterioration of water quality in downstream	2N a-c-e	3N	2N a-c-e	3N	• Liquid waste from concrete preparation works might be effused. • Proper disposal of the liquid waste the shall be enforced thoroughly. • IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • Proper water management taking agro-chemical input into consideration will be undertaking.
5 Decrease of crop production on construction phase	-	-	-	-	• Irrigation facility completely does not work at present.
6 Health hazard from agro-chemicals	-	-	2N a-c-e	3N	• IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • The hazard will be minimized by proper handling way of chemical under proposed extension works.
7 Increase of downstream flows affecting downstream ecology and/or community	-	-	-	-	• Unlikely
8 Land degradation in the project area due to erosion hazard	-	-	-	-	• No such site exists
9 Land degradation in the project area due to salt-accumulation	-	-	2N a-d-e	-	• Salt-effected area is not found in the project area at present. But it has a potential to progress the salt accumulation under un-proper drainage system.
10 Increased incidence of water borne diseases	-	-	2N a-d-e	2 - 3N a-d-e	• The infection from paddy field is hardly observed at present. However, since cropping intensity of paddy will be increased with project, the incident of diseases might be increased. • Health education of local people shall be undertaken. • O&M works such as weeding canal and bund, and pesticide application which make snail's habitat decrease will be undertaken by farmers.
11 Increase of constructed-related employment opportunity	2P a-c	2P a-c	-	-	• The construction works will provide temporary job opportunity to the villagers nearby.
12 Increase of crop production	-	-	1P a-d	1P a-d	• The biggest positive effect of the project. • This will be lead to higher living standard of the population.
13 Increase of agricultural-related employment opportunity	-	-	1P b-d	1P b-d	• Employment opportunity in marketing of inputs and outputs, processing, etc. will be increased substantially.

Remarks : *1 "with" indicates future condition with conservation measurements.

Significance of impact
1 : Significant
2 : Moderate
3 : Minor

Feature of impact
P : Positive
N : Negative

Characteristics of impact
a : Direct
b : Indirect
c : Short term
d : Long term
e : Reversible
f : Irreversible

The feature of impacts is indicated as follows:

1N a-c-e　Negative impact would be significant, direct, short term, and reversivle.

1P a-c-e　Positive impact would be significant, direct, short term, and reversivle.

The characteristics of insignificant impacts are not identified.

表-5　予想される環境影響 (3/5)

(3) Kpando-Torkor 地区

Probable / Potential Impacts	Stage				Comments / Recommended Mitigation Measures
	Construction		Operation		
	without	with *1	without	with *1	
1 Soil erosion in and around the construction sites	3N	-	-	-	• No fresh cut and embankment which can introduce the effect are not in the project works.
2 Alternation or destruction of the habit of flora and fauna	3N	-	2-3N b-d-e	3N	• The extension area of about 110 ha presently used for shifting cultivation and woods collection by villagers, even the area is not primary forest. Dependance on remaining bush will be increased and it might result in land degradation. • Extension works for reforestation and reduction of shifting cultivation shall be carried out. Through the works, the farmers could aware the importance of forest for their life and they could manage the area by themselves.
3 Damage to historic, cultural or religions area	-	-	-	-	• No such site exists
4 Deterioration of water quality in downstream	1 - 2N a-c-f	2 - 3N a-c-f	2N a-c-e	3N	• Efficient use (recycle) or leveling of disposal materials form excavation works shall be undertaken completely. • Liquid waste from concrete preparation works might be effused. • Proper disposal of the liquid waste the shall be enforced thoroughly. • IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • Fertilizer incorporating and mulching works could minimize the effect.
5 Health hazard from agro-chemicals	-	-	2N a-c-e	3N	• IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • The hazard will be minimized by proper handling way of chemical under proposed extension works.
6 Land degradation in the project area due to erosion hazard at operation stage	-	-	1 - 2N a-d-f	2 - 3N a-d-f	• Soil conservation measures such as contour bund with strip cropping and waterways will be included in the project components. • Mulching and contour plowing undertaken by farmers could minimize the effect.
7 Land degradation in the project area due to salt-accumulation	-	-	-	-	• No such site exists.
8 Increased incidence of water borne diseases	-	-	3N	-	• No additional effect can be expected.
9 Increase of constructed-related employment opportunity	2P a-c	2P a-c	-	-	• The construction works will provide temporary job opportunity to the villagers nearby.
10 Increase of crop production	-	-	1P a-d	1P a-d	• The biggest positive effect of the project. • This will be lead to higher living standard of the population.
11 Increase of agricultural-related employment opportunity	-	-	1P b-d	1P b-d	• Employment opportunity in marketing of inputs and outputs, processing, etc. will be increased substantially.

Remarks : *1 "with" indicates future condition with conservation measurements.

Significance of impact
1 : Significant
2 : Moderate
3 : Minor

Feature of impact
P : Positive
N : Negative

Characteristics of impact
a : Direct
b : Indirect
c : Short term
d : Long term
e : Reversible
f : Irreversible

The feature of impacts is indicated as follows:

1N a-c-e　Negative impact would be significant, direct, short term, and reversivle.

1P a-c-e　Positive impact would be significant, direct, short term, and reversivle.

The characteristics of insignificant impacts are not identified.

表-5　予想される環境影響 (4/5)

(4) Mankessim 地区

Probable / Potential Impacts	Stage				Comments / Recommended Mitigation Measures
	Construction		Operation		
	without	with *1	without	with *1	
1 Soil erosion in and around the construction sites	3N	-	-	-	• No fresh cut and embankment which can introduce the effect are not in the project works.
2 Alternation or destruction of the habit of flora and fauna	3N	-	3N	-	• Almost rehabilitation area has been developed and existing forest is scarcely found in the area.
3 Damage to historic, cultural or religions area	2N a-c-f	3N	2N a-c-f	3N	• There is a sacred grove of 0.4 ha in rehabilitation area. However, the area is excluded from rehabilitation plan. • Careful attention for un-disturbing the area should be taken on both stages.
4 Deterioration of water quality in downstream	2N a-c-e	3N	2N a-c-e	3N	• Liquid waste from concrete preparation works might be effused. • Proper disposal of the liquid waste the shall be enforced thoroughly. • IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • Fertilizer incorporating and mulching works could minimize the effect.
5 Decrease of crop production on construction phase	3N	3N	-	-	• No irrigation water supply in construction phase, but just 1 year. • This effect is already accepted by farmers. In the year, farmer can get a work as construction labour.
6 Health hazard from agro-chemicals	-	-	2N a-c-e	3N	• IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • The hazard will be minimized by proper handling way of chemical under proposed extension works.
7 Land degradation in the project area due to salt-accumulation	-	-	-	-	• No such site exists.
8 Increased incidence of water borne diseases	-	-	3N	-	• No additional effect can be expected.
9 Increase of constructed-related employment opportunity	2P a-c	2P a-c	-	-	• The construction works will provide temporary job opportunity to the villagers nearby.
10 Increase of crop production	-	-	1P a-d	1P a-d	• The biggest positive effect of the project. • This will be lead to higher living standard of the population.
11 Increase of agricultural-related employment opportunity	-	-	1P b-d	1P b-d	• Employment opportunity in marketing of inputs and outputs, processing, etc. will be increased substantially.

Remarks : *1 "with" indicates future condition with conservation measurements.

Significance of impact
1 : Significant
2 : Moderate
3 : Minor

Feature of impact
P : Positive
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Characteristics of impact
a : Direct
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e : Reversible
f : Irreversible

The feature of impacts is indicated as follows:

1N a-c-e　Negative impact would be significant, direct, short term, and reversivle.

1P a-c-e　Positive impact would be significant, direct, short term, and reversivle.

The characteristics of insignificant impacts are not identified

表-5　予想される環境影響 (5/5)

(5) Okyereko 地区

Probable / Potential Impacts	Stage				Comments / Recommended Mitigation Measures
	Construction		Operation		
	without	with *1	without	with *1	
1 Soil erosion in and around the construction sites	3N	-	-	-	• No fresh cut and embankment which can introduce the effect are not in the project works.
2 Alternation or destruction of the habit of flora and fauna	-	-	-	-	• Unlikely
3 Damage to historic, cultural or religions area	2N a-c-f	3N	3N	-	• There is a sacred grove of 0.4 ha in rehabilitation area. However, the area is excluded from rehabilitation plan. • The excavation works for drainage improvement is not included in project activities.
4 Effects on farm land, existing facilities, houses, due to project works	-	-	2N a-d-e	3N	• After construction of pumping station and intake facilities, seasonal flood damage will expand to roads and/or farm land. • Design and plan shall pay the attention carefully, and flood dike to protect to farm lands will be established.
5 Deterioration of water quality in downstream	2N a-c-e	3N	2N a-c-c	3N	• Liquid waste from concrete preparation works might be effused. • Proper disposal of the liquid waste the shall be enforced thoroughly. • IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • Proper water management taking agro-chemical input into consideration will be undertaking.
6 Health hazard from agro-chemicals	-	-	2N a-c-c	3N	• IPM or proper use of fertilizer and pesticide will be included in the improved farming practices. • The hazard will be minimized by proper handling way of chemical under proposed extension works.
7 Reduction of downstream flows that affect users of water	-	-	-	-	• Present flow from project site into drain is quite low.
8 Increase of downstream flows affecting downstream ecology and/or community	-	-	-	-	• Unlikely
9 Land degradation in the project area due to salt-accumulation	-	-	2N a-d-e	2P a-d	• Present salt-effected area will be reclaimed by irrigation farming because of establishment of proper drainage system.
10 Increased incidence of water borne diseases	-	-	2N a-d-e	3N	• The infection from paddy field is hardly observed at present. However, since cropping intensity of paddy will be increased with project, the incident of diseases might be increased. • Health education of local people shall be undertaken. • O&M works such as weeding canal and bund, and pesticide application which make snail's habitat decrease will be undertaken by farmers.
1 Increase of constructed-related employment opportunity	2P a-c	2P a-c	-	-	• The construction works will provide temporary job opportunity to the villagers nearby.
2 Increase of crop production	-	-	1P a-d	1P a-d	• The biggest positive effect of the project. • This will be lead to higher living standard of the population.
3 Increase of agricultural-related employment opportunity	-	-	1P b-d	1P b-d	• Employment opportunity in marketing of inputs and outputs, processing, etc. will be increased substantially.

Remarks : *1 "with" indicates future condition with conservation measurements.

Significance of impact
1 : Significant
2 : Moderate
3 : Minor

Feature of impact
P : Positive
N : Negative

Characteristics of impact
a : Direct
b : Indirect
c : Short term
d : Long term
e : Reversible
f : Irreversible

The feature of impacts is indicated as follows:

1N a-c-e　Negative impact would be significant, direct, short term, and reversivle.

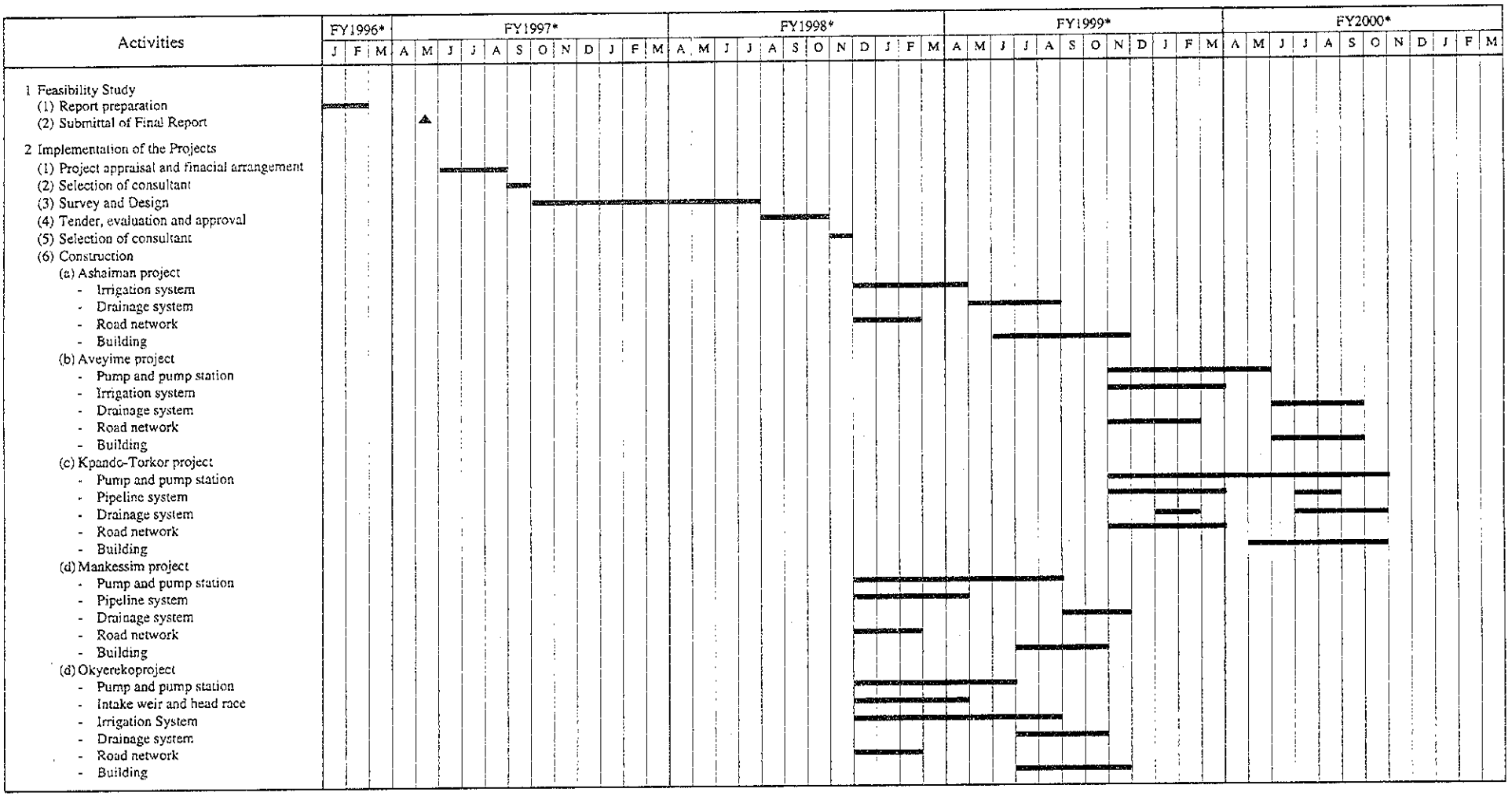
1P a-c-e　Positive impact would be significant, direct, short term, and reversivle.

The characteristics of insignificant impacts are not identified.

表-6　提案される土壌侵食防止工

Descriptions	Merits	Demerits
Vegetative Measures		
1. Contour hedgerow (Strip cropping) Vegetative rows or strips established along the contour. Trees serve as live barrier to surface runoff and soil erosion. If the nitrogen fixing crops or trees such as leguminous crops are used, it can improve soil condition.	1. Economical 2. Adaptable to various conditions 3. Easier to establish and repair 4. Durable if maintained properly 5. Improve the soil condition, if nitrogen fixing crops are used	1. It takes some time to attain benefits 2. Less effective when slope is too steep 3. Hedgerows may pose competition with crops
2. Mulching The mulching is the covering of the soil with crop residues such as straw, maize stalks, palm fronds or standing stubbles. The effect of mulching is the reducing of raindrop impact and of the velocity of runoff.	1. Economical 2. Adaptable to various conditions 3. Easier to establish and repair 4. Keeping of soil moisture and temperature 5. Improve the soil condition	1. Application of mulch may be required on each cropping season in tropical area 2. It requires a large amount of grasses (materials) for mulching
3. Agroforestry It is a system to incorporate trees within a farming system by planting them on land.	1. Economically 2. Trees can provide fuels, fodder, fruits, etc. to the farmers.	1. It takes some time to attain benefits 2. Trees may pose competition with crops 3. Less effective when slope is too steep
Physical Measures		
4. Contour bunds They are earth bunds, 1.5 to 2 m wide, thrown across the slope to act as a barrier to runoff, to form a water storage area on their upslope side and to break up a slope into segments shorter in length than is required to generate overland flow. They are frequently used with strip-cropping system.	1. Relatively easier to construct and repair 2. They are suitable for slopes of 1 to 7 degree.	1. The effectiveness is limited when heavy rains continue long. 2. The effectiveness is limited when used in very steep slope.
5. Waterways (Contour Ditches and Drainage Canals) They are digging structures established in the hillsides to check the erosive power of surface runoff by tapping soil particles. Drainage canal (grass waterways) are used as the outlet for contour ditches. It runs downslope and empty into river system or other outlets.	1. Relatively easier to construct and repair 2. Ditches and canals can be good water impoundment structures that can hold water for plants.	1. The effectiveness is limited when heavy rains continue long. 2. The effectiveness is limited when used in very steep slope.
Cultural Measures		
6. Contour Plowing It is a plowing method to create furrows following the contour of the land.	1. It increases water absorption capacity of the soil. 2. It also reduces both the quantity and velocity of surface runoff.	1. A bit difficult to plow properly.
7. Contour Planting It is a planting method following the contour of the land. The crops planted act as barriers to the force of surface runoff.	1. Easy to adopt	1. The effect is not high, if only it is adopted .

表-7　事業実施計画



* Japanese fiscal year

Note: Construction of five projects will be carried out by dividing them into two groups: 1st group=Ashiman project, Mankessim project and Okyereko project and 2nd group=Kpando-Torkor project and Aveyime project. This grouping is made considering the need of early implementation of Ashaiman project due to execution of farmers' training and easy and effective control of construction of Mankessim and Okyereko projects due to close location.

表-8　事業費

(Unit :10^6 Cedi)

Item	Ashaiman	Aveyime	Kpando-Torkor	Mankessim	Okyreko	Total
1 Development Area	56 ha	95 ha	155 ha	86 ha	81 ha	473 ha
2 Direct Construction Cost						
(1) Pump station	0	558	1,953	747	272	3530
(2) Irrigation system						
(a) Canal	388	729	0	0	595	1712
(b) Pipeline	0	106	1,360	787	0	2253
(3) Drainage system	33	28	285	394	38	778
(4) Farm road	44	97	178	92	87	498
(5) Related structures	116	95	67	31	155	464
(6) Building*	306	167	221	167	188	1049
(7) Supplimental water supply facility	0	0	0	0	219	219
(8) Green belt	0	0	118	31	0	149
(9) Electric line	0	72	218	97	207	594
(10) Minor repairing of dam crest	0	0	0	4	0	4
Total of Item 2	887	1,852	4,400	2,350	1,761	11,250
3 O & M Equipment**	319	113	176	150	148	906
4 Engineering Services***	133	278	660	353	264	1688
5 Administration Cost****	44	93	220	118	88	563
Total of Item 2 to5	1,383	2,336	5,456	2,971	2,261	14,407
6 Physical Contingency*****	89	185	440	235	176	1125
Total of Item 2 to6	1,472	2,521	5,896	3,206	2,437	15,532
(Cost per ha in 10^3 Cedi)	26,286	26,537	38,039	37,279	30,086	32,837
(Cost per ha in US$)	15,462	15,610	22,376	21,929	17,698	19,316
7 Price Contingency******	490	1,055	1,896	671	759	4871
Total of Item 2 to 7	1,962	3,576	7,792	3,877	3,196	20,403
Total in 10^3 US$	1,154	2,104	4,584	2,281	1,880	12,002
Cost per ha in 10^3 Cedi	35,036	37,642	50,271	45,081	39,457	43,135
Cost per ha in US$	20,609	22,142	29,571	26,518	23,210	25,374

* : Cost of training facility such as lecture hall, domitories and dining hall is included in Ashaiman project, and cost of lecture hall is also included in Okyereko project.
** : Purchasing cost of backhoe and bus which will be used for all projects, is included in Ashaiman project.
*** : 15% of direct construction cost.
**** : 5% of dorect construction cost.
***** : 10% of direct construction cost.
****** : annual escalation rate of 2.5% for Foreign currency and 25.0% for local currency (see Table I-14).

表-9　年間資金計画

(unit: 10^6 Cedi)

Item	Total			FY1997			FY1998			FY1999			FY2000		
	L/C	F/C	Amount	L/C	F/C	Amount	L/C	F/C	Amount	L/C	F/C	Amount	L/C	F/C	Amount
1 Ashaiman Project															
(1) Direct construction cost*	505	382	887	0	0	0	253	191	444	252	191	443	0	0	0
(2) O & M equipment**	0	319	319	0	0	0	0	319	319	0	0	0	0	0	0
(3) Engineering services (15%of F/C of (1))	0	133	133	0	40	40	0	67	67	0	26	26	0	0	0
(4) Administration cost (5% of (1))	25	19	44	0	0	0	12	10	22	12	10	22	0	0	0
Sub-total	530	853	1,383	0	40	40	265	587	852	264	227	491	0	0	0
(5) Physical contingency (10% of (1))	51	38	89	0	0	0	26	19	45	25	19	44	0	0	0
Sub-total	581	891	1,472	0	40	40	291	606	897	289	246	535	0	0	0
(6) Price contingency	439	51	490	0	1	1	164	31	195	275	19	294	0	0	0
Total	1,020	942	1,962	0	41	41	455	637	1,092	564	265	829	0	0	0
2 Aveyime Project															
(1) Direct construction cost	728	1,124	1,852	0	0	0	0	0	0	510	787	1,297	218	337	555
(2) O & M equipment	0	113	113	0	0	0	0	0	0	0	113	113	0	0	0
(3) Engineering services (15%of F/C of (1))	0	278	278	0	83	83	0	56	56	0	83	83	0	56	56
(4) Administration cost (5% of (1))	36	57	93	0	0	0	0	0	0	26	39	65	10	18	28
Sub-total	764	1,572	2,336	0	83	83	0	56	56	536	1,022	1,558	228	411	639
(5) Physical contingency (10% of (1))	73	112	185	0	0	0	0	0	0	51	79	130	22	33	55
Sub-total	837	1,684	2,521	0	83	83	0	56	56	587	1,101	1,688	250	444	694
(6) Price contingency	919	136	1,055	0	2	2	0	3	3	559	85	644	360	46	406
Total	1,756	1,820	3,576	0	85	85	0	59	59	1,146	1,186	2,332	610	490	1,100
3 Kpando-Torkor Project															
(1) Direct construction cost	1,146	3,254	4,400	0	0	0	0	0	0	688	1952	2,640	458	1302	1,760
(2) O & M equipment	0	176	176	0	0	0	0	0	0	0	176	176	0	0	0
(3) Engineering services (15%of F/C of (1))	0	660	660	0	198	198	0	132	132	0	198	198	0	132	132
(4) Administration cost (5% of (1))	57	163	220	0	0	0	0	0	0	34	98	132	23	65	88
Sub-total	1,203	4,253	5,456	0	198	198	0	132	132	722	2,424	3,146	481	1,499	1,980
(5) Physical contingency (10% of (1))	115	325	440	0	0	0	0	0	0	69	195	264	46	130	176
Sub-total	1,318	4,578	5,896	0	198	198	0	132	132	791	2,619	3,410	527	1,629	2,156
(6) Price contingency	1,513	383	1,896	0	5	5	0	7	7	754	202	956	759	169	928
Total	2,831	4,961	7,792	0	203	203	0	139	139	1,545	2,821	4,366	1,286	1,798	3,084
4 Mankessim Project															
(1) Direct construction cost	635	1,715	2,350	0	0	0	381	1,029	1,410	254	686	940	0	0	0
(2) O & M equipment	0	150	150	0	0	0	0	150	150	0	0	0	0	0	0
(3) Engineering services (15%of F/C of (1))	0	353	353	0	106	106	0	177	177	0	70	70	0	0	0
(4) Administration cost (5% of (1))	32	86	118	0	0	0	19	52	71	13	34	47	0	0	0
Sub-total	667	2,304	2,971	0	106	106	400	1,408	1,808	267	790	1,057	0	0	0
(5) Physical contingency (10% of (1))	63	172	235	0	0	0	38	103	141	25	69	94	0	0	0
Sub-total	730	2,476	3,206	0	106	106	438	1,511	1,949	292	859	1,151	0	0	0
(6) Price contingency	525	146	671	0	3	3	247	77	324	278	66	344	0	0	0
Total	1,255	2,622	3,877	0	109	109	685	1,588	2,273	570	925	1,495	0	0	0
5 Okyereko Project															
(1) Direct construction cost***	764	997	1,761	0	0	0	382	499	881	382	498	880	0	0	0
(2) O & M equipment	0	148	148	0	0	0	0	148	148	0	0	0	0	0	0
(3) Engineering services (15%of F/C of (1))	0	264	264	0	79	79	0	132	132	0	53	53	0	0	0
(4) Administration cost (5% of (1))	38	50	88	0	0	0	19	25	44	19	25	44	0	0	0
Sub-total	802	1,459	2,261	0	79	79	401	804	1,205	401	576	977	0	0	0
(5) Physical contingency (10% of (1))	76	100	176	0	0	0	38	50	88	38	50	88	0	0	0
Sub-total	878	1,559	2,437	0	79	79	439	854	1,293	439	626	1,065	0	0	0
(6) Price contingency	665	94	759	0	2	2	247	44	291	418	48	466	0	0	0
Total	1,543	1,653	3,196	0	81	81	686	898	1,584	857	674	1,531	0	0	0
6 Grand Total	8,405	11,998	20,403	0	519	519	1,826	3,321	5,147	4,682	5,871	10,553	1,896	2,288	4,184

* : including common trainning facility such as domitories, lecture hall and dining hall (160,201,000 Cedi under L/C and 106,801,000 Cedi under F/C).
** : including common O & M equipment such as Backhoe and bus (209,000,000 Cedi under F/C).
*** : including common training facility of lecture hall (12,403,000 Cedi under LC and 8,269,000 Cedi under F/C).

表-10　更新費

(Unit: 1000 Cedi)

Item	Useful Life	Ashiaman (56 ha)			Aveyime (95 ha)			Kpandor-Torkor (155 ha)		
		L/C	F/ C	Total	L/C	F/ C	Total	L/C	F/ C	Total
1 Pump and accessories	15	-	-	-	50,074	450,653	500,727	125,181	1,126,635	1,251,816
2 Steel pipe	20	-	-	-	4,335	39,015	43,350	58,908	530,175	589,083
3 Sprinkler system	15	-	-	-	6,340	57,060	63,400	59,777	537,992	597,769
4 Steel gate	20	898	8,078	8,976	3,169	28,520	31,689	680	6,120	6,800
5 Intake valve	20	560	5,040	5,600	-	-	-	-	-	-
6 O & M equipment	10	0	137,000	137,000	0	153,800	153,800	0	243,700	243,700

(Unit: 1000 Cedi)

Item	Useful Life	Mankessim (86 ha)			Okyereko (81 ha)		
		L/C	F/ C	Total	L/C	F/ C	Total
1 Pump and accessories	15	68,726	618,538	687,264	25,546	229,918	255,464
2 Steel pipe	20	35,852	322,665	358,517	12,500	112,500	125,000
3 Sprinkler system	10	32,606	293,450	326,056	-	-	-
4 Steel gate	20	-	-	-	1,550	13,949	15,499
5 Intake valve	20	-	-	-	-	-	-
6 O & M equipment	10	0	149,900	149,900	0	147,800	147,800

表-11　運営・維持管理費

(Unit : 1000 Cedi)

Description	Ashaiman	Aveyime	Kpndo-Torkor	Mankessim	Okyereko
1 Development Area	56 ha	95 ha	155 ha	86 ha	81 ha
2 Administration Cost					
(1) Salary of project staff	3,700	3,700	3,700	3,700	3,700
(2) Operarion cost of office	500	500	500	500	500
Sub-total	4,200	4,200	4,200	4,200	4,200
3 O & M of Pump and Pump Station					
(1) Operation cost (Cedi 49/kWH)	-	8,300	20,400	12,100	7,800
(2) Maintenance cost*	-	15,500	41,700	20,700	6,400
Sub-total	-	23,800	62,100	32,800	14,200
4 O & M of Command Area					
(1) O & M equipment	1,003	1,142	1,464	1,148	1,176
(2) Labour cost**	678	1,086	551	516	783
(3) Material cost***	778	839	1,024	438	693
(4) Contract for repair****	1,170	1,259	1,536	657	657
Sub-total	3,629	4,326	4,575	2,759	3,309
Total	7,829	32,326	70,875	39,759	21,709
Cost per ha in Cedi	139,804	340,274	457,258	462,314	268,012
Cost per ha in US$	82	200	269	272	158

*　: 5 % of pump and accessories costs per year.

**　: 10 man-day per km for irrigation canal, drainage canal, green-belt and road (Cedi 3000/man-day).

***　: 0.08 % of direct construction cost excluding pump and pump station.

**** : 0.12 % of direct construction cost excluding pump and pump station.

表-12 ガーナ国政府年次別経常歳出及び開発投資額

(Unit: Cedis Million)

	Total Expenditures					Recurrent Expenditures					Development Expenditures				
	1990	1991	1992	1993	1994*	1990	1991	1992	1993	1994*	1990	1991	1992	1993	1994*
General Services															
General Public Services	33,376	41,732	60,710	78,116	168,188	27,787	34,113	46,861	71,488	134,878	5,589	7,619	13,849	6,628	33,310
Defence	9,006	15,230	18,201	26,600	36,147	8,334	14,750	16,783	24,712	31,883	672	480	1,418	1,888	4,264
Public Order and Safety	13,470	17,155	25,717	35,718	50,448	12,905	15,622	23,802	32,224	44,442	565	1,533	1,915	3,494	6,006
Total	55,852	74,117	104,628	140,434	254,783	49,026	64,485	87,446	128,424	211,203	6,826	9,632	17,182	12,010	43,580
Community and Social Services															
Education	64,835	78,801	119,383	158,119	213,901	58,139	74,452	113,814	151,345	208,864	6,696	4,349	5,569	6,774	5,037
Health	25,706	28,654	38,893	59,674	55,802	20,584	25,501	34,738	52,873	49,907	5,122	3,153	4,155	6,801	5,895
Social Security and Welfare Services	18,389	23,884	34,674	68,424	82,587	18,041	22,624	33,054	67,932	81,495	348	1,260	1,620	492	1,092
Housing and Community Amenities	6,607	7,481	9,242	11,136	33,326	1,516	1,894	2,189	3,351	3,133	5,091	5,587	7,053	7,785	30,193
Recreational, Cultural & Religious Services	6,872	7,810	9,648	16,151	17,343	4,054	5,159	6,867	12,426	12,721	2,818	2,651	2,781	3,725	4,622
Total	122,409	146,630	211,840	313,504	402,959	102,334	129,630	190,662	287,927	356,120	20,075	17,000	21,178	25,577	46,839
Economic Services															
Fuel and Energy	1,048	1,102	1,380	1,450	1,525	20	16	23	32	41	1,028	1,086	1,357	1,418	1,484
Agriculture, Forestry and Fishing	10,438	12,378	15,667	21,150	18,950	7,188	9,045	10,681	14,927	13,213	3,250	3,333	4,986	6,223	5,737
Mining, Manufacturing and Construction	2,625	3,186	4,950	8,123	29,761	1,952	2,008	3,264	4,317	2,889	673	1,178	1,686	3,806	26,872
Roads and Waterways	16,089	28,168	51,150	69,481	81,331	3,799	5,074	5,499	10,306	8,991	12,290	23,094	45,651	59,175	72,340
Other Transport and Communication	3,248	4,325	4,074	6,049	6,321	1,657	1,705	1,421	2,811	3,085	1,591	2,620	2,653	3,238	3,236
Other Economic Services	4,834	5,613	7,541	15,674	19,778	2,266	2,770	3,787	5,772	6,812	2,568	2,843	3,754	9,902	12,966
Total	38,282	54,772	84,762	121,927	157,666	16,882	20,618	24,675	38,165	35,031	21,400	34,154	60,087	83,762	122,635
Other Purposes															
Interest on Public Debt	27,318	42,828	61,004	135,904	230,146	27,318	42,828	61,004	135,904	230,146	0	0	0	0	0
Transfers to Other Levels of Government	2,633	6,151	9,475	6,138	44,759	2,633	6,151	9,475	6,138	6,460	0	0	0	0	38,299
NAM Capital Expenditure	0	6,443	0	0	0	0	0	0	0	0	0	6,443	0	0	0
Other - Special Efficiency Fund	7,980	9,320	27,106	43,004	50,998	0	0	0	0	0	7,980	9,320	27,106	43,004	50,998
Total	37,931	64,742	97,585	185,046	325,903	29,951	48,979	70,479	142,042	236,606	7,980	15,763	27,106	43,004	89,297
Grand Total	254,474	340,261	498,815	760,911	1,141,311	198,193	263,712	373,262	596,558	838,960	56,281	76,549	125,553	164,353	302,351

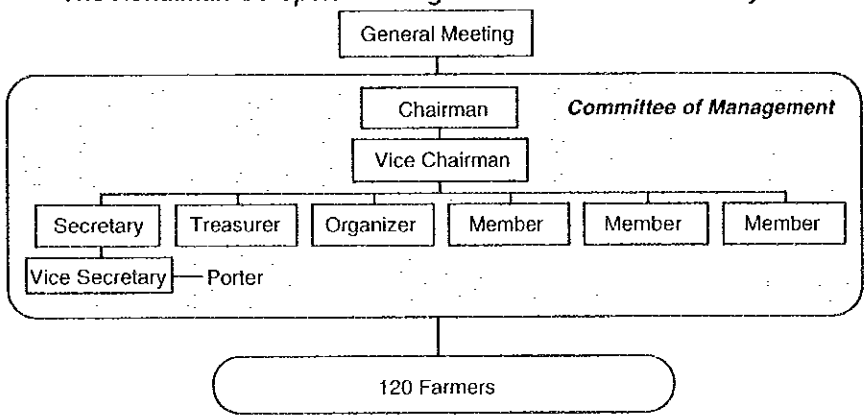
* Provisional

出　典　(1) Quarterly Digest, Ministry of Food and Agriculture, March 1995.
(2) The State of the Ghanaian Economy in 1994, University of Ghana, July 1995.

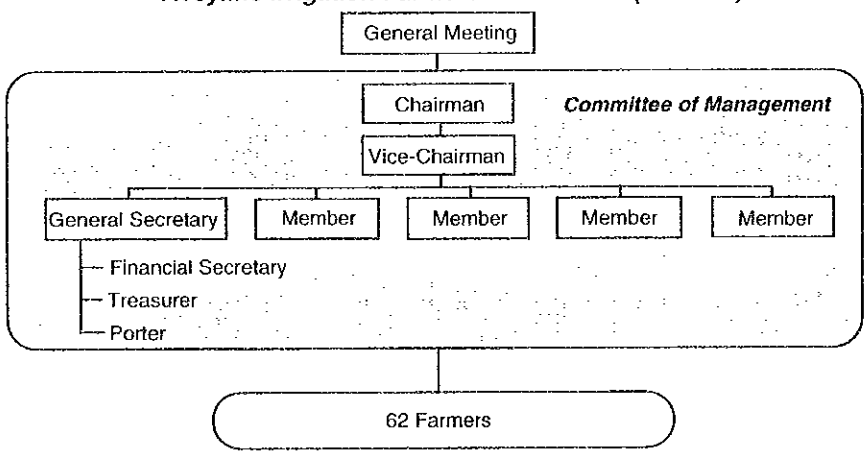
注：歳出額は実勢価格

付　図

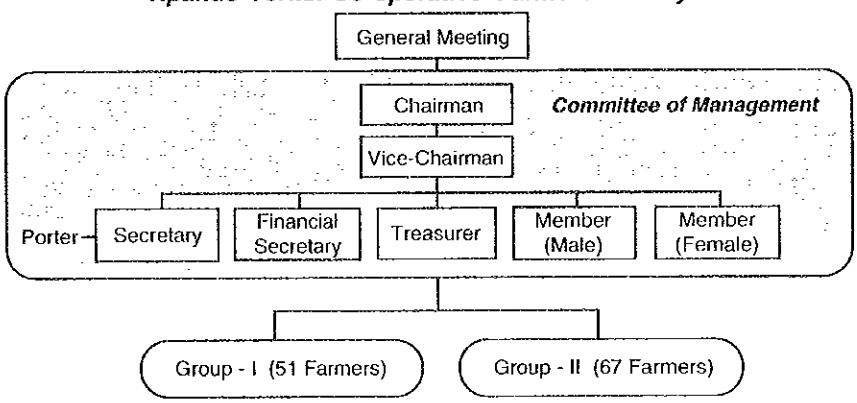
The Ashaiman Co-operative Irrigation Rice Farmers Society Ltd.



Aveyime Irrigation Farmers Association (AIRFAS)



Kpando-Torkor Co-operative Farmers Society Ltd.



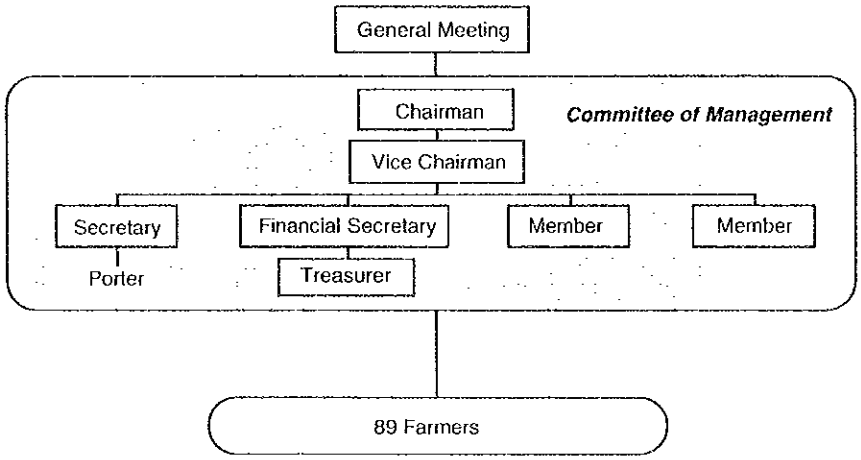
Note: As of December 1995

図-1
既存協同組合組織図 (1/2)

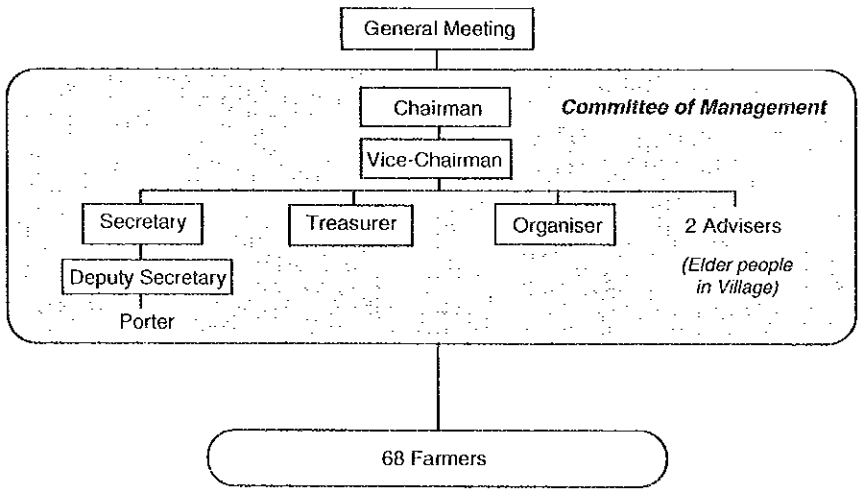
THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

Beefikrom Co-operative Irrigation Vegetable Growers and Marketing Society Ltd. (Mankessim Irrigation Project)



Okyereko Irrigation Rice Farmers Co-operative

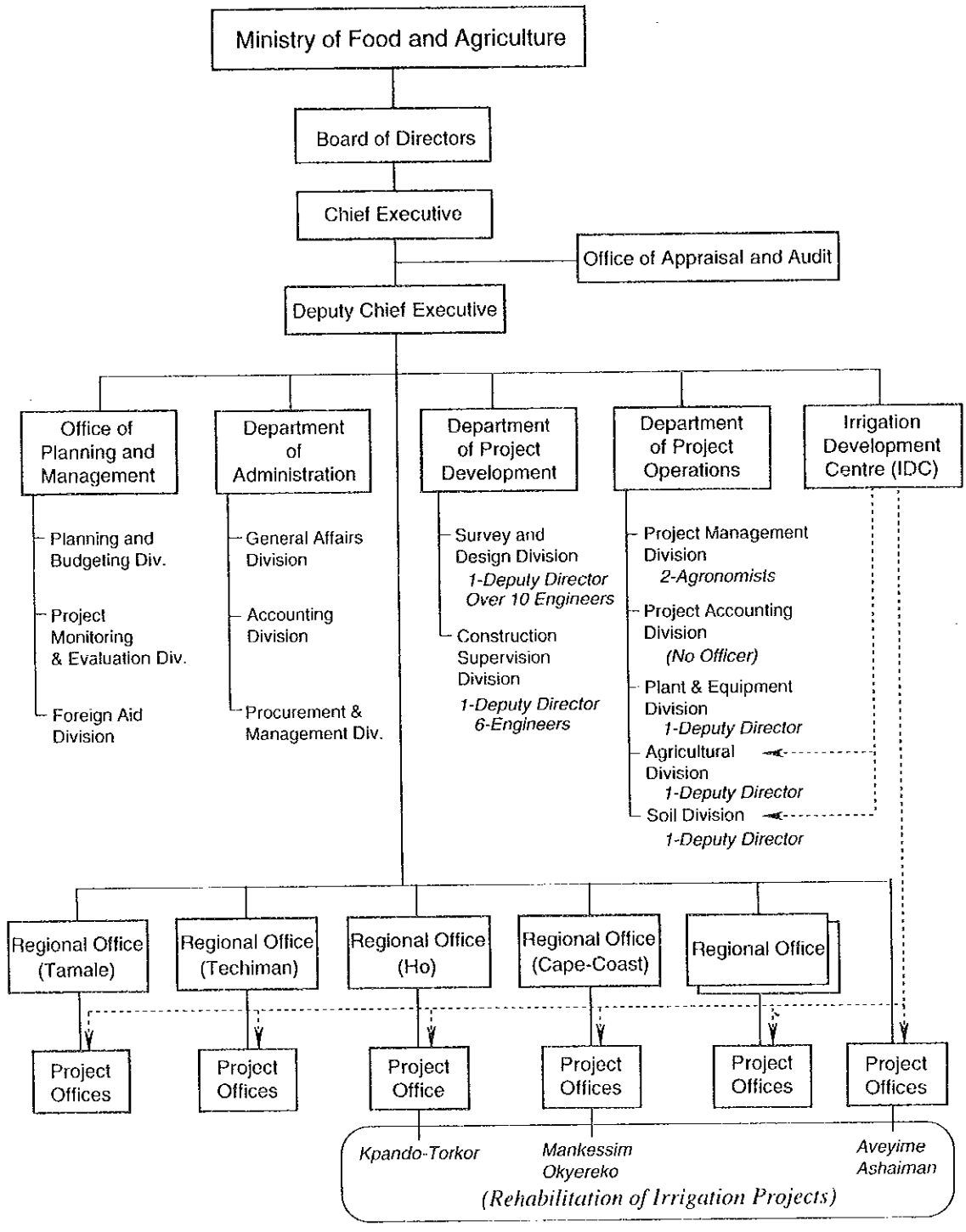


Note: As of December 1995

図-1
既存協同組合組織図 (2/2)

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

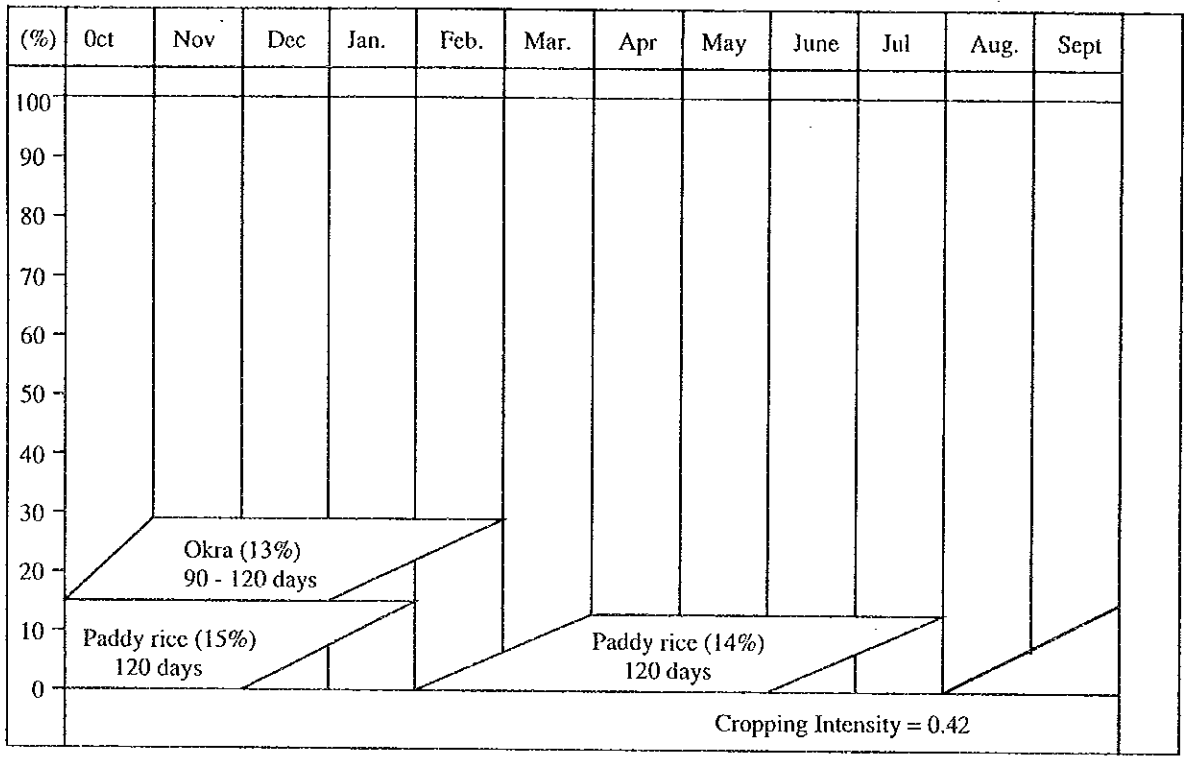


Note: As of December 1995 Source: GIDA Head Office

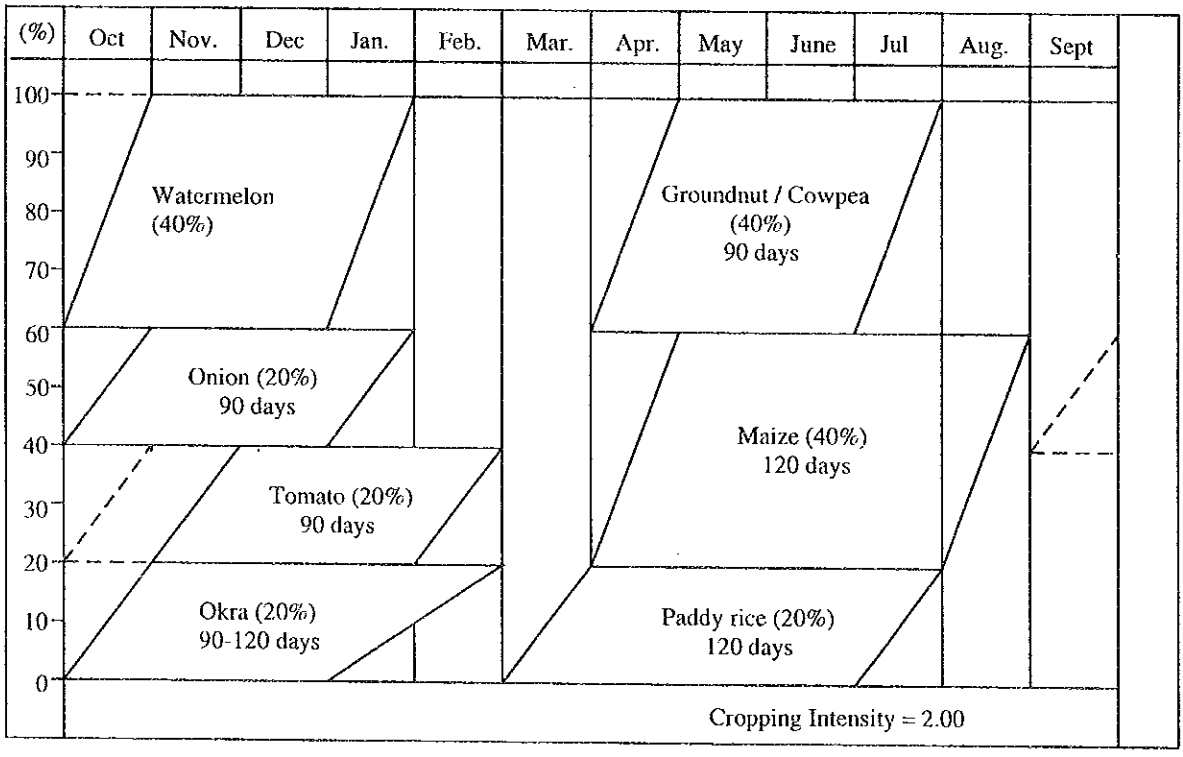
図-2
灌漑開発公社（GIDA）組織図

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency



Present Cropping



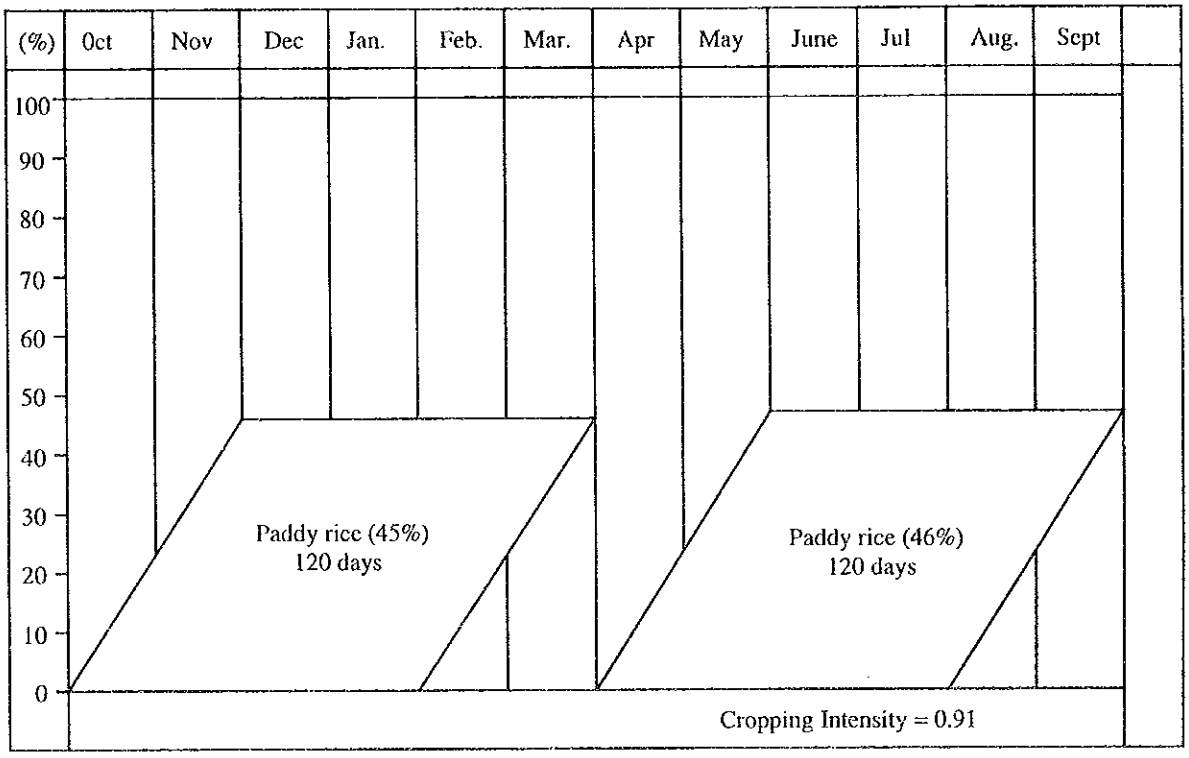
Proposed Cropping Pattern

図-3

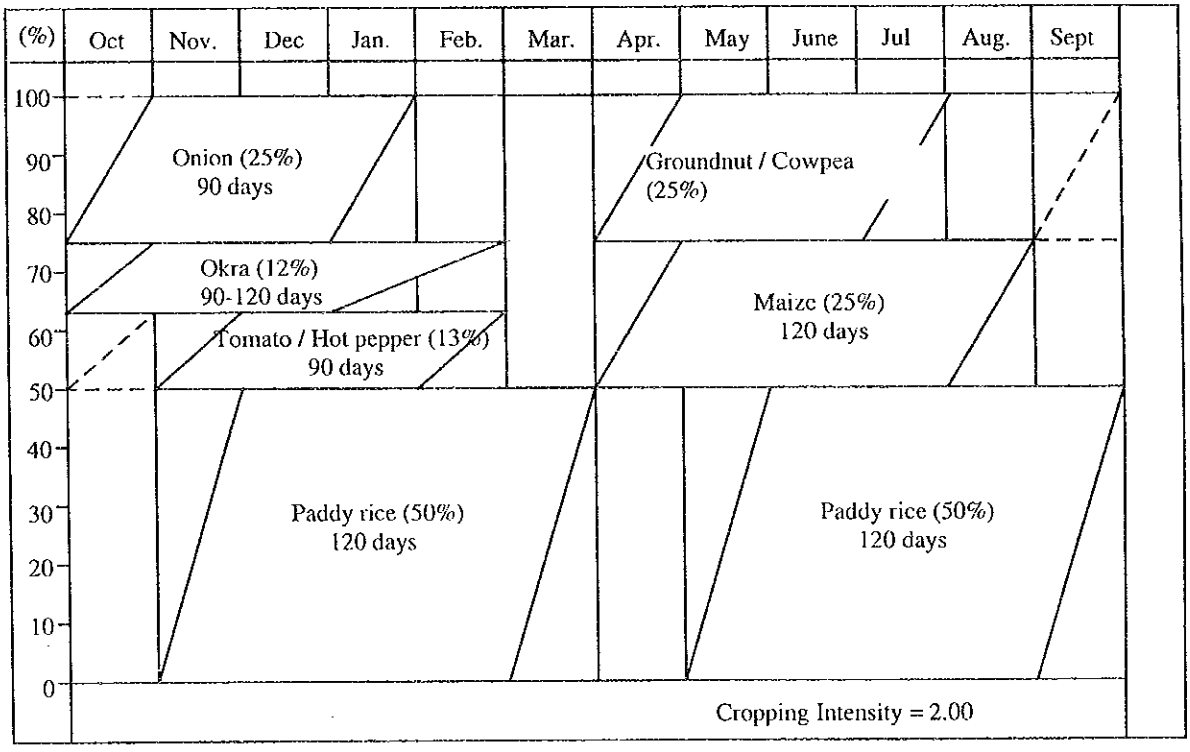
現況及び計画作付体系-
Ashaiman地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECT IN THE REPUBLIC OF GHANA

Japan International Coopertion Agency



Present Cropping



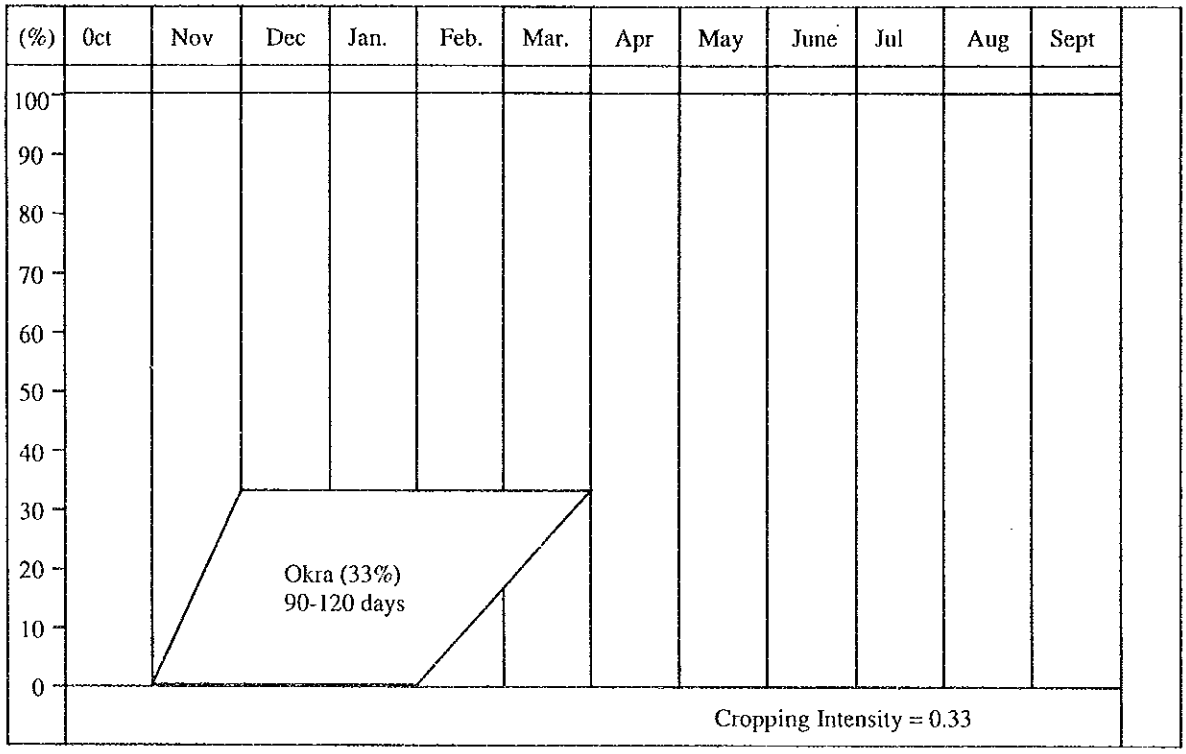
Proposed Cropping Pattern

図-4

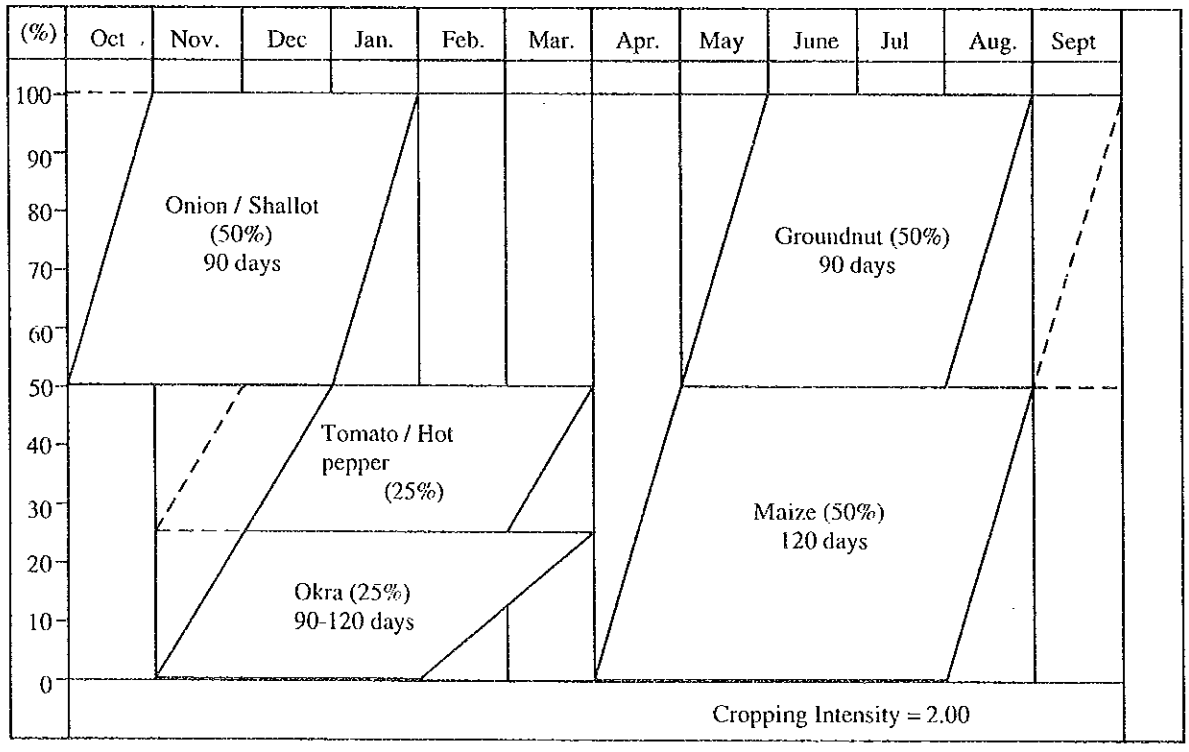
現況及び計画作付体系-
Aveyime地区

THE STUDY ON THE REHABILITATION
OF IRRIGATION PROJECT
IN THE REPUBLIC OF GHANA

Japan International Coopertion Agency



Present Cropping



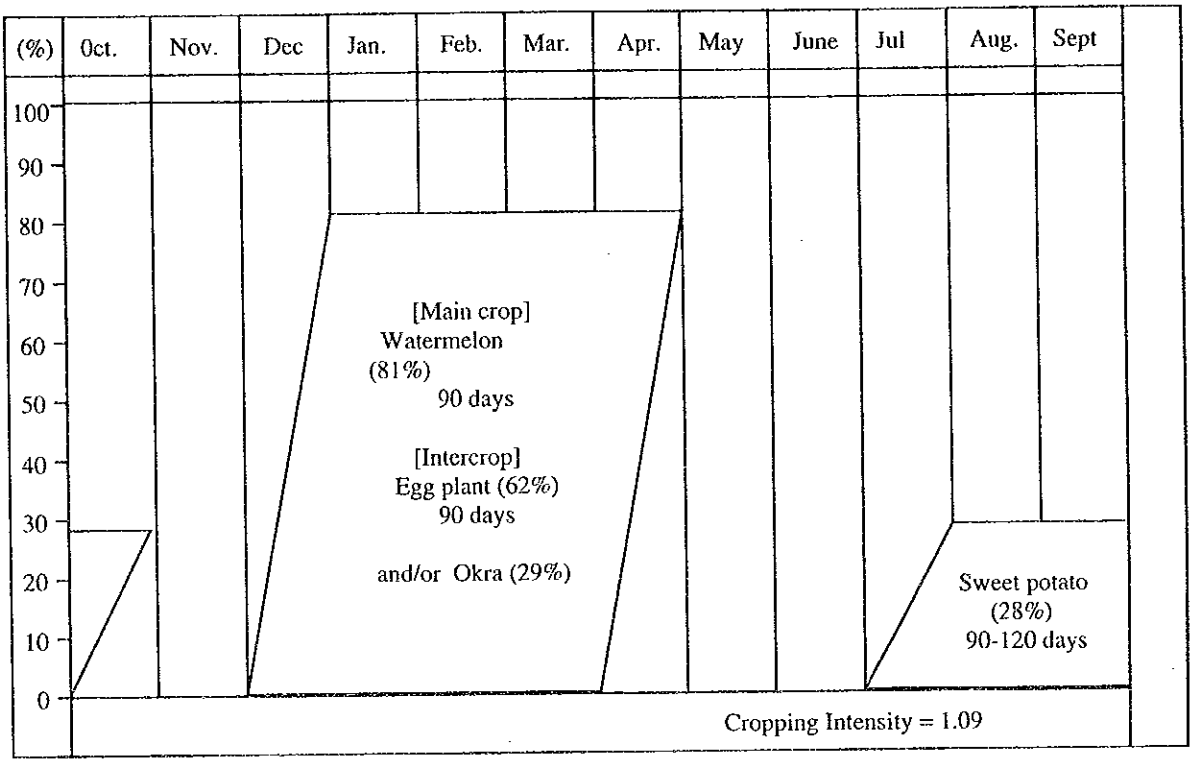
Proposed Cropping Pattern

図-5

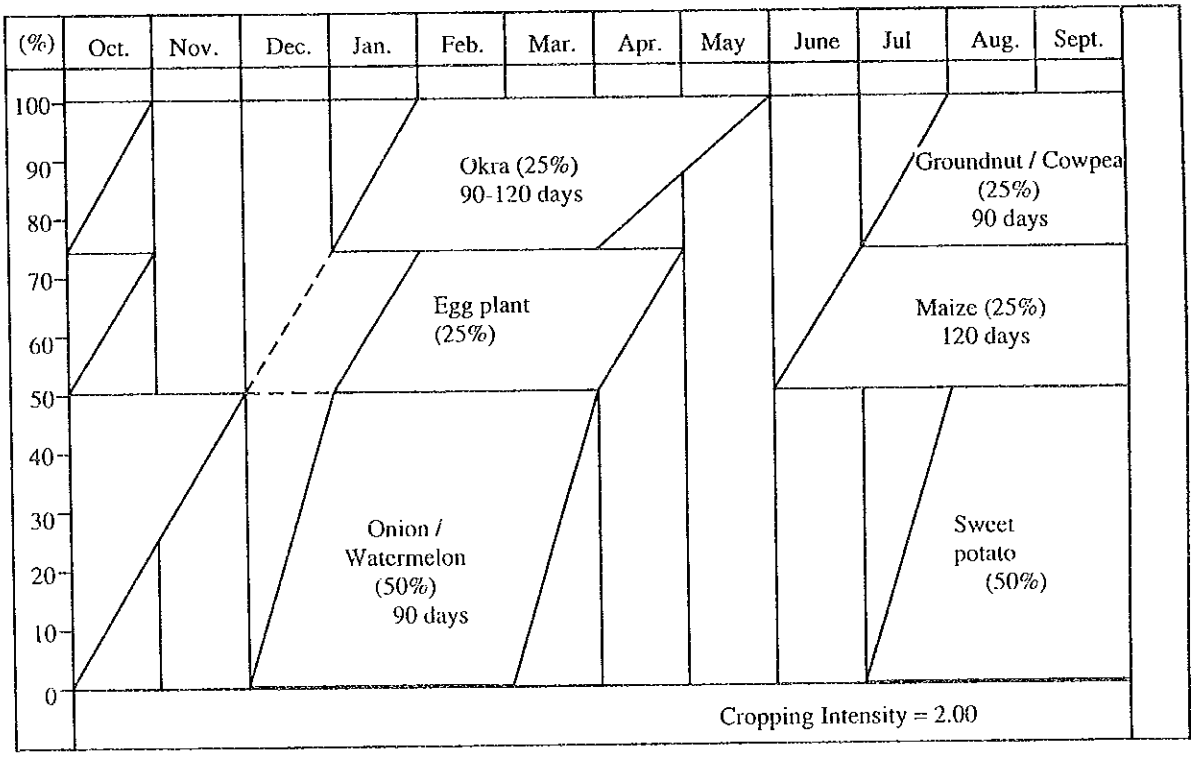
現況及び計画作付体系-
Kpando-Torkor 地区

THE STUDY ON THE REHABILITATION
OF IRRIGATION PROJECT
IN THE REPUBLIC OF GHANA

Japan International Coopertion Agency



Present Cropping



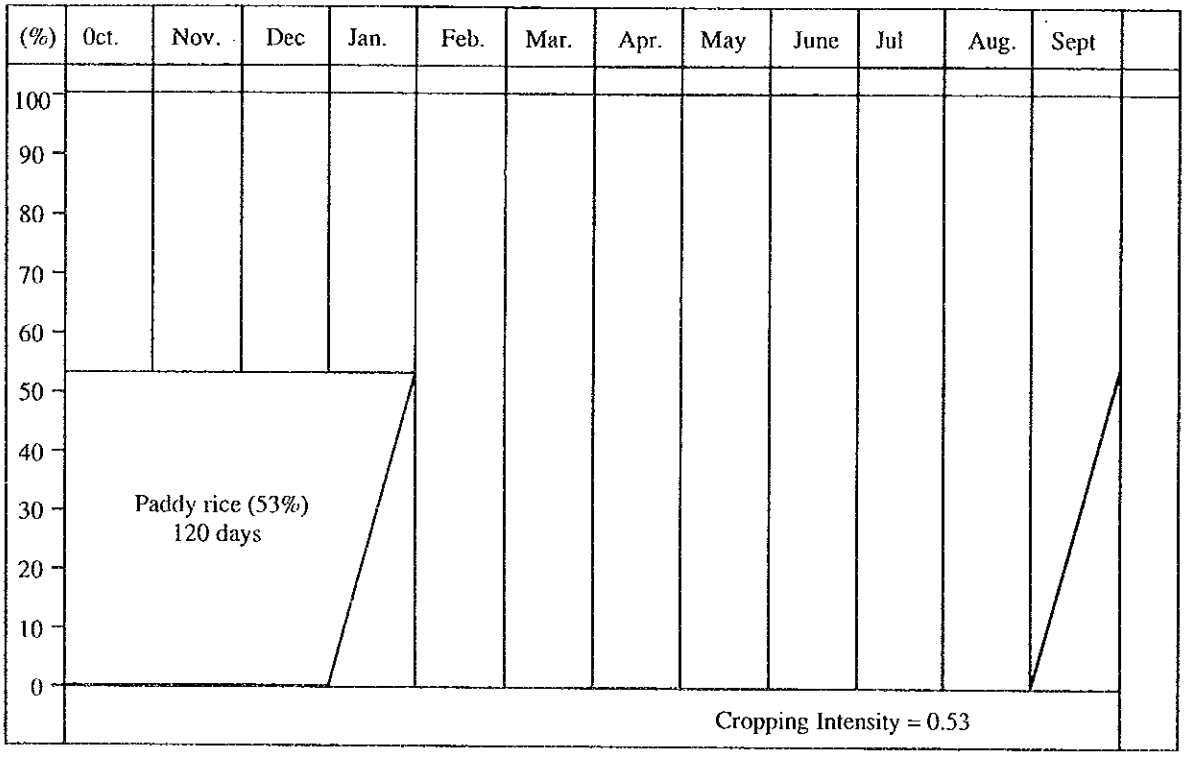
Proposed Cropping Pattern

図-6

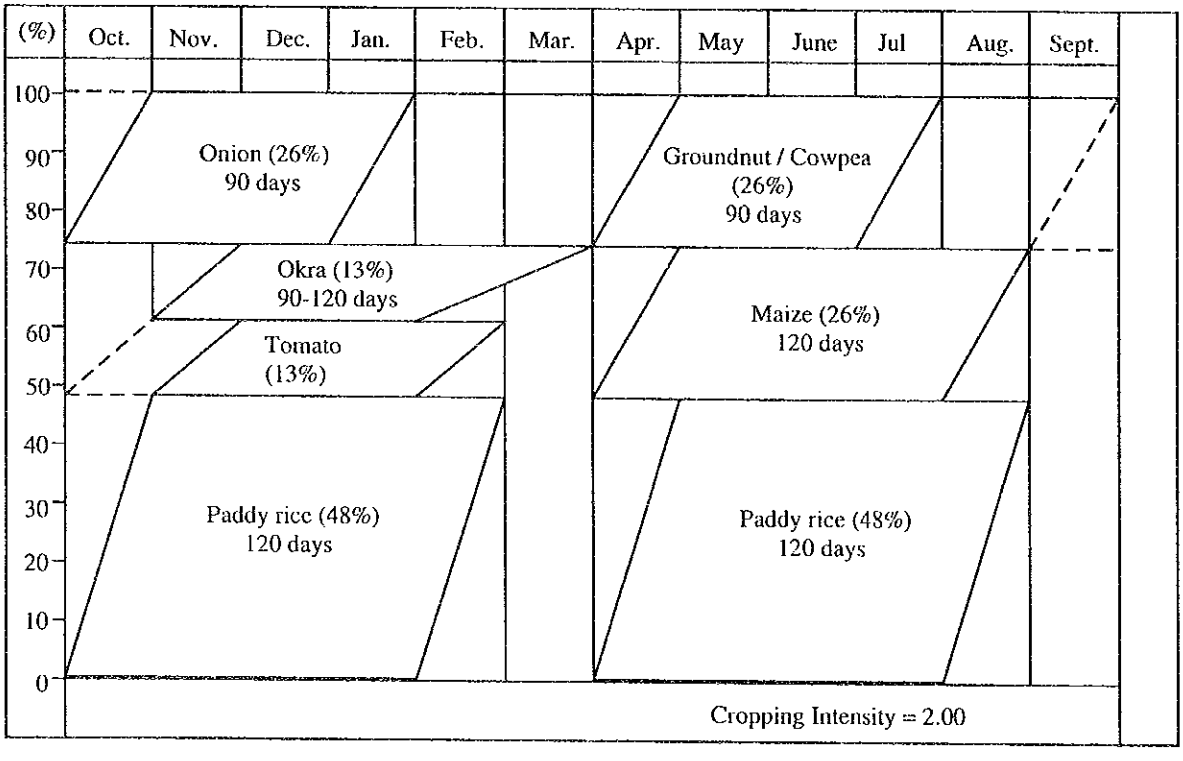
現況及び計画作付体系-
Mankessim 地区

THE STUDY ON THE REHABILITATION
OF IRRIGATION PROJECT
IN THE REPUBLIC OF GHANA

Japan International Coopertion Agency



Present Cropping



Proposed Cropping Pattern

図-7

現況及び計画作付体系
-Okyereko 地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECT IN THE REPUBLIC OF GHANA

Japan International Coopertion Agency

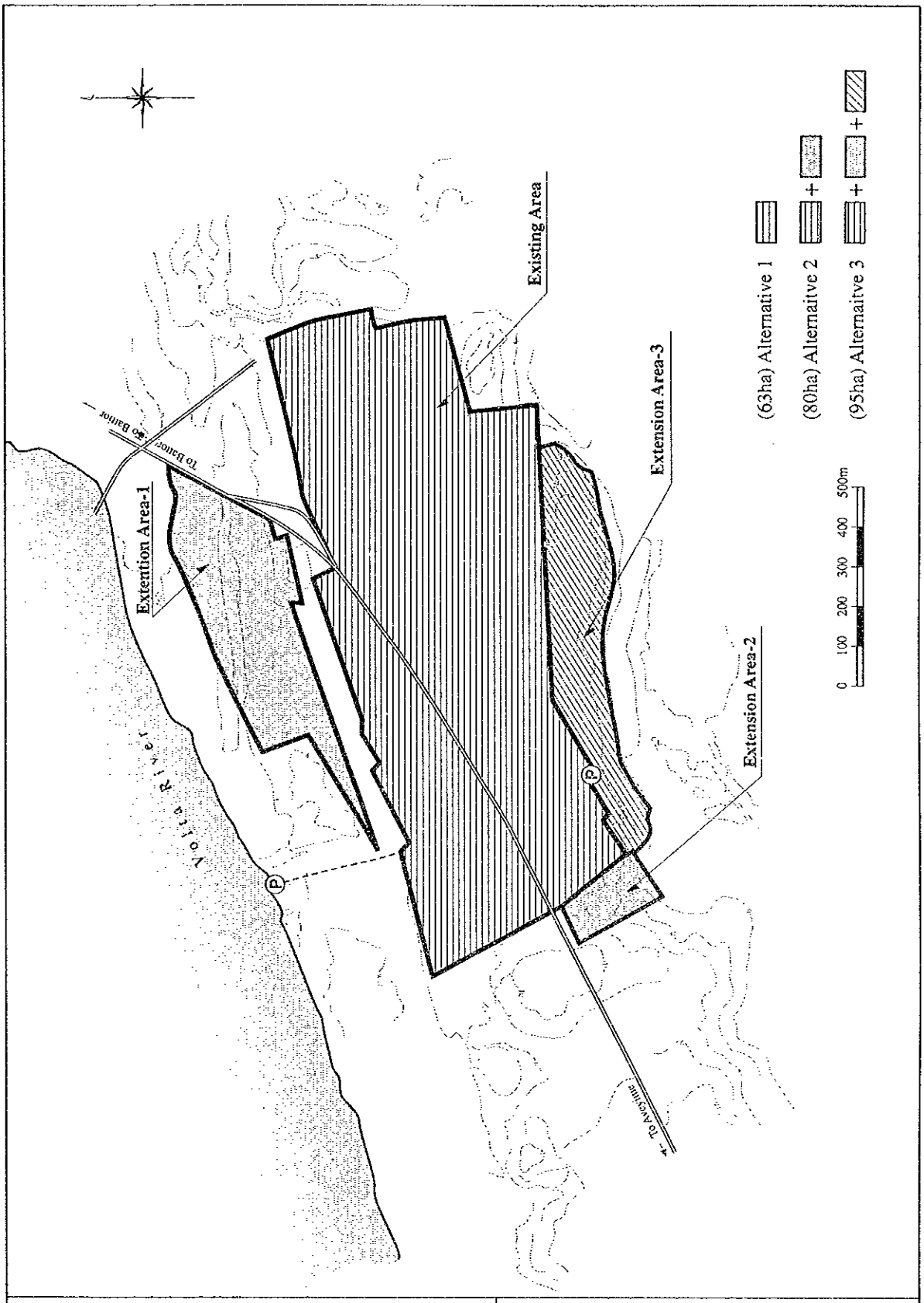


図-8
比較検討案-Aveyime 地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

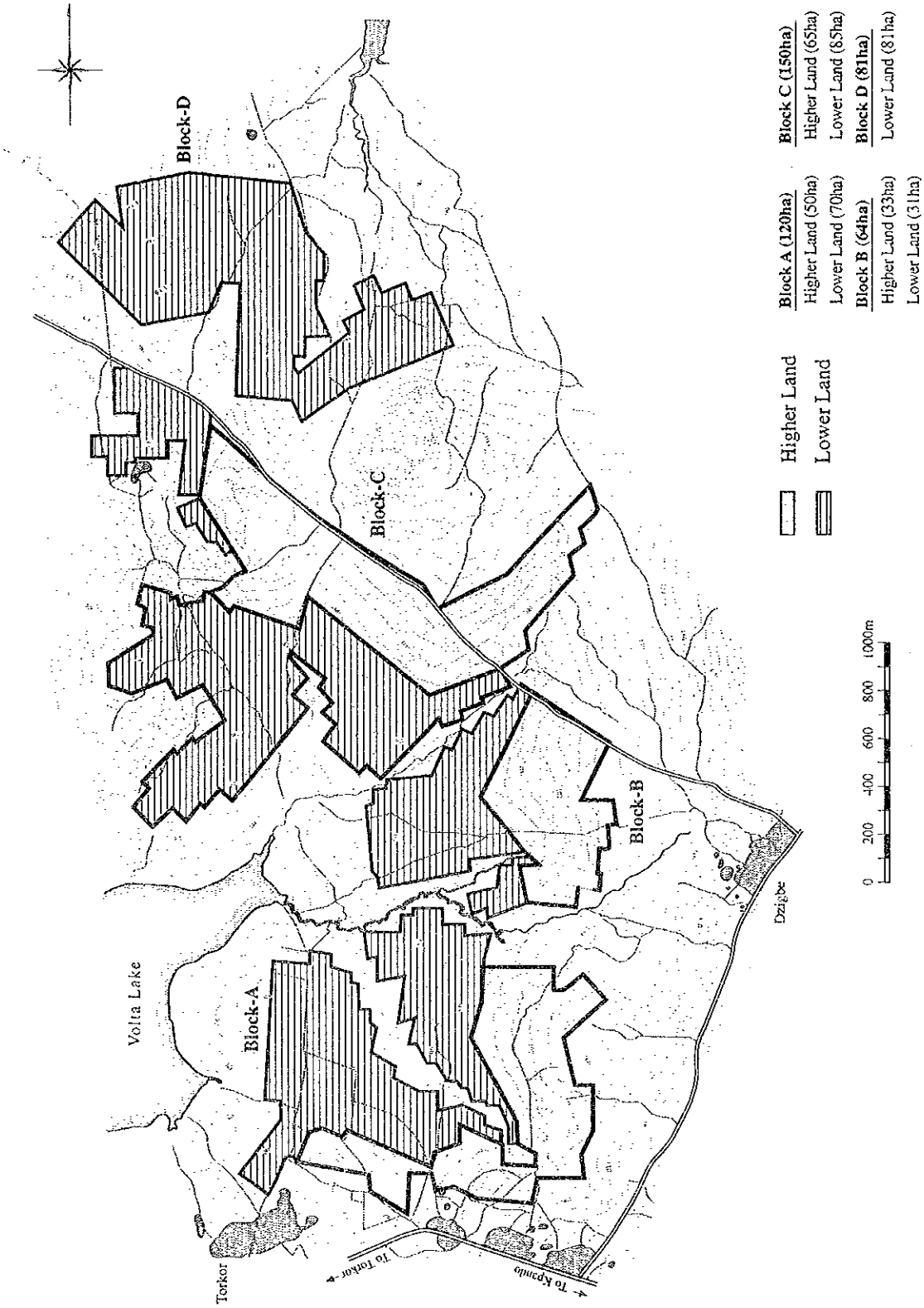


図-9
比較検討案-Kpando -Torkor 地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

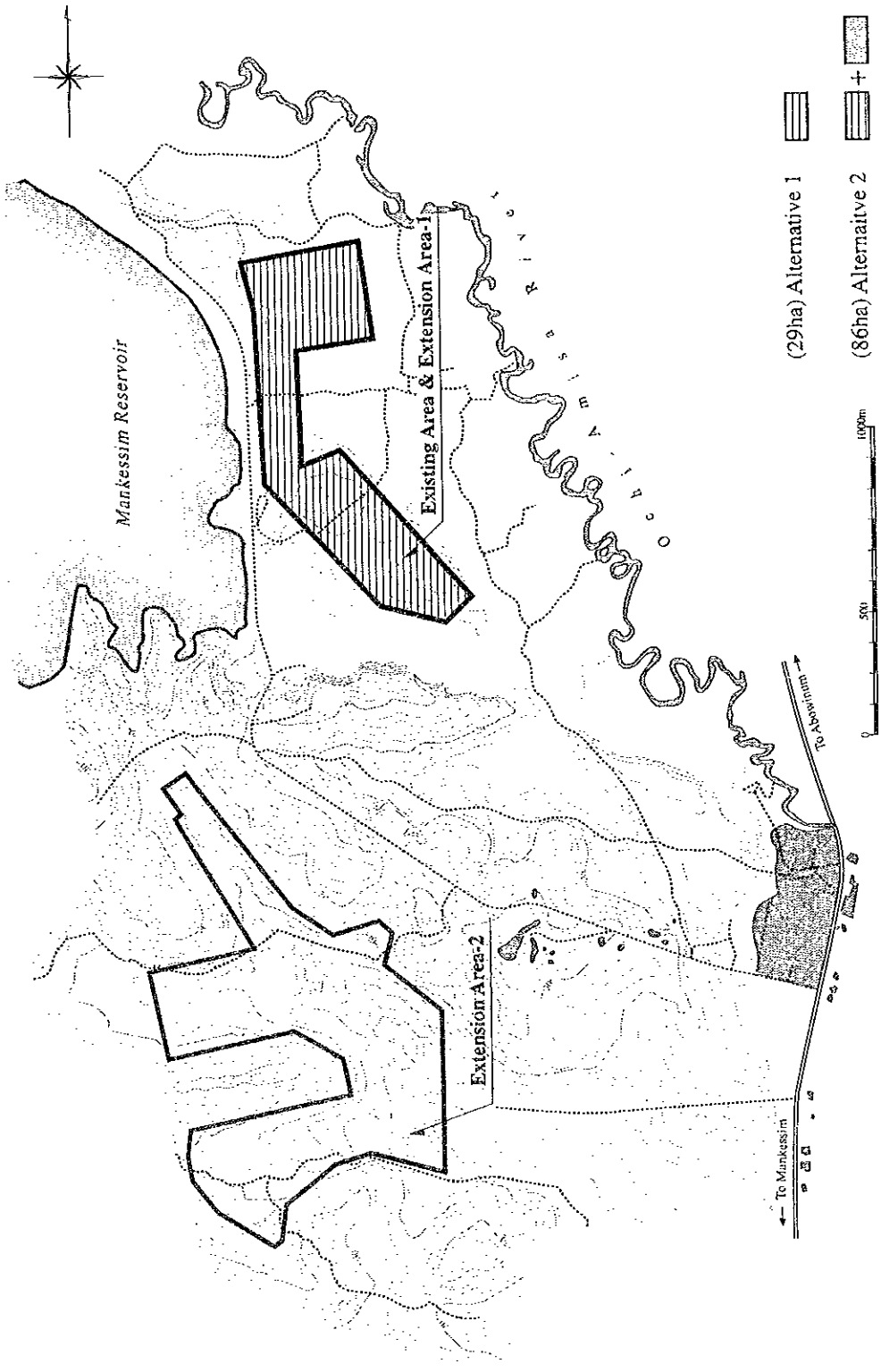


図-10

比較検討案-Mankessim地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

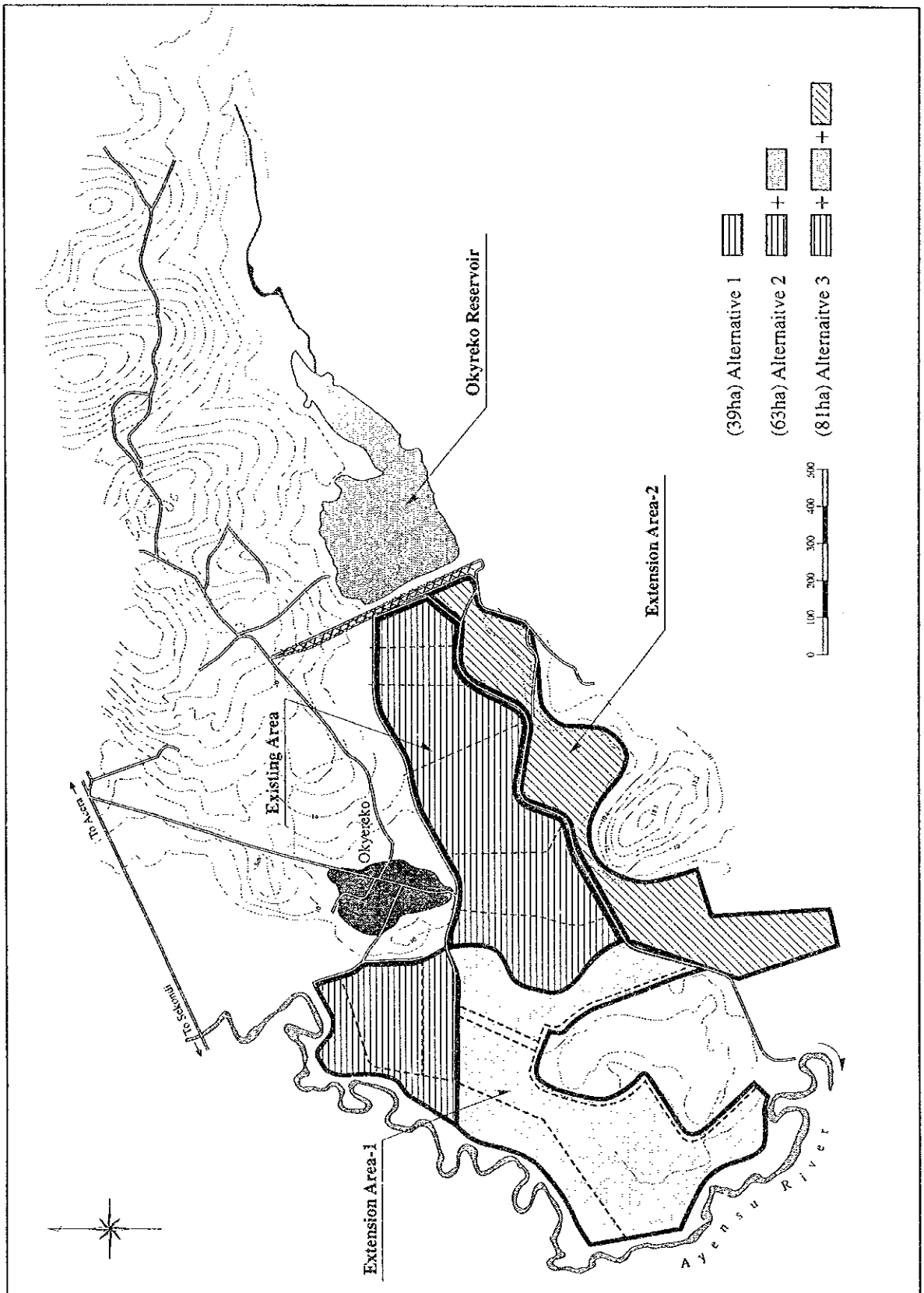


図-11
比較検討案-Okyereko 地区

THE STUDY ON THE REHABILITATION
OF IRRIGATION PROJECTS
IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

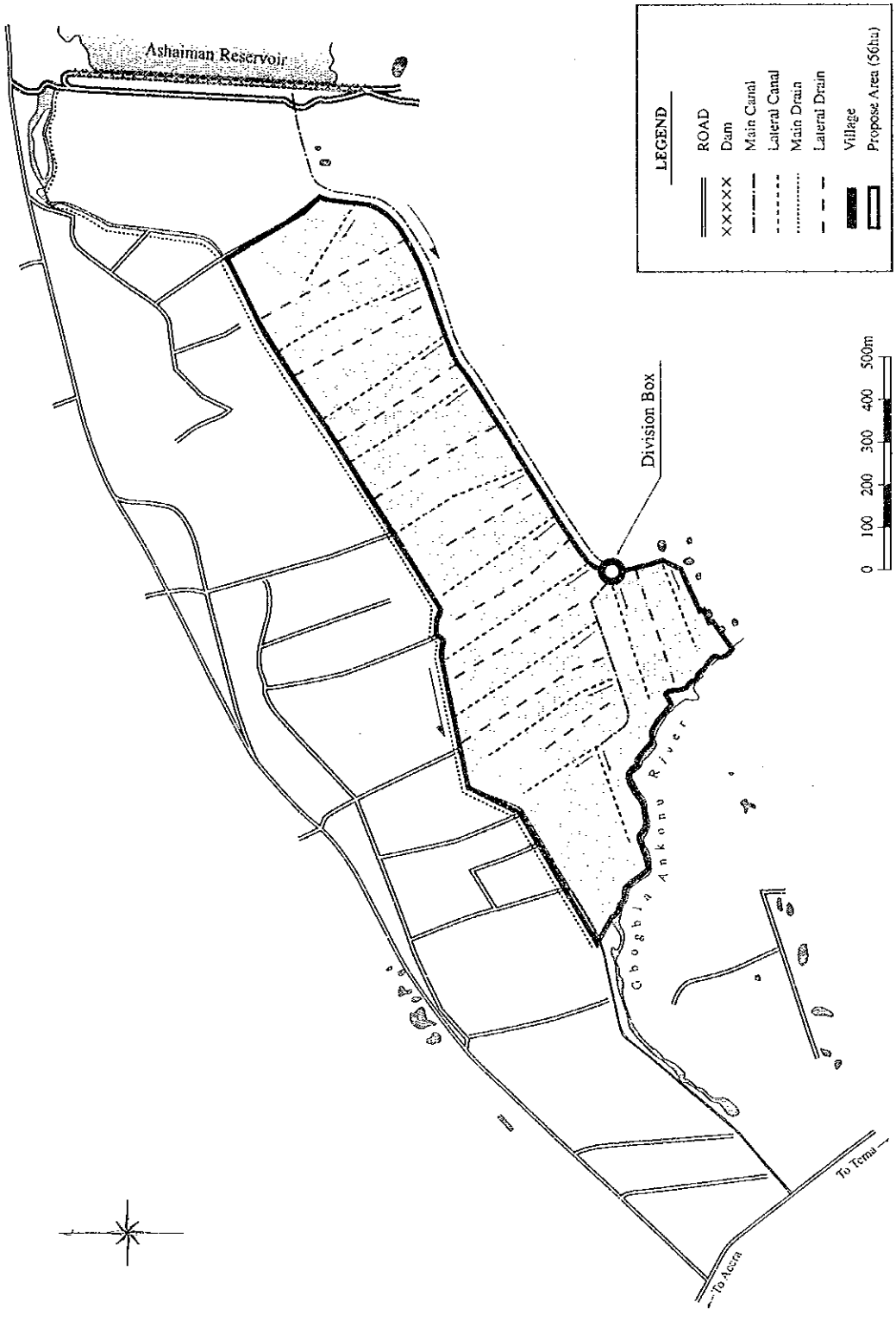


図-12
潅漑排水計画概要図-Ashaiman 地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

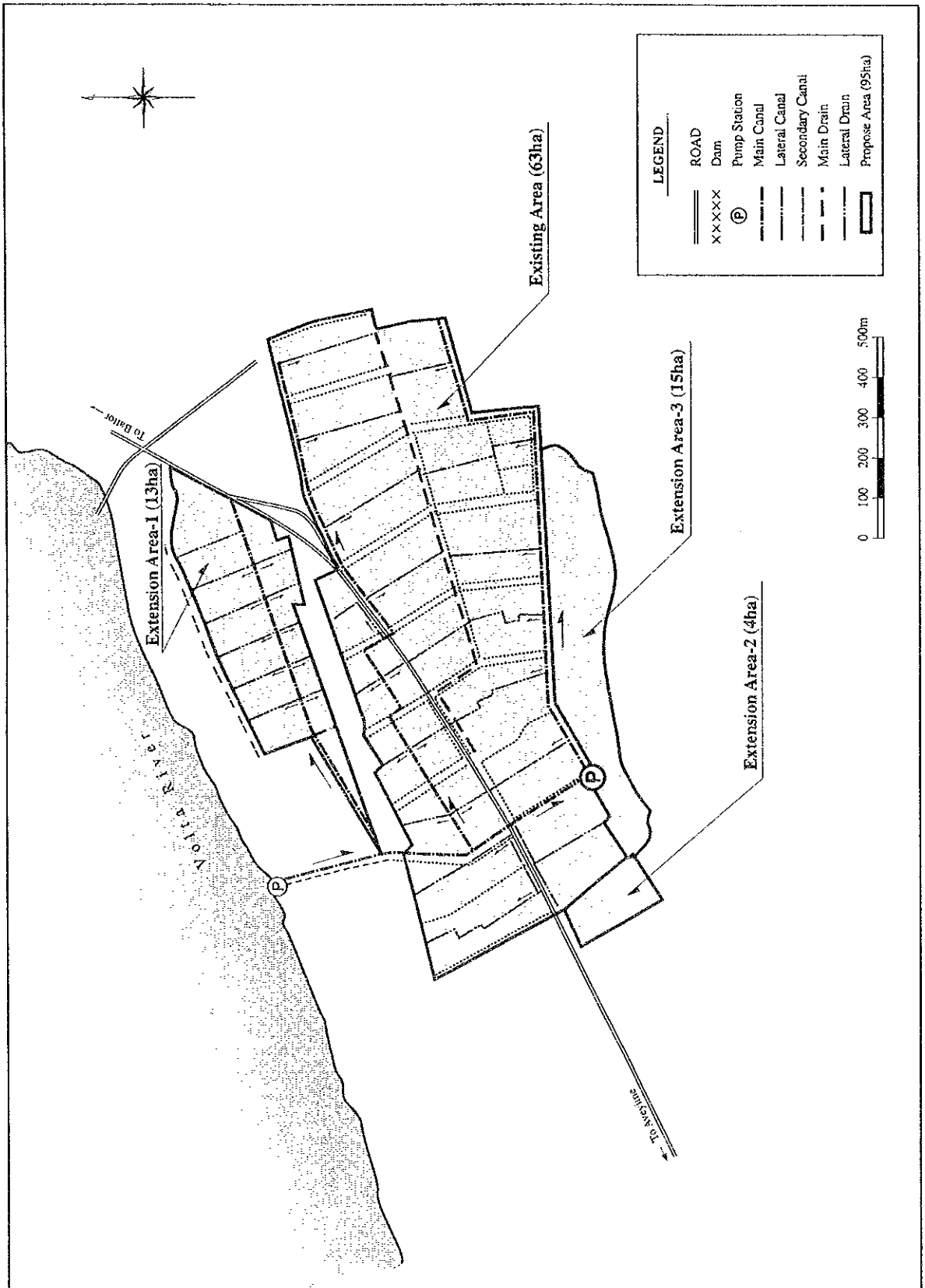


図-13
灌漑排水計画概要図-Aveyime 地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

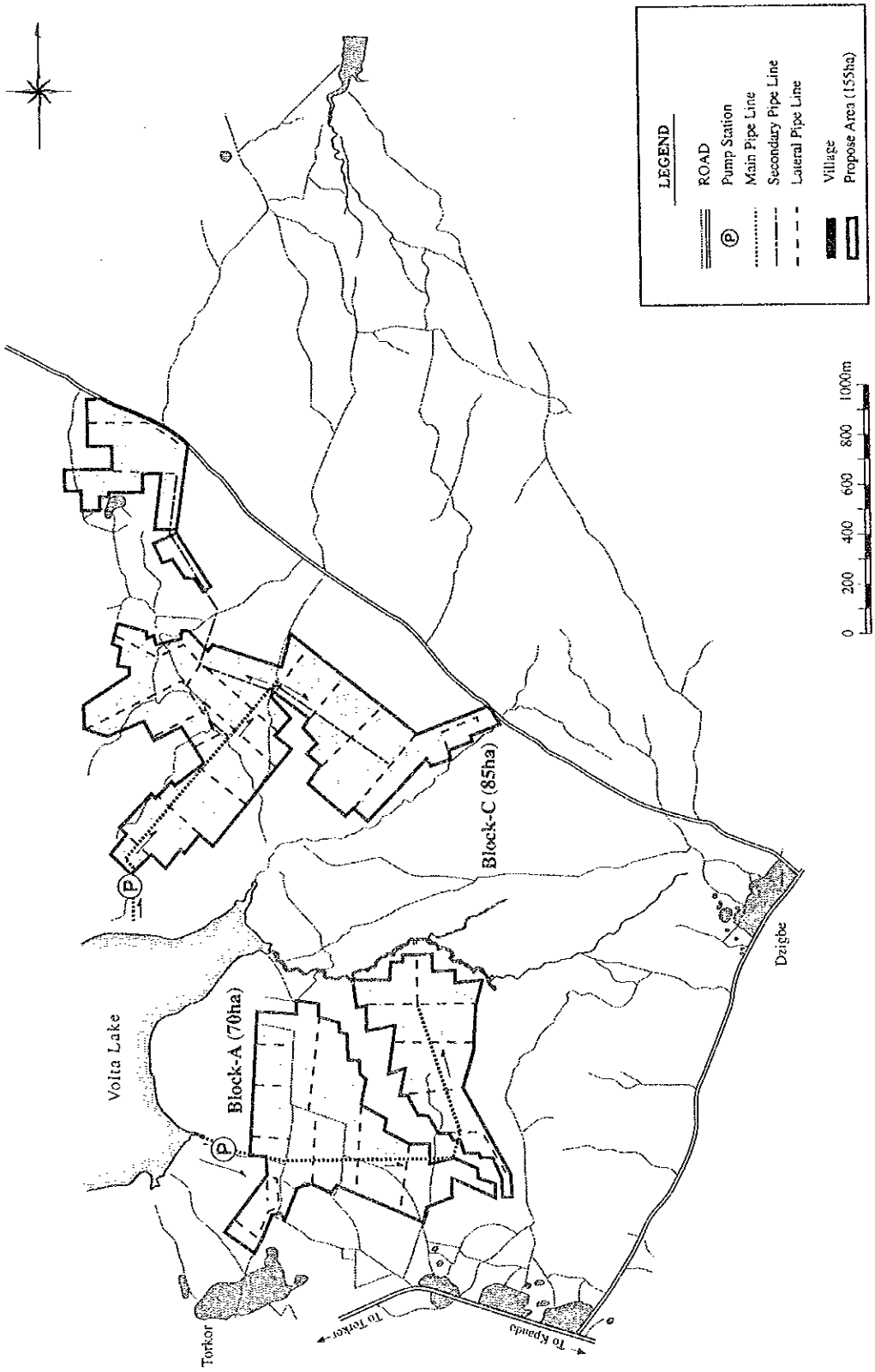


図-14
潅漑排水計画概要図-Kpando-Torkor 地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

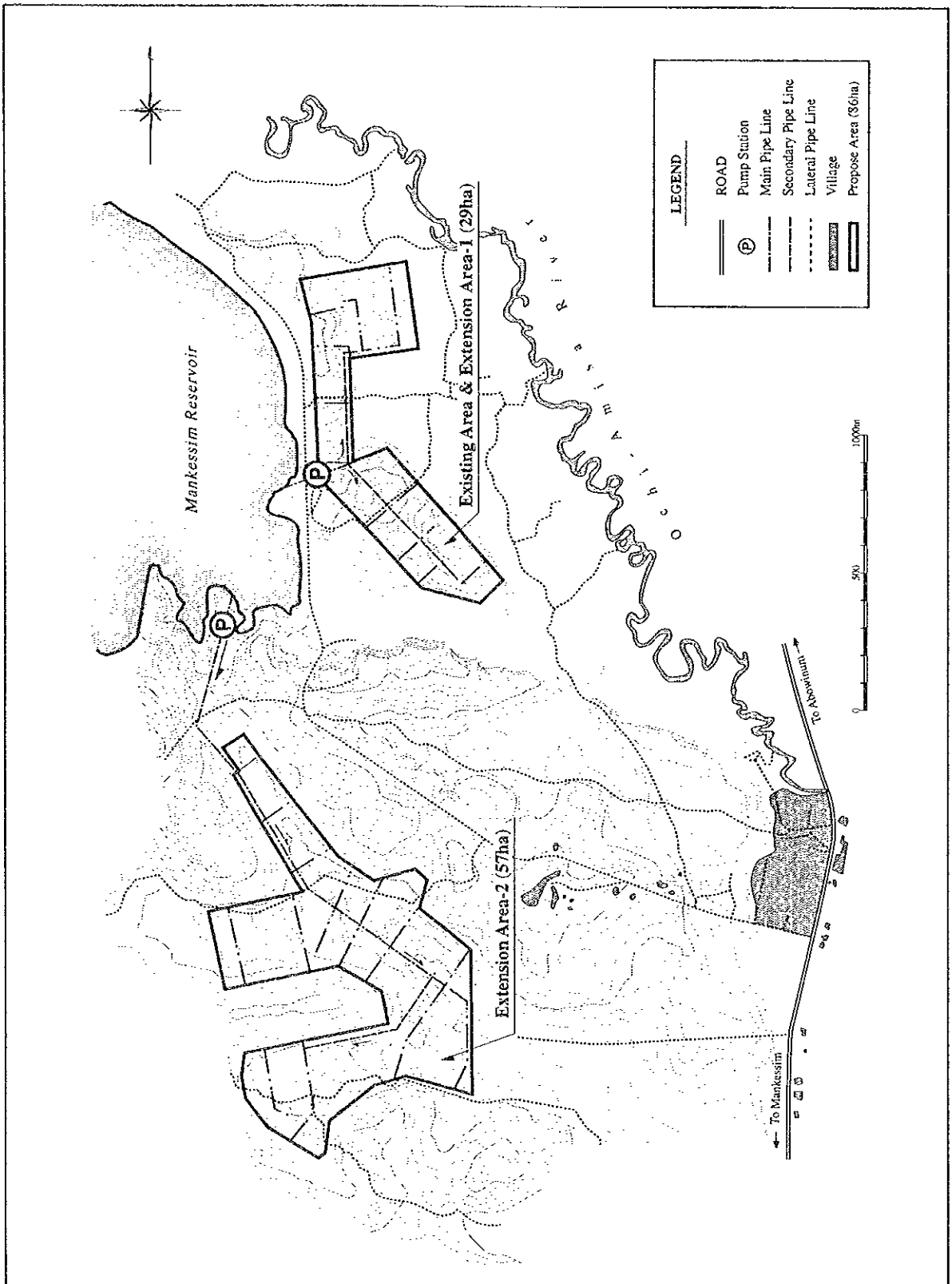


図-15
潅漑排水計画概要図- Mankessim 地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

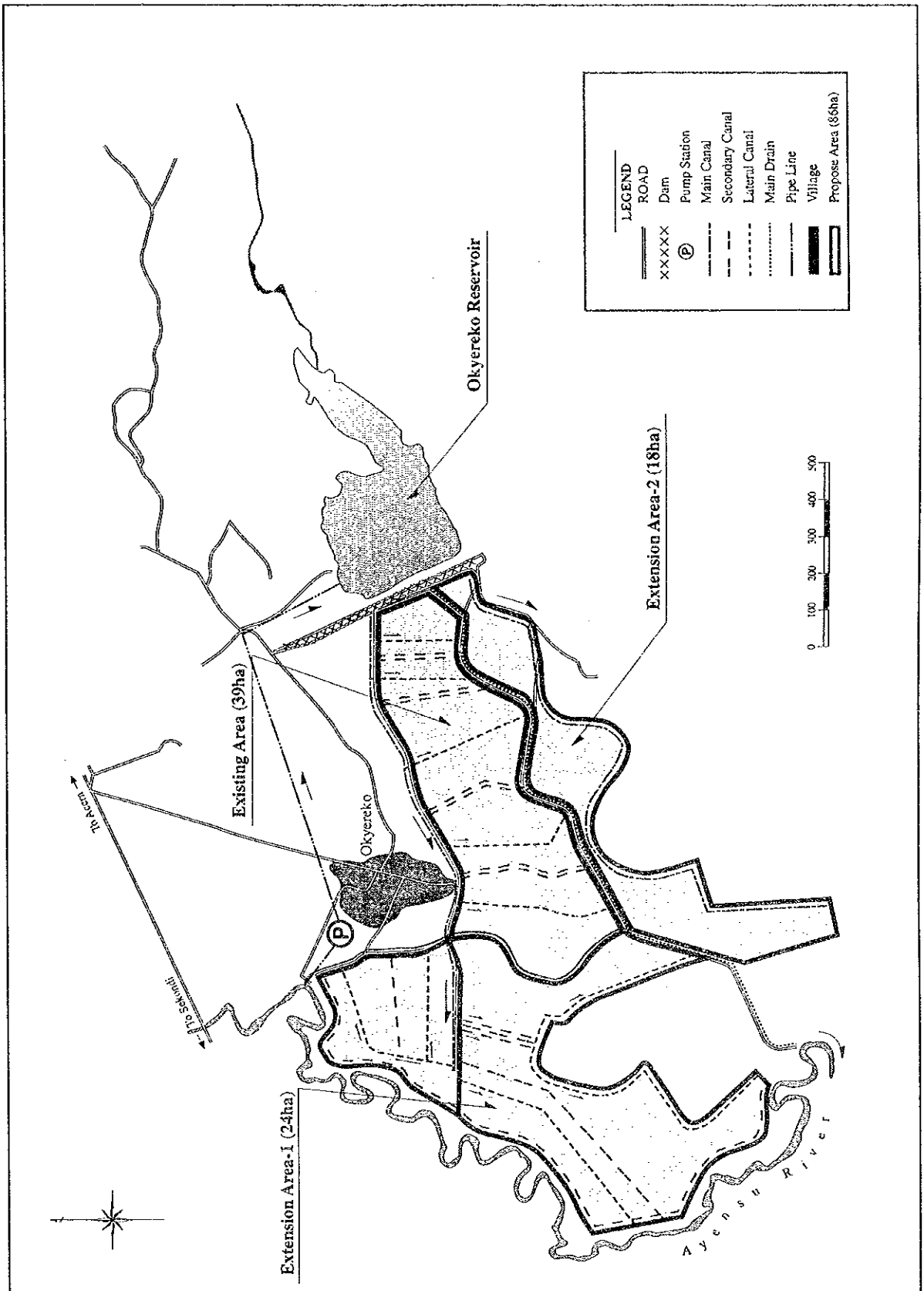


図-16
潅漑排水計画概要図-Okyereko 地区

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

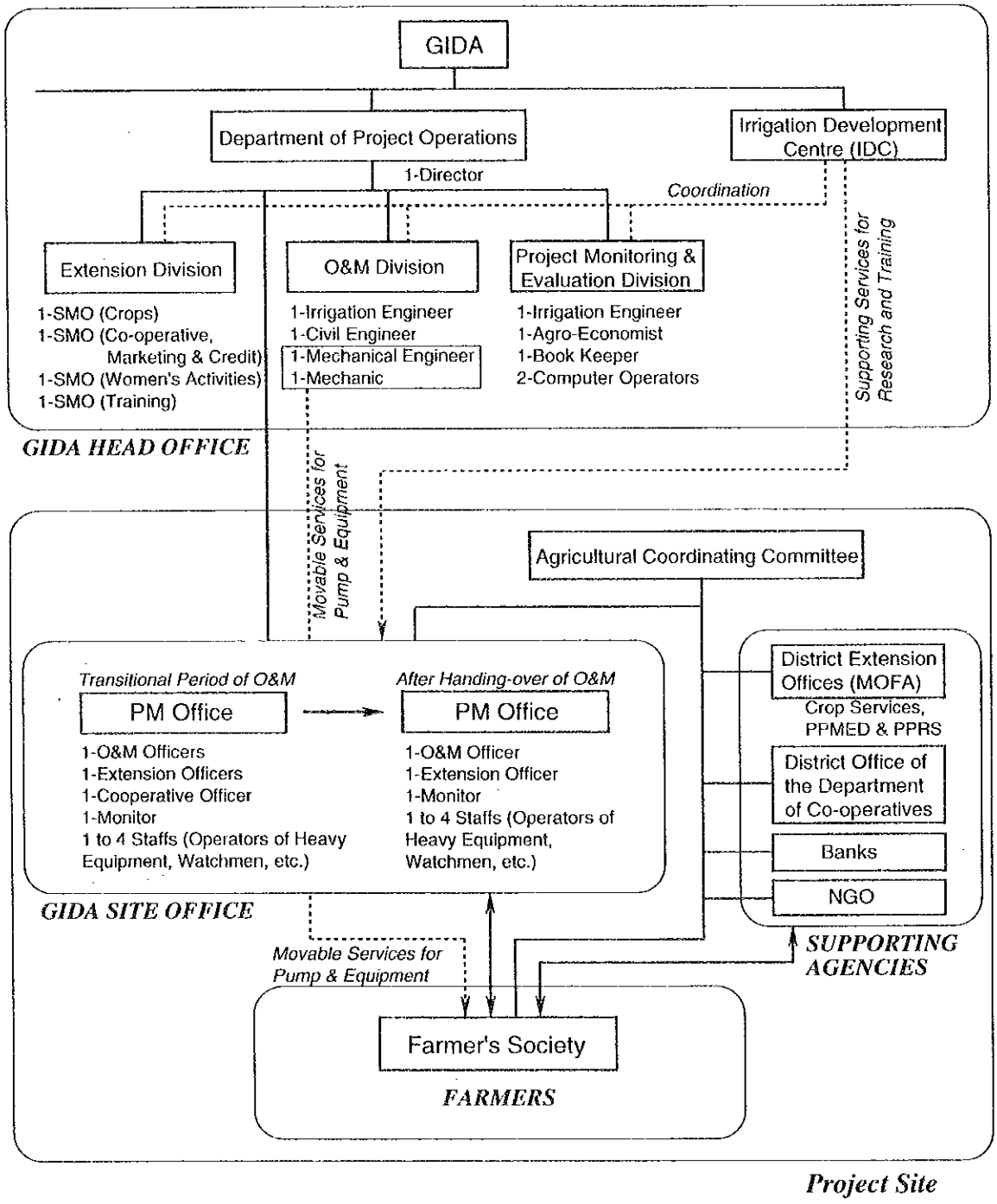
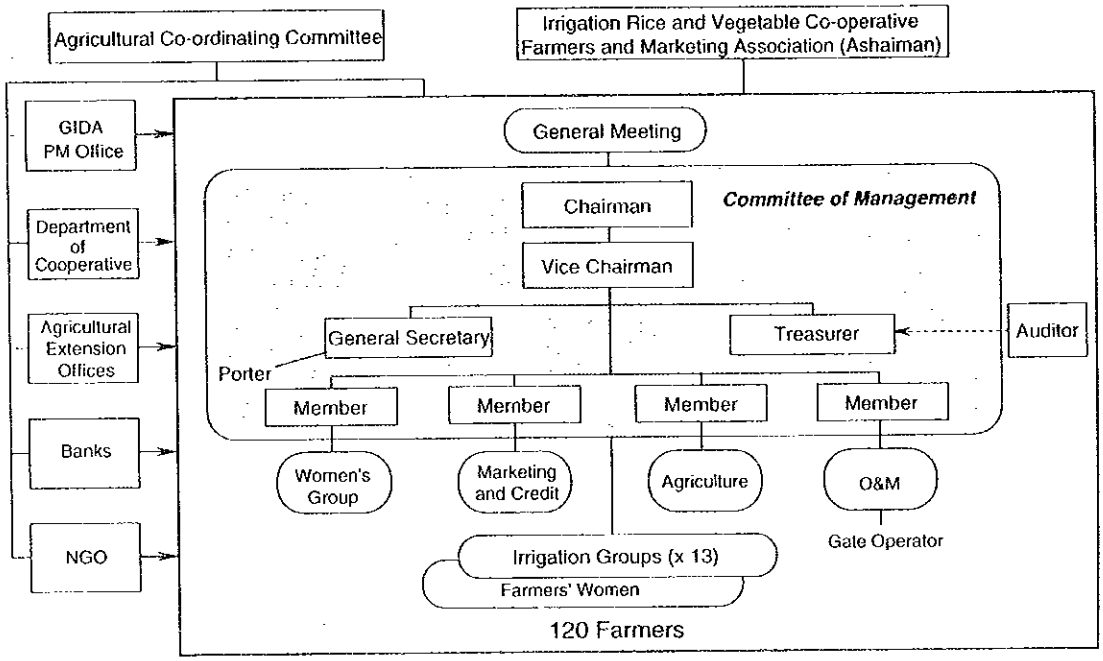


図-17　実施機関計画組織図

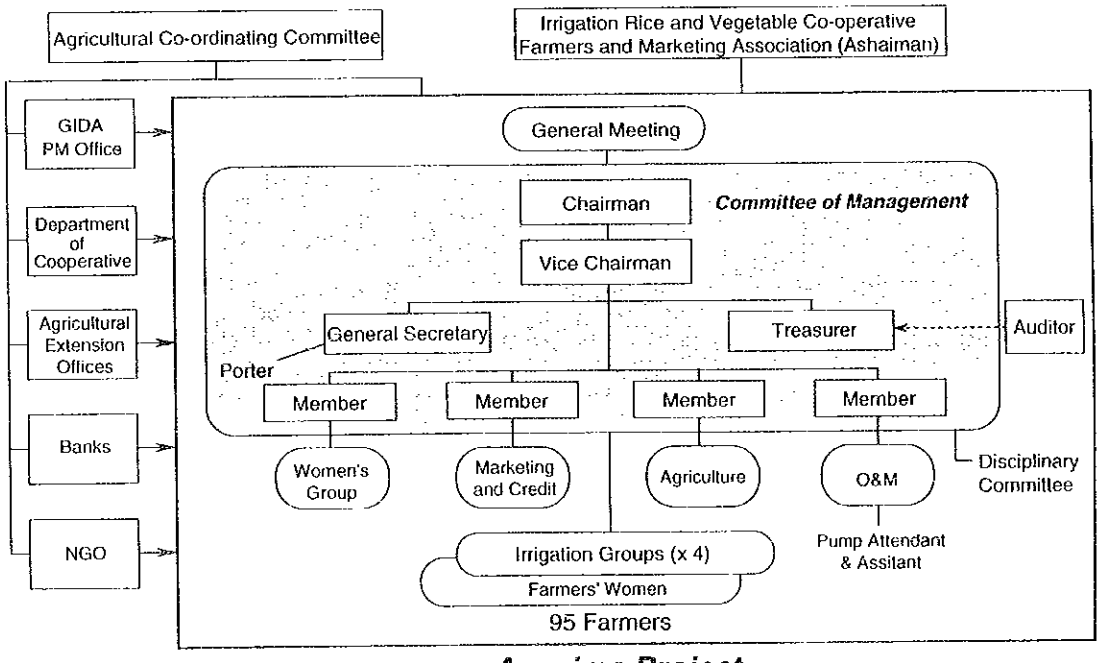
THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency



Ashaiman Project

(54 ha)



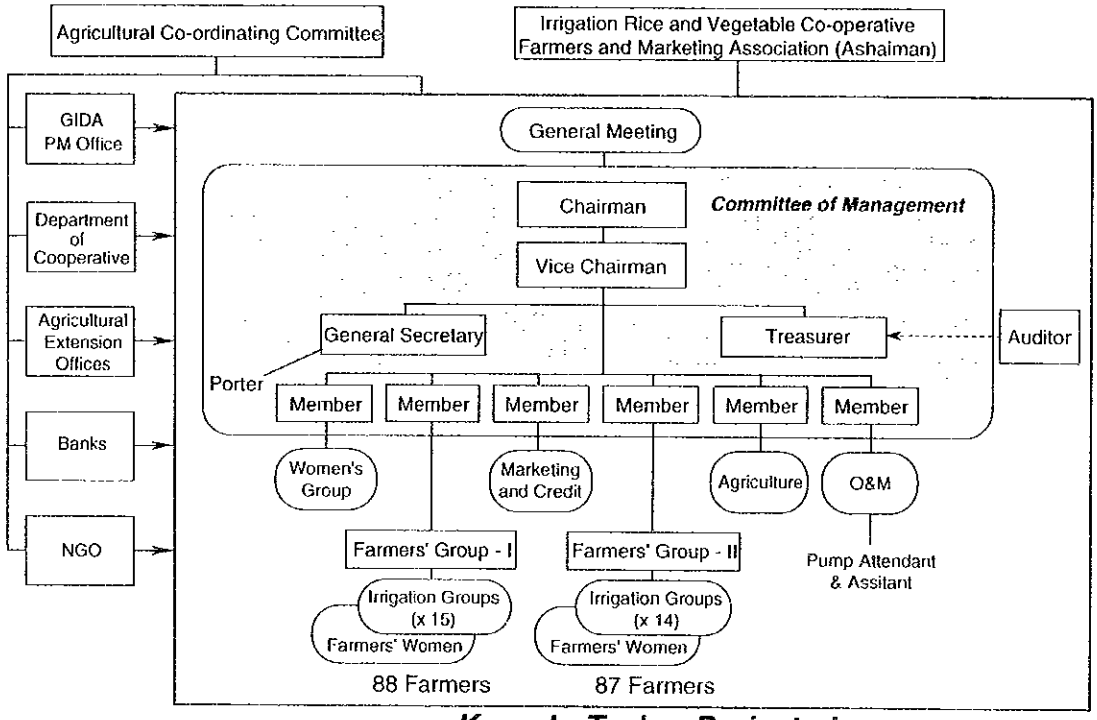
Aveyime Project

(95 ha)

図-18 (1/4)
協同組合（水利組合）計画組織図

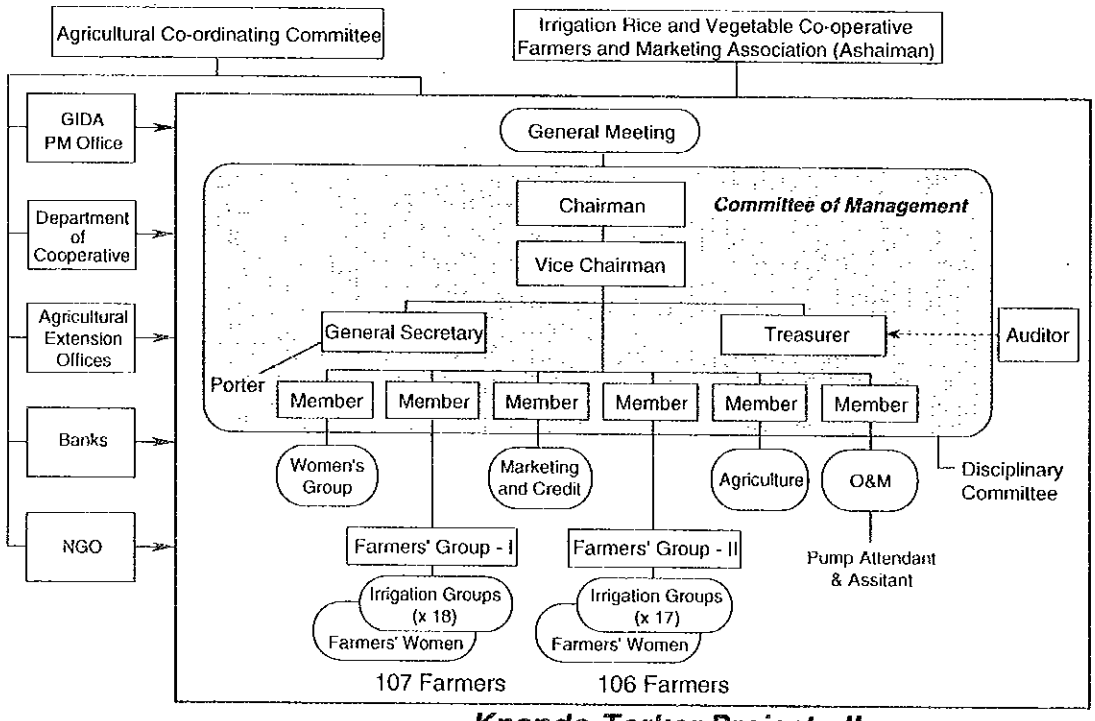
THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency



Kpando-Torkor Project - I

(70 ha)



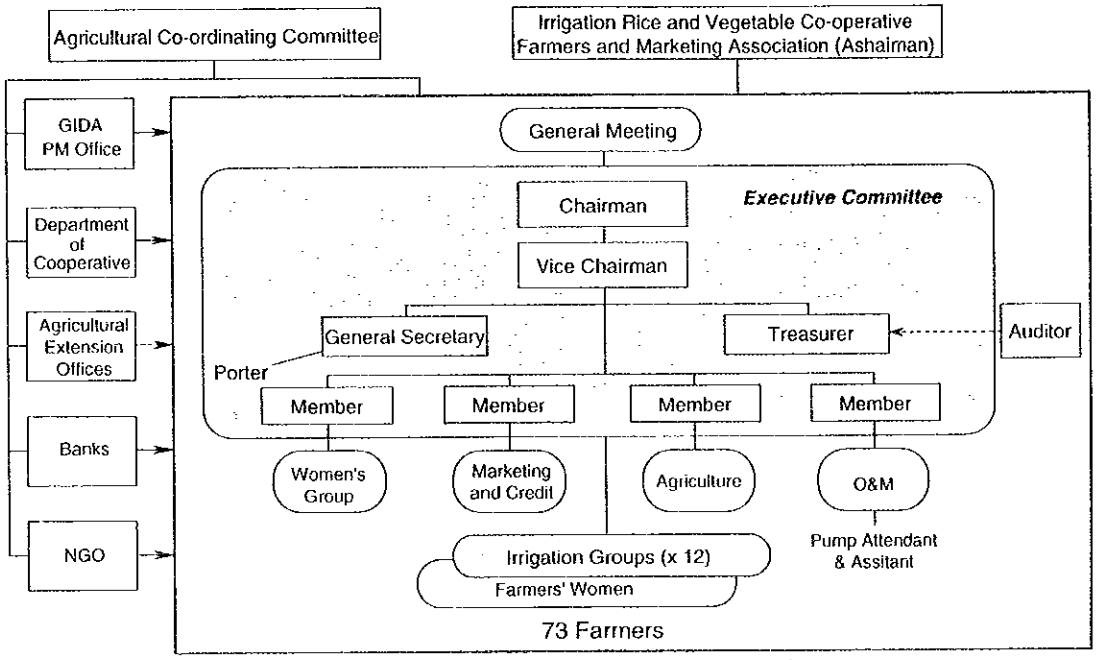
Kpando-Torkor Project - II

(85 ha)

図-18 (2/4)
協同組合（水利組合）計画組織図

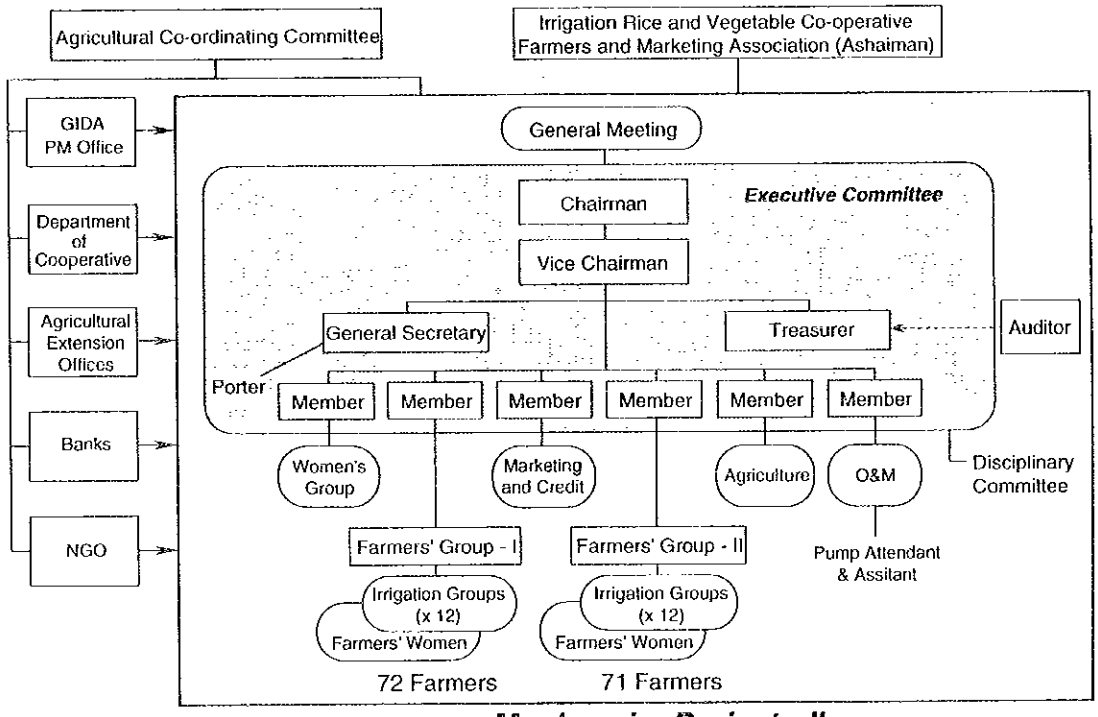
THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency



Mankessim Project - I

(29 ha)



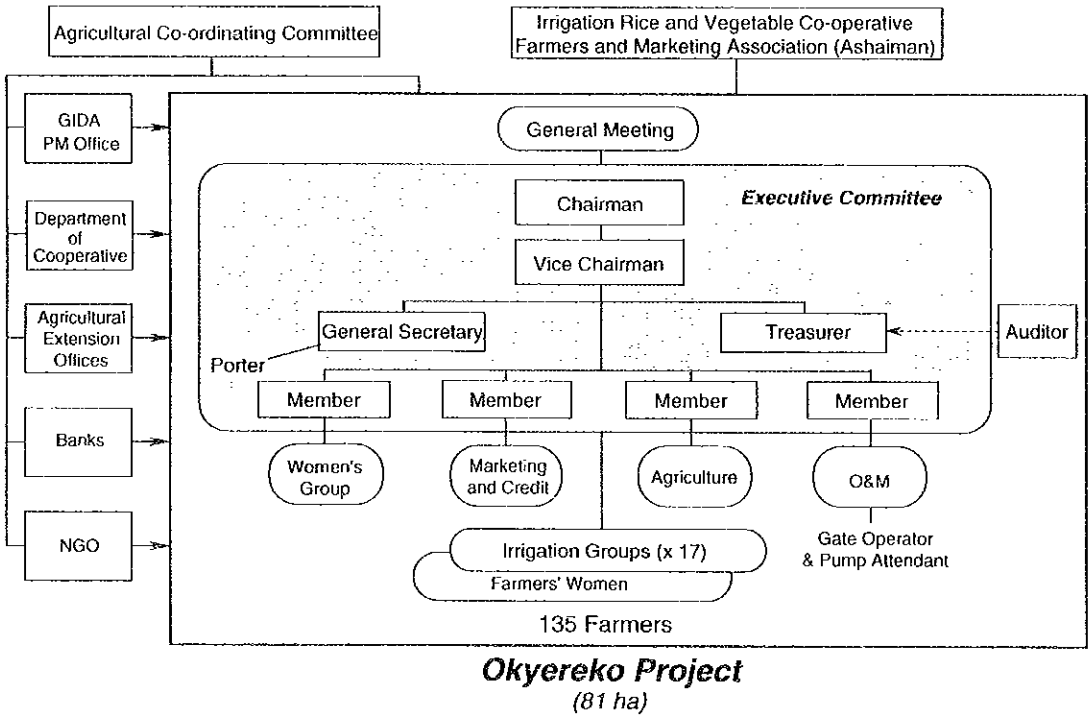
Mankessim Project - II

(57 ha)

図-18 (3/4)
協同組合（水利組合）計画組織図

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency



Okyereko Project
(81 ha)

図-18 (4/4)
協同組合（水利組合）計画組織図

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

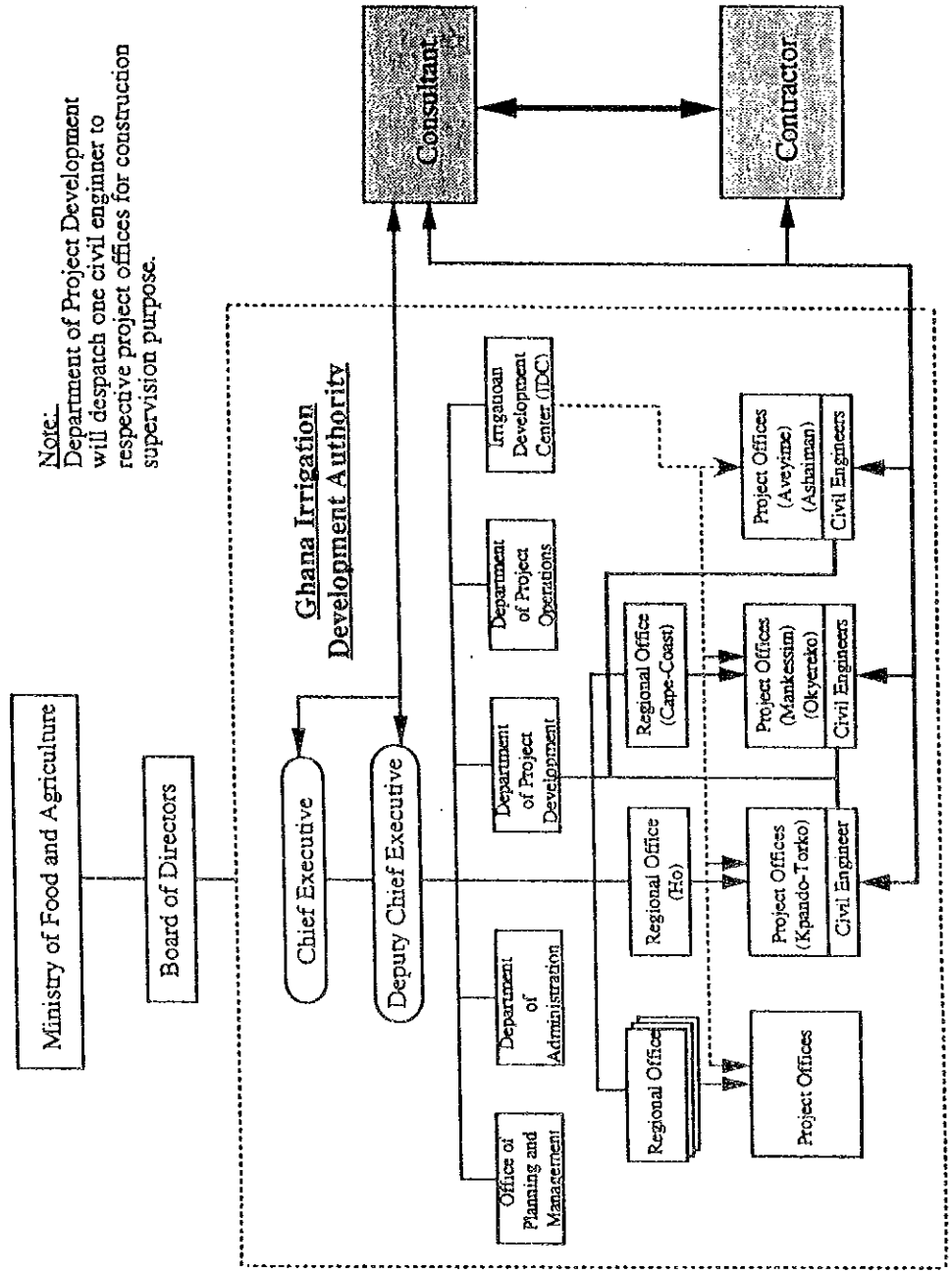


図-19

GIDAの工事監理組織図

THE STUDY ON THE REHABILITATION OF IRRIGATION PROJECTS IN THE REPUBLIC OF GHANA

Japan International Cooperation Agency

添付資料

MINUTES OF MEETING
ON
SCOPE OF WORK
FOR
THE STUDY
ON
THE REHABILITATION OF IRRIGATION PROJECTS
IN
THE REPUBLIC OF GHANA

AGREED UPON
BETWEEN
GHANA IRRIGATION DEVELOPMENT AUTHORITY
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

ACCRA, 19 APRIL, 1995

Mr. O. K. GYARTENG
Chief Executive,
Ghana Irrigation Development Authority

Mr. TAKEAKI SATO
Leader,
Preparatory Study Team,
Japan International Cooperation Agency

The preparatory study team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), and headed by Mr.Takeaki SATO, visited the Republic of Ghana April 9 to April 21, 1995 for the purpose of discussing and confirming the Scope of Work for the the Study on the Rehabilitation of Irrigation Project in the Republic of Ghana (hereinafter referred to as "the Study").

The Team had a series of discussions with the officials concerned at Ghana Irrigation Development Authority (hereinafter referred to as "GIDA") and other organizations on the Scope of Work for the Study. The list of participants in the meetings is attached in the ANNEX I.

As a result of the discussions, The Team and GIDA agreed on the Scope of Work for the Study.

The following are the main issues discussed and agreed upon by both sides in relation to the Scope of Work for the Study.

1. GIDA requested that countermeasure(s) against soil erosion in the catchment area(s) be prepared in the Study.
   The Team replied that general countermeasure(s), without cost estimate, in the catchment area(s) will be proposed in the Study.
   GIDA agreed with the Team.

2. Thirty copies of the Draft Final Report will be submitted.

3. GIDA requested that "private properties or restricted areas" in the sentence of VII, 1., (6) be replaced with "project area and its vicinity".

4. Counterpart personnel will be assigned from GIDA staff members.

5. Offices for the Japanese study team equipped with telephone(s) or communication facilities, electricity, water supply and necessary number of desks and chairs will be provided in Accra, Techiman and Tamale.

6. GIDA requested that the equipment necessary for the Study (attached as ANNEX II) be provided by JICA and the Team promised to convey its request to the Government of Japan.

7. GIDA shall provide necessary number of drivers for vehicles at its own expense.

8. GIDA requested a counterpart training in Japan. The Team promised to convey its request to the Government of Japan.

9. GIDA requested that Subinja project and Okyereko project be included in the Study.
   The Team agreed with GIDA.

ANNEX I

LIST OF PARTICIPANTS

Ghanaian Side

Ministry of Food and Agriculture

Hon. Mr. Atsu-Ahedor	Deputy Minister of Food and Agriculture (Crops)

Ghana Irrigation Development Authority

Mr. O. K. Gyarteng	Chief Executive
Mr. Kwabena Wiafe	Deputy Chief Executive (Engineering)
Mr. A. K. Affram	Deputy Chief Executive (Agronomy)
Mr. Opoku-Mensah	Director of Planning
Mr. H. A. Torgbor	Director of Project Development
Mr. D. M. Ohemeng	Director of Project Operation / Director of IDC

Japanese Side

Preparatory Study Team

Mr. Takeaki SATO	Leader
Mr. Izumi OBA	Member
Mr. Hideki NISHIJIMA	Member
Mr. Masahiro IIDA	Member
Mr. Sumio SHINDO	Member
Mr. Kenichi MATSUMOTO	Member

JICA Ghana Office

Mr. Toshiharu KAI	Deputy Resident Representative

Irrigation Development Center (IDC)

Mr. Akira OGAWA	Colombo Plan Expert

ANNEX II

LIST OF EQUIPMENT

-copying machine

-communication equipment

-vehicles

-computing equipment and accessories (IBM compatible)

-air conditioner

MINUTES OF MEETING
FOR
INCEPTION REPORT
ON
THE STUDY
ON
THE REHABILITATION OF IRRIGATION PROJECTS
IN
THE REPUBLIC OF GHANA

ACCRA, 23 OCTOBER, 1995

Mr. O.K. GYARTENG
Chief Executive
Ghana Irrigation Development Authority

Mr. KUNIO IRIE
Leader
JICA Study Team

Witnessed by

Mr. TAKEAKI SATO
Leader
Advisory Team
Japan International Cooperation Agency

1. **Date : 20 October, 1995 (9 : 30 am - 12 : 00 pm)**

2. **Place : Conference Room at GIDA**

3. **Attendants : See attached list**

4. **Summary of Discussion :**

The JICA Study Team (the Study Team) submitted twenty (20) copies of the Inception Report (the Report) to Ghana Irrigation Development Authority (GIDA) on 20 October, 1995 in accordance with the Scope of Work for the Study on the Rehabilitation of Irrigation Projects agreed upon between GIDA and Japan International Cooperation Agency (JICA) on 19 April, 1995.

The meeting was held at GIDA's conference room. Prior to the meeting, the Minutes of Meeting agreed between GIDA and the Preparatory Study Team on 19 April, 1995 were confirmed.

In the meeting, Mr. K. Irie, Leader of JICA Study Team, presented the highlights of the Inception Report. Discussions followed after the presentation with the following as conclusions:

(1) In principle, the contents of the Inception Report were accepted by GIDA.

(2) GIDA requested the Study Team that the agricultural development plan to be proposed should be worked out, putting careful attention to the sufficient maintenance period for operation and maintenance of the project facilities. The Study Team agreed to this request.

(3) GIDA requested the Study Team to study the possibility of expansion of irrigated land in the areas adjacent to the existing project sites. The Study Team agreed to make such a study within the extent economically justifiable.

(4) GIDA requested that the Steering Committee Meeting be held once a month. The Study Team agreed to this request.

(5) EIA study shall be executed for the selected priority projects in line with the latest government regulation.

(6) The proposed cropping pattern should include plan for crop diversification, taking into account the natural, social and economic conditions of the respective study projects.

(7) The weighted selection criteria which will be used for selection of priority projects should be prepared and discussed with GIDA in advance.

(8) The possibility of recovering capital cost of the Projects from the farmers should be studied.

(9) The contractor(s) for execution of any work on the agreement should be selected by bidding, except soil laboratory test.

LIST OF ATTENDANTS

Ghanaian Side

1. Ministry of Food and Agriculture

Hon. Mr. V.K. Atsu-Ahedor	Deputy Minister of MOFA (Crops)

2. Ministry of Finance

Mr. E.K. Nkansah	Representative of Ministry of Finance

3. Ghana Irrigation Development Authority

Mr. O.K. Gyarteng	Chief Executive
Mr. Kwabena Wiafe	Deputy Chief Executive (Engineering)
Mr. M.A.K. Affram	Deputy Chief Executive (Agronomy)
Mr. H.A. Torgbor	Director of Development
Mr. Yaw Yeboah	Deputy Director of Planning
Mr. S. Oduro-Konadu	Principal Agronomist
Mr. Sammy Akagbor	Principal Agronomist (Soils)
Mr. E.T. Obuobi	Chief Personnel Officer
Mr. P. Osew-Owusu	Solicitor

Japanese Side

1. Advisory Team :

Mr. Takeaki Sato	Leader
Mr. Makoto Takahashi	Coordinator

JICA Ghana Office :

Mr. Toshiharu Kai	Deputy Resident Representative

Irrigation Development Centre (IDC) :

Mr. Akira Ogawa	Colombo Plan Expert

2. JICA Study Team :

Mr. Kunio Irie	Leader
Mr. Hitoshi Shimazaki	Irrigation and Drainage System
Mr. Tadaharu Murono	Social and Farmer' Organisation
Mr. Noboru Mochizuki	Management and Agricultural Aspects
Mr. Kisaku Yamada	Agro-economic Study & Project Evaluation
Mr. Mototaka Nishi	Hydrological & Meteorological Study
Mr. Yasushi Osato	Structure Design & Cost Estimate
Mr. Yoji Mizuguchi	Pedology & Environment
Mr. Shigeya Otsuka	Coordinator

MINUTES OF MEETING
FOR
PROGRESS REPORT - I
ON
THE STUDY
ON
THE REHABILITATION OF IRRIGATION PROJECTS
IN
THE REPUBLIC OF GHANA

ACCRA, 22 DECEMBER, 1995

Mr. O.K. GYARTENG
Chief Executive
Ghana Irrigation Development Authority

Mr. KUNIO IRIE
Leader
JICA Study Team

1. **Date** : **22nd October, 1995 (10:00 - 13:30)**

2. **Place** : **Conference Room at GIDA**

3. **Attendants** : **See attached list**

4. **Summary of Discussion** :

The JICA Study Team (the Study Team) submitted twenty (20) copies of the Progress Report-I (the Report) to Ghana Irrigation Development Authority (GIDA) on 19th December, 1995 in accordance with the Scope of Work for the Study on the Rehabilitation of Irrigation Projects agreed upon between GIDA and Japan International Cooperation Agency (JICA) on 19 April, 1995.

At the meeting, Mr. K. Irie, Leader of JICA Study Team, presented the highlights of the Report, and other experts made additional explanation of their technical sections. Discussions followed after the presentation with the following as conclusions:

(1) In principle, the contents of the Report were accepted by GIDA.

(2) GIDA requested the Study Team to :

(a) Spell out the title of all tables shown in the paragraphs,
(b) Make further study on the water requirements,
(c) Make further study on possibility of increasing the reservoir capacity of Ashaiman project,
(d) Make a study on improvement of intake valve at Ashaiman reservoir,
(e) Study the maintenance method of drainage system,
(f) Make further study on fertilizer and other agro-chemicals application effects on environment,
(g) Study needs of rehabilitation and new construction of staff quarters in connection with the projects rehabilitation, and
(h) Make further study on credit facilities to farmers.

LIST OF ATTENDANTS

Ghanaian Side

1. Ghana Irrigation Development Authority :

Mr. O.K. Gyarteng	Chief Executive
Mr. Kwabena Wiafe	Deputy Chief Executive (Engineering)
Mr. M.A.K. Affram	Deputy Chief Executive (Agronomy)
Mr. H.A.Torgbor	Director of Development
Mr. D.N. Ohemeng	Acting Director of Operations
Mr. Yaw Yeboah	Deputy Director of Planning
Mr. Nana Kofi Koduah	Deputy Director of Plant
Mr. Sammy Akagbor	Deputy Director of Agriculture
Mr. Chris Bence	Agronomist

Japanese Side

1. JICA Study Team :

Mr. Kunio Irie	Leader
Mr. Hitoshi Shimazaki	Irrigation and Drainage System
Mr. Tadaharu Murono	Social and Farmer' Organisation
Dr. Noboru Mochizuki	Management and Agricultural Aspects
Mr. Kisaku Yamada	Agro-economic Study & Project Evaluation
Mr. Yasushi Osato	Structure Design & Cost Estimate
Mr. Yoji Mizuguchi	Pedology & Environment
Mr. Shigeya Otsuka	Coordinator

MINUTES OF MEETING
FOR
INTERIM REPORT
ON
THE STUDY
ON
THE REHABILITATION OF IRRIGATION PROJECTS
IN
THE REPUBLIC OF GHANA

ACCRA, 14th MARCH, 1996

Mr. O.K. GYARTENG
Chief Executive
Ghana Irrigation Development Authority

Mr. KUNIO IRIE
Leader
JICA Study Team

1. **Date** : **12th March, 1996 (10:00 - 13:30)**

2. **Place** : **Conference Room at GIDA**

3. **Attendants** : **See attached list**

4. **Summary of Discussion** :

The JICA Study Team (the Study Team) submitted twenty (20) copies of the Interim Report (the Report) to the Ghana Irrigation Development Authority (GIDA) on 11th March, 1996 in accordance with the Scope of Work for the Study on the Rehabilitation of Irrigation Projects agreed upon between GIDA and Japan International Co-operation Agency (JICA) on 19 April, 1995.

At the meeting, Mr. K. Irie, Leader of the Study Team, presented the highlights of the Report. Discussions followed after the presentation with the following as conclusions:

(1) In principle, the contents of the Report were accepted by GIDA.

(2) GIDA agreed to the five selected priority projects, but requested that three more projects namely, Amate, Subinja and Akumadan be added to the priority projects in an attempt at obtaining a reasonable regional balance. Reasons for requesting for the specific three projects are as follows:

(a) Amate project:
Amate is one of the lakeshore projects which the Government of Ghana is trying to promote due to vastness of the Volta Lake. Kpando-Torkor serves as a pilot for the eastern side of the Volta whilst Amate serves as a pilot for the western side. The EIRR is higher than Aveyime. The reason for non-selection is access. Fortunately, the latest information is that the road is just about to be rehabilitated , and access would have considerably improved by the time of project implementation.

(b) Subinja project:
Subinja has high total point but low EIRR. Only two projects were studied in the region, Tanoso and Subinja. Both were initiated by FAO as pilot to act as a catalyst for private tomato and other vegetable growing initiative. Apart from

the regional balance expected from such rehabilitation work, Subinja is needed as a model farm for vegetable growers in the district and in the region.

(c) Akumadan project:
Akumadan serves as a pilot scheme for tomatoes. It was established by FAO to propagate the growing of vegetables. Its main objective in vegetables production has now caught on very well with the population. There is now need to provide better facilities to upgrade the present husbandry. The total of points is high and the EIRR is quite low. The reason is the calculated low dependable water. It is suggested that the study be carried to feasibility level whilst checking calculations and assumptions.

In any case as far as the Study Team is concerned, the go ahead has been given to it to prepare the feasibility study on the five projects as proposed in the Report.

(3) It was confirmed that the feasibility study on Ashaiman project shall be executed for the existing facilities covering 44 ha of the irrigable area only.

(4) GIDA requested the Study Team to make further study on capital and O&M cost recovery at the feasibility study time:

(5) The costs for rehabilitation of the projects should be shown separately as construction costs per ha, costs for institutional improvement per ha, and those for agricultural extension services, etc. per ha.

(6) GIDA suggested the Study Team check the availability of existing aerial photography prepared by the Government of Ghana recently which may be used for preparation of topographic maps of the five priority projects.

LIST OF ATTENDANTS

Ghanaian Side

1. Ministry of Food and Agriculture :

Mr. J.A. Poku	Deputy Director, Department of Crop Services

2. Ghana Irrigation Development Authority :

Mr. O.K. Gyarteng	Chief Executive
Mr. Kuwabena Wiafe	Deputy Chief Executive (Engineering)
Mr. M.A.K. Affram	Deputy Chief Executive (Agronomy)
Mr. H.A.Torgbor	Director, Department of Project Development
Mr. D.M. Ohemeng	Acting Director, Department of Project Operations
Mr. A. Opoku-Mensah	Director, Department of Planning

Japanese Side

1. Irrigation Development Centre :

Mr. Akira Ogawa	JICA Expert

2. JICA Study Team :

Mr. Kunio Irie	Leader
Mr. Hitoshi Shimazaki	Irrigation and Drainage System
Mr. Tadaharu Murono	Social and Farmer' Organisation

MINUTES OF MEETING
FOR
PROGRESS REPORT-II
ON
THE STUDY
ON
THE REHABILITATION OF IRRIGATION PROJECTS
IN
THE REPUBLIC OF GHANA

ACCRA, 18th DECEMBER, 1996

Mr. O.K. GYARTENG
Chief Executive
Ghana Irrigation Development Authority

Mr. KUNIO IRIE
Leader
JICA Study Team

1. **Date** : **18th December, 1996 (10:00 - 12:00)**

2. **Place** : **Conference Room at GIDA**

3. **Attendants** : **See attached list**

4. **Summary of Discussion** :

The JICA Study Team (the Study Team) submitted twenty (20) copies of the Progress Report -II (the Report) to the Ghana Irrigation Development Authority (GIDA) on 16th December, 1996 in accordance with the Scope of Work for the Study on the Rehabilitation of Irrigation Projects agreed upon between GIDA and Japan International Co-operation Agency (JICA) on 19th April, 1995.

At the meeting, Mr. K. Irie, Leader of the Study Team, presented the highlights of the Report. Discussions followed after the presentation with the following as conclusions:

(1) In principle, the contents of the Report were accepted to GIDA.

(2) As for the rehabilitation plan on the projects, the following are confirmed to be included in the study:

   (a) Downstream portion of the existing spillways of Ashaiman and Okyereko projects shall be rehabilitated because of severe damages.

   (b) Green belt with intercepting drain and collector drain shall be provided in Kpando-Torkor and Mankessim projects, in order to avoid soil erosion.

   (c) Staff quarters will be needed for the visiting researchers at Ashaiman project. In addition, a fence will also be needed for security purpose.

(3) GIDA has no specific design standard. Feasibility level design for the project facilities such as canals, road, related structures and pump station may be made using the generally authorized Japanese, USA and British standards.

(4) Institutional Improvement Plan
The institutional improvement plan was basically accepted by GIDA. Further study on credit facility will be made taking into consideration revolving fund.

(5) Privatization of GIDA
GIDA is requesting the Cabinet cancellation of its privatization. It is confirmed that even if GIDA were to be privatized in the future, the Ministry of Food and Agriculture shall take care of the Project as the government executing agency.

LIST OF ATTENDANTS

Ghanaian Side

1. Ghana Irrigation Development Authority :

Mr. O.K. Gyarteng	Chief Executive
Mr. Kwabena Wiafe	Deputy Chief Executive (Engineering)
Mr. D.M. Ohemeng	Acting Director, Department of Project Operations
Mr. A. Opoku-Mensah	Director, Department of Planning

Japanese Side

1. Japan International Cooperation Agency :

Mr. Osamu Kosegawa	Deputy Resident Representative of JICA Ghana Office

2. Irrigation Development Centre :

Mr. Akira Ogawa	JICA Expert

3. JICA Study Team :

Mr. Kunio Irie	Leader
Mr. Hitoshi Shimazaki	Irrigation and Drainage System
Mr. Tadaharu Murono	Social and Farmers' Organisation
Mr. Noboru Mochizuki	Management and Agricultural Aspects
Mr. Kisaku Yamada	Agro-economic Study and Project Evaluation
Mr. Yasushi Osato	Structure Design and Cost Estimate
Mr. Shigeya Otsuka	Coordinator

MINUTES OF MEETING

FOR

DRAFT FINAL REPORT

ON

THE STUDY

ON

THE REHABILITATION OF IRRIGATION PROJECTS

IN

THE REPUBLIC OF GHANA

ACCRA, 14 MARCH, 1997

Mr. O.K. GYARTENG
Chief Executive
Ghana Irrigation Development Authority

Mr. KUNIO IRIE
Leader
JICA Study Team

Witnessed by

Mrs. AGNES M. BATSA
Head, Bilateral Unit
International Economic Relations Division
Ministry of Finance

Witnessed by

Ms. MIYUKI YAMAZAKI
Coordinator
Advisory Team
Japan International Cooperation Agency

1. Date : 11th March, 1997 (9 : 00 am - 11 : 00 am)

2. Place : Conference Room at GIDA

3. Attendants : See attached list

4. Summary of Discussion :

The JICA Study Team (the Study Team) submitted twenty (20) copies of the Draft Final Report (the Report) to Ghana Irrigation Development Authority (GIDA) prior to this explanation meeting, in accordance with the Scope of Work for the Study on the Rehabilitation of Irrigation Projects agreed upon between GIDA and Japan International Cooperation Agency (JICA) on 19 April, 1995.

At the meeting, Mr. K. Irie, Leader of JICA Study Team, presented a brief explanation on the contents of the Report. Discussions followed after the presentation with the following as conclusions:

(1) In principle, the contents of the Report were accepted to GIDA.

(2) GIDA asked the Study Team to ensure that Table-7 "Implementation Schedule" is given a footnote mentioning that the fiscal year in the table means the Japanese fiscal year. The Study Team agreed to this request.

(3) GIDA asked that the Study Team to change the expression of "no or low interest" on the 6th line from top on page S-14 to "prevailing interest." The Study Team agreed to this request.

(4) GIDA requested the Study Team to mention reforestation/green belt which will be provided around the Okyereko reservoir by beneficiaries as a recommendation, in order to protect the reservoir from further siltation. The Study Team agreed to this request.

(5) GIDA asked the Study Team whether the budgets for training of staff and capital for the revolving loan recommended in the Report are included in the project cost or not. The Study Team answered that these budgets are not included in the project cost. Hence, GIDA asked for the possibility to the JICA Advisory Team of finding out whether something could be done about it. The JICA Advisory Team agreed to convey the message to JICA Headquarters.

(6) Further comments on the Report by GIDA, if any, will be sent to the JICA Study Team by 15 April, 1997.

(7) It was confirmed that the official letter stating that GIDA will not be privatized, will be issued to JICA by the Ministry of Food and Agriculture. (The JICA Study Team later informed GIDA that the Deputy Minister for Food and Agriculture in charge of crops (Mr.V.A.Atsu Ahedor) also confirmed the above when the JICA Study Team paid a courtesy call on him on 11th March, 1997)

(8) GIDA agreed to circulate the Final Report under the condition of "for official use only".

LIST OF ATTENDANTS

Ghanaian Side

1. Ghana Irrigation Development Authority

Mr. O.K. Gyarteng	Chief Executive
Mr. Kwabena Wiafe	Deputy Chief Executive (Engineering)
Mr. A.Opoku-Mensah	Director of Department of Planning
Mr. H.A. Torgbor	Director of Development
Mr. D.M. Ohemeng	Acting Director, Department of Project Operation

Japanese Side

1. JICA Advisory Team :

Ms. Miyuki Yamazaki	Coordinator

2. JICA Study Team :

Mr. Kunio Irie	Leader
Mr. Hitoshi Shimazaki	Irrigation and Drainage System
Mr. Tadaharu Murono	Social and Farmer' Organization