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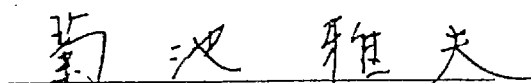
MINUTES OF UNDERSTANDING
BETWEEN THE JAPANESE ADVISORY STUDY TEAM AND
THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE REPUBLIC OF GHANA
ON THE JAPANESE TECHNICAL COOPERATION
FOR THE SMALL-SCALE IRRIGATED AGRICULTURE PROMOTION PROJECT

The Japanese Advisory Study Team (hereinafter referred to as "the Japanese Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Masao Kikuchi, visited the Republic of Ghana from March 13 to March 25, 2000 for the purpose of interim evaluation of the Project Type Technical Cooperation for the Small-scale Irrigated Agriculture Promotion Project (hereinafter referred to as "the Project") as well as discussing the major issues related to the implementation of the Project.

During its stay in the Republic of Ghana, the Team carried out a field visit, exchanged views and held a series of discussion with the Ghanaian authorities concerned in respect of the desirable measures to be taken by both Governments for the successful implementation of the Project.

As a result of the discussions, the Team and the Ghanaian authorities concerned agreed to recommend to their respective Governments the matters referred to in the interim evaluation report attached hereto.

Accra, March 23, 2000

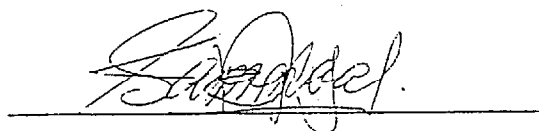


Masao KIKUCHI

Leader

Japanese Advisory Study Team

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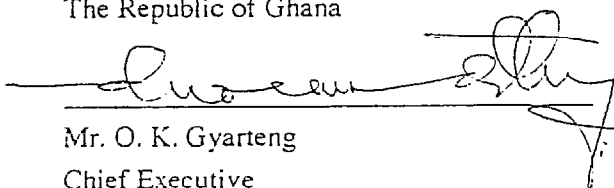


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THE ATTACHED DOCUMENT

THE INTERIM EVALUATION REPORT
OF THE JAPANESE ADVISORY STUDY TEAM
FOR

THE SMALL-SCALE IRRIGATED AGRICULTURE PROMOTION PROJECT

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1. INTRODUCTION

1-1 BACKGROUND

The Project started on August 1, 1997 for a five-year term according to the Record of Discussion (hereinafter referred to as "the R/D") signed on May 27, 1997. The Japanese Consultation Team was dispatched from July 6 to 17, 1998 to formulate the detailed Tentative Schedule of Implementation (hereinafter referred to as "the TSI"). The Joint Evaluation Team (hereinafter referred to as "the Team") consisted of the members listed in ANNEX 1 was assigned to conduct the interim evaluation.

1-2 OBJECTIVES OF THE INTERIM EVALUATION

The interim evaluation is performed halfway through the project cycle to correct the schedule and to reflect the results of the evaluation into the on-going stage of the Project. It is conducted to evaluate whether the Project is progressing satisfactorily or not, and to evaluate measures taken or to be taken against the changes in external conditions. In the course of the evaluation, the Project Design Matrix (hereinafter referred to as "the PDM") are reviewed. Based on the observation and study on the implementation of the Project, measures will be forwarded to both governments.

1-3 EVALUATION METHOD

This evaluation was conducted by the Team in accordance with the R/D, the TSI and the PDM through report analyses, field visits, interviews and discussions with the personnel involved in the Project based on "Five Basic evaluation Components", that is, efficiency, effectiveness, relevance, impact, and sustainability.

The major evaluation components are efficiency, effectiveness, and relevance. Efficiency examines whether the extent of assistance was adequate and timely, or not. Effectiveness examines the achievement level of the outputs and project purpose. Relevance examines the adequacy and consistency of the project identification, formulation and implement in the given conditions. In addition, impacts of the Project are considered to examine the influence of the Project and for further development. Even though measures have been put in place for the sustainability of the Project, these measures could not be evaluated now by the Team.

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2. PROGRESS OF THE PROJECT

2-1 ACCOMPLISHMENT IN TERMS OF INPUTS

2-1-1 JAPANESE INPUTS

Dispatch of Experts

A total of eight long-term experts were dispatched in accordance with the R/D and the TSI, except that an expert on agricultural machinery was dispatched with a delay of 1 year and 2 months. Seven short-term experts had been dispatched as scheduled. A list of the dispatched Japanese experts is attached as ANNEX 2.

Training of Ghanaian Personnel in Japan

Twelve counterparts have visited Japan to participate in technical training. All the training programs have been efficiently conducted. The list of trained personnel is given in ANNEX 3.

Provision of Machinery and Equipment

Major Machinery and Equipment were provided in order to implement the Project activities effectively as shown in ANNEX 4. All provided machinery and equipment have been utilized properly for the Project activities

Fund to Cover Local Cost

The Japanese side spent a part of the project management cost in order to implement the Project activities more effectively within the limited time allocation. The supplementary fund made by the Japanese side is shown in ANNEX 5.

2-1-2 GHANAIAN INPUT

Assignment of Counterparts

Ghanaian counterparts have been assigned in accordance with the R/D. A list of assigned counterparts is attached as ANNEX 6.

Allocation of Budget

The Ghanaian side approximately allocated 875,000,000 cedis in the last three years(1997~1999) as shown in ANNEX 7.

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Provision of Land, Buildings and Facilities

The Ghanaian side has provided necessary land, building and facilities for the Project.

2-2 ACCOMPLISHMENT IN TERMS OF OUTPUTS

2-2-1 Analysis and Evaluation of Farmers Situation and Farming System

The socio-economic and socio-cultural backgrounds of the two communities, Ashaiman and Okyereko are quite different. The social backgrounds of these farmers have a big influence on adoption of technology, organization of farmers, farm management behavior of farmers etc. Technology development, extension and farm management should therefore take specific social sites into consideration.

The following conditions are necessary for the development of appropriate technology for increased and stable agricultural productivity in the farming systems:

1. The establishment of cropping patterns with multiple cropping and diversification involving high value and marketable crops are necessary for sustainable crop production for increase in farmers income.
2. Governmental trade liberalization policies on agricultural inputs coupled with weak value of the cedi in the global economy have adverse effects on the locally produced crops and farmers income. Labor and cost saving technologies are required to improve the farmer position.
3. The start of farm operations are delayed due to lack of production credit and machinery. The lack of production credit result in inability of farmers to purchase and use production inputs like fertilizers or in the use of less than the required amounts of inputs while the lack of machinery cause poor land preparation and high post harvest losses. Therefore the provision of an input credit package should be considered.
4. Water must be utilized properly as a common resource in irrigation projects. Therefore management for efficient water utilization and operation and maintenance (hereinafter referred to as "O&M") of irrigation facilities must be improved technically, institutionally, economically as well as environmentally.



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5. Institutional strengthening of the farmer organizations in management is necessary.
6. Appropriate technology development and extension methodologies should be improved in order to strengthen and integrate research extension linkages for farmers to have access to improved technologies.

2-2-2 Improvement of Component Technology

The baseline survey revealed that the development and improvement of component technology are necessary conditions to achieve the project purpose i.e. improvement of the Farming System.

Therefore, based on the results of the baseline survey, each Section developed and prioritized a number of activities that needed to be carried out for the development and improvement of the component technology.

Crop Cultivation

Rice

1. Four promising varieties (WITA 8, WITA 9, Rc 34, Rc 54) were selected.
2. Saline tolerant varieties (Rc 48, Rc 50) were tested in Okyereko field
3. Appropriate fertilization methods were developed
4. Insects pests and diseases on rice were identified
5. Rice based cropping patterns such as zero tillage planting after lowland rice and rice ratoon were tested.

Vegetables

1. Suitable crops/vegetables in the irrigated field were selected
2. Recommendable varieties on okra, hot pepper and tomato were selected
3. Cultural management practices trials on vegetables were conducted
4. Major insects pests and diseases on vegetables were identified
5. Utilization of "neem" for cabbage technology was developed

Water Management

1. In order to improve the planning of the irrigable area for the year, it is necessary to quantify



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the reservoir capacity and produce the capacity curves. This data is compiled for both the Ashaiman and the Okyereko dams. It was therefore possible to determine irrigable area on the right bank of Ashaiman Scheme during the left bank rehabilitation period.

2. Maintaining the reservoir storage, weirs were also installed in the canals and calibrated to measure the water released during each irrigation period.
3. With available climatic data from the Ashaiman Meteorological Station, computations of unit water requirements for various crops has been programmed and water released accordingly on rotational basis to meet the crop demand. The rotation was done with the farmers to enable them appreciate the need to conserve irrigation water.
4. The basis of the determination of irrigation service charge has been produced by the Water Management Section. This is yet to be finalized in further consultation with farmers and other stakeholders. Meanwhile the farmers became aware of their roles in the O&M of the irrigation facilities through the several meetings.

Agricultural Machinery

1. The cultivation method that was practised on the project was just tilling and crossing in which the operator worked more hours on the field. A new method was developed in which the land was rotovated once and roughly crossed with leveling board. The proper usage of depth control device of a rotovator was mentioned to check the depth of tilling on the paddy field because there wasn't any mention of the function of depth control on the rotary which is equipped on the power tiller. Animal traction was studied at Ashaiman experimental field.
2. The furrow wheels of power tillers have been modified to floaters to suit any type of soil for rotovating without the power tiller sticking. Some of the cage wheels have been modified by broadening the surface track in order to avoid unnecessary sticking during tilling.
3. Metal winnowers were developed to replace the old system where farmers had to depend on wind direction etc. before winnowing. In order to improve the rice farming system, the fabrication of simple tools such as sickles, seeding buckets, line markers, leveling boards were produced to support the rice production system.



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Farm Management, Extension and Farmers' Organization

1. Strengthening capability of Technical Staff in data collection and analyses and feedback system for appropriate technology development through Farming Systems Research and Extension (hereinafter referred to as "FSR/E") approach.

Counterpart staff of the Farm Management, Extension and Farmers' Organization Section collected and collated information from the other Sections to prepare the questionnaire used for the farming systems survey.

Field survey data encoding and analysis was done over a period of two and half (2.5) months (13th April - 30th June). FileMaker Pro, a spreadsheet program was used for the data analysis. Counterpart staff were given a 2-week training in the application of this program by a JICA expert.

Secondly, in order to improve on the capability of counterpart staff to conduct FSR/E Surveys, three farmers were selected to go through a complete cropping cycle using their own crop production techniques.

The study made it possible to collect additional information on farmers' farming as well as further verify data that was collected in the Baseline Survey. It also gave a better understanding of farmers approach to crop production.

2. Monitoring system for farmers is being developed. Selected farmers are allowed to crop on the Sections' research plots, using their own existing techniques farming practices. The Section supplies the farmer with inputs on a timely basis. This study is a verification process on the effect of timely supply and application of inputs on the yield of farmers. Records of the farmers farming practice are taken during this exercise and recorded on data sheets designed for the purpose. Data is collected by both the farmer and technical staff from the Section. Results of some of the studies indicate that, given inputs on a timely basis, farmers yields have increased from 3.7mt/ha of paddy to 4.9 mt/ha indicating a 30% increase in yield.



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3. Seminars have been organized for farmers and the executives of the farmers associations as a capacity building exercise. The aim is to strengthen farmers' farm plans, record keeping activities and budgeting/expenditure activities.

So far, topics that have been covered in various seminars include management of agricultural cooperatives, cooperative membership and storekeeping. Other training areas are lined up for the Co-operative executives and the members.

4. This activity seeks to set up a Management Information System (MIS) through which information flow between technical staff and farmers would be enhanced. As a first step in information dissemination, the Section is providing the necessary support for the farmers to publish a newspaper (Ayekoo Network) for the Ashaiman and Okyereko Co-operatives, to give technical, social, marketing, financial and other types of information to both farmers and technical staff.

2-2-3 Verification of Farming System

The preliminary verification was done on plot of the Project Experimental Farm with 2 farmers from the co-operative. The integrated approach involved all the Sections in a holistic approach to the entire farm enterprise. Recommendation from the analysis of results brought out the interventions necessary for improvement.

The verification was improved in a FSR/E on-farm trial on an area of 12.4 ha involving 31 farmers at the rehabilitated Okyereko Irrigation Project.

A comprehensive plan of input credit management supported with mechanized services was drawn with the involvement of all Sections of the Project and the co-operative and its members.

Irrigation water requirements and schedules were designed and farmers were duly informed and trained in the O&M of facilities.

2-2-4 Supporting System for Sustainable Farming

1. Irrigation schemes cannot be sustained without an elaborate O&M culture of the projects by not only farmers but also concerned authorities. Farmers are gradually being trained in the O&M of facilities with their responsibilities and their roles to play in the setting and

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collection of the irrigation service charges. GIDA also has provided some parts of roles to play as supporting body for sustainable farming.

2. Input credit and land preparation have been identified to be the bane of low crop production. 30% increases have been observed at both Okyereko and Ashaiman using different farm groups. Implications are that no technological improvements can be made without any credit system being put in place.
3. Under the Extension System, women groups are so unique and are being organized under one umbrella. A special credit system for women groups has yielded positive result.
4. The co-operative has been realized as the key to the success of the model farming system of the model sites.
5. Studies on management of input credit and joint-use of farm machinery by farmers are being carried out. The input credit has already resulted in increasing rice yields at Ashaiman from an average of 3.7 t/ha to 4.9 t/ha, an increase of 30%. The results of this study is to help reinforce business activities of the cooperatives.
6. The women at both sites have been organized into Women's Groups within the cooperative. The micro-credit scheme was extended to them. At Okyereko, they were provided with groundnut seeds for cultivation, while Ashaiman women cultivated rice. Not only was 100% loan recovery achieved, but it also provided additional income to the farm family.
7. Farmers are being trained in cooperative and credit management through workshops. This has created cooperative awareness and strengthened cooperative management capabilities of farmers.
8. The old offices of GIDA have been renovated for the cooperatives at both sites.
9. Prospect of rice seed production system was verified.
10. Recommendation for good drinking water and clinic for the people of Okyereko in order to minimize the incidence of waterborne diseases has been made.



GIDA

3. RESULT OF THE EVALUATION

3-1 EFFICIENCY

As reported in the progress report of the project, input of the Japanese side until now has been fulfilled. Long-term experts were dispatched and assigned at the beginning of the technical cooperation. Training of counterparts in Japan and provision of equipment required for the project are being delivered. These inputs are at a satisfactory level.

On the other hand, input of Ghanaian side, allocation of local counterpart fund and assignment of counterparts including IDC Deputy Director was not satisfactorily implemented. From the view point of the project efficiency, there is need for improvement.

During the first one and half years, baseline survey was conducted at the irrigation schemes of Ashaiman and Okyereko in order to analyze and evaluate the present status and farming system practised.

From the baseline survey, the direction of the project activity was identified and defined. The output of this survey is highly rated in the evaluation.

In order to improve component technology, various studies are being conducted at the experimental field level.

The rehabilitation of the irrigation and training facilities by the Japanese Grant Aid project is expected to be completed by the end of March 2000. After completion of rehabilitation work, verification of component technology verified at experimental farm and on-farm verification of farming system will be conducted on a larger scale in the rehabilitated irrigation schemes as planned.

Further, the activities to improve the supporting system for sustainable farming system, study on O&M of irrigation facilities, micro-credit system for agricultural input such as fertilizer and agro-chemicals through farmers' cooperative strengthening activities and other related subjects are being carried out.

Those verified output through the above mentioned activities are directly related to the improvement of the sustainable farming systems. Though the analysis and report compilation of the baseline survey took some time, it is judged that the project activity is being efficiently implemented.

3-2 EFFECTIVENESS

The Project has started to achieve the purpose stated in the R/D that is to improve a Model Farming System, which means a comprehensive system which comprises both appropriate



farming technologies, to promote multiple farming based on paddy rice and other crops utilizing irrigation facilities, and institutional systems to support farmers' organization as well as farmers under supervision of GIDA in Ashaiman and Okyereko irrigation schemes as Model sites.

The baseline survey was carried out to identify the direction of improvement of the farming system in both model sites considering priority of the problems to be solved.

Establishment of the model farming system has been scheduled through verification of the farming system in the experimental field and further on-farm level.

Consequently the verification of component technologies, which are needed for improvement of the farming system, identified in the base line survey is still in progress in the experimental field.

Specifically, with the Ashaiman project site, verification of existing farming technologies with farmers' participation is in progress using FSR/E method. On a larger scale at the Okyereko project site, the verification of integrated component technologies is being implemented in a part of the existing area, which was rehabilitated by Japanese Grant Aid project before the completion of the whole area as planned.

For the full verification of on-farm level farming system adopting the component technologies at project level has been scheduled to start after the completion of the rehabilitation work, which will be completed end of March 2000, based on the TSI revised after the intensive discussion with Japanese Technical Advisory Team in July 1998.

Supporting system for sustainable farming system, which is one of the most important activities of the Project, are as follows;

1. Improvement of O&M system of irrigation facilities
2. Justification of feasibility of agricultural micro credit system that will be able to support farmers for provision of input on time.
3. Justification of extension system using FSR/E method.
4. Promotion of group activities in women's groups and strengthening of farmers' co-operative.

Even though not all the output has been achieved through the activities mentioned above, these activities are progressing in line with the project purpose, therefore the project purpose will be achieved in the rest of the project period.

3-3 IMPACT

Generally, it is not very explicit to evaluate both the direct and indirect impacts from the



project implementation at this stage of the Project.

The identified impacts from the project implementation include:-

1. The Agricultural Credit Scheme has led to an increase in yield due to the timely acquisition of inputs.
2. Ashaiman and Okyereko farmers' co-operative have been strengthened
3. The involvement of the women groups in the co-operatives has developed a higher motivation among the members.
4. The awareness created by the co-operative spirit has led to the rehabilitation and management of 20 ha of the right bank of the Ashaiman project whilst the left bank is being rehabilitated to produce upland crops.

It has been expected that, the impacts will have social and economical benefits within the communities and the supporting systems help in the establishment of sustainable farming systems.

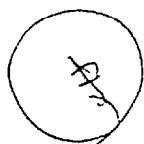
These impacts are expected to be increased and consolidated above the current levels within the time limits of the Project.

3-4 RELEVANCE

This project is to be implemented as part of the important agricultural policy in the Medium Term Agricultural Development Strategy (1991 - 2000). This includes rehabilitation of the existing irrigation projects and the promotion of sustainable O&M of the facilities by farmers. In 1995, the National Development Planning Commission of Ghana launched the Integrated Social Economic Development Strategy, known as Vision 2020, thereafter an Accelerated Agricultural Growth and Development Strategy (AAGDS) in support of Ghana Vision 2020 was formed.

The irrigated agriculture component in AAGDS, emphasized the following:

1. Expansion of total irrigated area from about 10,000 ha to 100,000 ha by 2020,
2. Recommendation of irrigated farming not limited to rice and grains, but also to high valued commodities (vegetables, fruits), considering the economic and financial aspects,
3. Recommendation of transfer of the irrigation facilities, as a strategy for expansion, from GIDA to private sector which includes farmers associations,
4. Construction of new irrigation facilities, mostly aimed at small scale irrigated area, including valley bottoms.



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From the above mentioned policies, there is no change of importance of small scale irrigated agriculture promotion policy. Overall goal and project purpose are appropriate, considering the fact that they are consistent with the policy of the Ghanaian government.

4. MEASURES TO BE TAKEN

4-1 MODIFICATION OF THE PDM

1. The Team concluded that the R/D and TSI modified in July 1998 should be basically unchanged, since they are still functioning effectively. This is because the overall goal and project purpose are consistent with Ghanaian irrigated agriculture promotion policy and accomplishments and activities were properly done.
2. The Team and personal involved in the project (Japanese experts and Ghanaian counterparts) made some changes in the wording of the PDM which was revised in July 1998. Based on analysis of baseline survey "Objectively Verifiable Indicators" and "Means of Verification" were changed as in Annex 8.

4-2 ACTIVITY PLAN AND PROSPECT

Future activities of the Project may be influenced by the project purpose, progress of the activities, and the rest of the cooperation period. Rehabilitation of irrigation facilities and construction of training facilities under the Grant Aid of Japanese Government are to be completed by the end of March 2000. Based on these factors mentioned, some activities mentioned in the TSI may receive more attention than others.

1. While laying emphasis on activities "III. Verification of Farming System, IV. Supporting System for Sustainable Farming System, and V. Training (Component Technology, Farming System, and Operation of Supporting System)" according to the TSI, "II. Improvement of Component Technology" will continue.
2. Detailed activities of each item mentioned in (1) will be implemented after studying their validity at the Technical Committee meeting. Views expressed in the Midterm Report -Approach and Direction- prepared by the Project should be respected during the implementation of the activities. Component technologies to be introduced in the farming system should be clarified at the Technical Committee, then all Sections concerned should work in close relation during experiment and verification of the activities.
3. It is suggested that FSR/E methods should be applied in research and verification of



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component technologies at the experimental field and farmers' fields. Then, content of the technology should be reviewed and fed back to improve the farming system.

4. It is advised that in implementation of the above mentioned items III, IV and V, Farmers' Organization/Farm Management Section at IDC should play an important role. For the smooth implementation of the activities, other concerned Sections should collaborate well under the mutual understanding on the importance of such activities.
5. On "V. Training", since the training facilities in Ashaiman and accommodation facilities in Accra are about to be completed within March 2000, training plans and curricula on component technology, farming system and operation of supporting system should be prepared before conducting the training courses.

5. RECOMMENDATIONS

5-1 REINFORCEMENT OF IMPLEMENTATION SETUP

The Project has reached an important stage of approaching the project purpose through trial and verification of the farming systems, training of component technology, farming system and operation of supporting system. Furthermore, it is expected that, knowledge, technology and experience accumulated by the Ghanaian personnel as a result of the technical cooperation be utilized for training of all stakeholders. Models of farming system are being established in Ashaiman and Okyereko irrigation schemes. These self-helping and sustainable supporting systems, when strengthened, will be extended to other irrigation schemes under GIDA. For such activities in the future, it is recommended to reinforce the implementation body.

1. The General Director of the Project is the Chief Director, Ministry of Food and Agriculture; the Project Director is the Chief Executive, Ghana Irrigation Development Authority (GIDA); the Project Manager is the Director of the Irrigation Development Center/Department of Project Operation. It is quite important that all the three executive management staff work in close relation and carry out respective roles and duties.
2. FSR/E method based extension system is being developed as an integral part of supporting system under the Project. Since it is expected that the Outputs of the Project will be extended to other parts of the country, strengthening of the linkage with the Extension Department, Ministry of Food and Agriculture is important.
3. Although there is no official document, which clearly indicates the roles and duties of IDC, IDC is recognized as a technology development and extension training organization for 22



irrigation schemes under GIDA.

4. Since the Project is based at IDC, further enhancement of human resources in IDC is recommended for the Project to play a key-role in the extension of knowledge, technology and experience of the Project.
5. The Japanese Team had confirmation from GIDA Chief Executive that the Government of Ghana will not privatize GIDA, and the Team met the Minister of Food and Agriculture and during discussions appealed to him not to change this policy.

5-2 STRENGTHENING THE LINKAGE WITH COOPERATIVE DEPARTMENTS

The Project has been training farmers for sustainable development of the farming system as an integral part of the support system. Although it was planned to assign a person from the Cooperative Department, Ministry of Labour and Social Welfare, it has not yet materialized. Since the Cooperative Department registers the farmer organizations and exercises the external auditing powers, it is recommended that the linkage between the Project and the Department be strengthened.

5-3 RUNNING EXPENSES SHOULDERED BY GIDA

The Ghanaian Government has provided its counterpart fund for running expense as a part of the Inputs. For research activities of the Project, 50 million cedis was released in 1999 and 63.9 million cedis is allocated for the year 2000 for activities of the Project. The Team encourages the further effort for obtaining sufficient budget in the coming years. It is proposed that budgetary allocation for the Project has to be clearly marked for its smoother implementation.

5-4 LAND ALLOCATION IN ASHAIMAN AND OKYEREKO IRRIGATION SCHEMES

The Project for Rehabilitation of Irrigation Facilities is to be completed within March 2000. It is recommended that GIDA takes initiatives, and considers the views and expectation of farmers. The land allocation process would be accorded urgency needed by the Land Allocation Committees.

5-5 OPERATION AND MAINTENANCE OF IRRIGATION FACILITIES

It is planned that parts of irrigation facilities in Ashaiman and Okyereko are maintained by



respective farmers' organizations. In the gradual transfer of roles of operation and management activities to the farmers' organizations, it is hoped that the farmers ability to bear the responsibilities be considered carefully so as not to overburden them.

5-6 REVOLVING FUND FOR AGRICULTURAL MICRO CREDIT

Irrigated farming usually requires more input than that of rainfed farming. One of the main limiting factors in the irrigated agriculture in Ghana is poor supporting system on delivering production inputs such as fertilizer, agricultural chemical, machinery service, etc. Results of micro-credit verification trials for agricultural cooperatives at Ashaiman and Okyereko confirmed the importance of delivering the inputs on time. It is suggested that repaid money from farmers to the cooperatives will be used as revolving funds for strengthening farmers' cooperatives and promotion of irrigated farming. It is expected that the Project will guide and advise on the issue of revolving fund management. It is further expected that, through listening to the views from the Project side, the Ministry of Food and Agriculture will discuss with the Ministry of Finance on utilization of input materials donated under KR-2 Programme and the counterpart funds of KR-2 for the above mentioned revolving fund.



ANNEX 1

List of Joint Evaluation Team Members

	Name	Position
(Japanese Side)		
1	Masao Kikuchi (Leader)	Technical Adviser, Association for International Cooperation of Agriculture and forestry
2	Hideki Okada (Cultivation)	Chief, Administration of Technical Cooperation Section, Crop Production Division, Agricultural Production Bureau, MAFF
3	Kenichi Ito (Water Management)	Manager, Agriculture Promotion Section, Osaka Prefecture Minami-Kawachi Office for Agriculture-Forestry Promotion and Nature Conservation
4	Toshio Shibata (Farmers' Organization /Farm Management)	Ex-JICA Expert
5	Yoji Nakata (Agricultural Machinery)	Chief, Crop Production and Machinery Section, Agricultural Production and Extension Division, Agricultural Production and Marketing Department, Kanto Regional Agricultural Administration Office, MAFF
6	Tsuyoshi Nozoe (Technical Cooperation)	Staff, Agricultural Technical Cooperation Division, Agricultural Development Cooperation Department, JICA
(Ghanaian Side)		
7	Christine Obeng-Boampong	Director, Policy Planning Monitoring and Evaluation Directorate, Ministry of Food and Agriculture
8	Adu Amponsah	Schedule Officer, Japanese Desk, Ministry of Finance



ANNEX 2

List of Japanese Experts Dispatched

I. Long Term Experts

	Expert on	Name	Duration
1	Team Leader	Toshiyuki TSUJIMOTO	15. 08. 1997 - 14. 02. 2000
2	Co-ordinator/Training	Miyuki YAMAZAKI	15. 08. 1997 - 31. 07. 1999
3	Farmers' Organization and Farm Management	Kunihiro MASUMI	15. 08. 1997 - Present
4	Crop Cultivation	Tatsushi TSUBOI	01. 08. 1997 - Present
5	Water Management	Katsumasa SATO	15. 08. 1997 - Present
6	Agricultural Machinery	Keiichi TANAKA	01. 10. 1998 - Present
7	Co-ordinator/Training	Hideo ITO	15. 09. 1999 - Present
8	Team Leader	Motonori TOMITAKA	05. 03. 2000 - Present

II. Short Term Experts

Japanese Fiscal Year 1997

	Expert on	Name	Duration
1	Data Processing & Analysis on Base-Line Survey	Yosuke TANAKA	20. 02. 1998 - 15. 03. 1998

Japanese Fiscal Year 1998

	Expert on	Name	Duration
1	Vector Control	Shin-ichi NODA	16. 07. 1998 - 13. 08. 1998
2	Vegetable Production Technology	Hideo KATAHIRA	05. 11. 1998 - 19. 12. 1998
3	Agricultural Co-operative	Seisuke KOGA	15. 02. 1999 - 15. 03. 1999

Japanese Fiscal Year 1999

	Expert on	Name	Duration
1	Farm Management	Masuo ANDO	29. 11. 1999 - 16. 12. 1999
2	Crop (Vegetable) Production	Teruo SHIMADA	29. 11. 1999 - 26. 12. 1999
3	Agricultural Machinery	Fujio ICHINOSE	17. 01. 2000 - 12. 02. 2000
4	Water Balance	Nobumasa HATCHO	29. 03 - 16. 04 (Scheduled)

ANNEX 3

List of Counterpart Personnel Trained in Japan

Japanese Fiscal Year 1997

	Field of Training	Title of Job (at that time)	Name	Duration
1	Irrigation Agriculture	Chief Director, MOFA	Samuel Kojo DAPAAH	09. 03. 1998 - 21. 03. 1998
2	Irrigation and Drainage	Director, Project Development, IDA	Humphrey Adja TORGBOR	27. 02. 1998 - 15. 03. 1998

Japanese Fiscal Year 1998


	Field of Training	Title of Job (at that time)	Name	Duration
1	Vegetable Cultivation Technology for Extension	Section Head, Extension /Training, IDA	Damien Atta AMOATIN	22. 02. 1999 - 18. 08. 1999
2	Irrigation and Drainage	Deputy Director, Proj. Dev't., IDA	Billy Samuel OWUSU	14. 03. 1999 - 15. 04. 1999
3	Agricultural Cooperative Management	Agricultural Extensionist, IDA	Isaac Nii-Yarboye ANNANG	14. 03. 1999 - 29. 05. 1999
4	Agricultural Cooperative Management	Secretary, Farmers' Coop.	Samuel Bampo OPOKU	14. 03. 1999 - 10. 04. 1999
5	Agricultural Machinery Management	Unit Head, Farm Machinery, IDA	Raphael K. DENUTSUI	22. 02. 1999 - 23. 10. 1999
6	Rice Cultivation (Middle Eastern & African)	Unit Head, Training, IDA	Chris Kog FERUTA-BENEE	22. 02. 1999 - 23. 10. 1999

Japanese Fiscal Year 1999

	Field of Training	Title of Job (at that time)	Name	Duration
1	Farm Management	Senior Agricultural Economist, IDA	Kwasi Mintah ASARE	30. 08. 1999 - 26. 02. 2000
2	Irrigation and Drainage II	AG. Unit Head, Water Mng'ment., IDA	Thomas Annang ODONKOR	07. 02. 2000 - 17. 11. 2000
3	Vegetable Cultivation Technology	Unit Head, Horticulture, IDA	Prosper AKUMANI	07. 02. 2000 - 17. 11. 2000
4	Rice Cultivation	Unit Head, Rice Culture, IDA	Peter M. D. ABUGAH	21. 02. 2000 - 20. 10. 2000

ANNEX 4

List of Major Machinery and Equipment Provided by Japan



JFY	Equipment (Maker/Model)	Amount	Qty.	Frequency of Use	Condition	Remarks
1997	Mitsubishi Pajero	US\$97,500	3	Good	Good	
1997	Nissan Pickup	US\$19,492	1	Good	Good	
1997	Mitsubishi Space Wagon	US\$20,000	1	Good	Good	
1998	Isuzu Pickup	US\$20,000	1	Good	Good	
1998	Isuzu Pickup	US\$20,000	1	Good	Good	
1998	Toyota Hi-Ace (Mini-Bus)	GHC49,407,200	1	Good	Good	
1998	Generator	US\$25,483	1	Good	Good	
1998	Radio Communication Equipment	US\$15,850	8	Good	Good	
1998	Radio Communication Equipment	GHC 6,160,000	1	Good	Good	
1999	Isuzu Pickup	US\$43,320	2			Scheduled to Purchase
1999	Isuzu Truck	US\$26,600	1			Scheduled to Purchase

ANNEX 5


List of Supplementary Fund to Cover Local Cost

Unit: 1,000 Japanese Yen

Description	Japanese Fiscal Year	1997	1998	1999	Total
Local Running Cost		3,630	15,300	6,000	24,930
Enlightenment and Extension		1,774	3,023	5,750	10,547
Technical Exchange			2,500		2,500
Security Measures		9,416	2,299	2,400	14,115
Physical Infrastructure Work		4,000			4,000
TOTAL		18,820	23,122	14,150	56,092

ANNEX 6

List of Counterpart Personnel Assigned (1/2)



Field	Name	Rank	Duration of Assignment	Remarks
General Director	Dr. Samuel K. DAPAAH	Chief Director, MOFA	01/08/97 - Present	
Project Director	Mr. Oduro Kwadjo GYARTENG	Chief Executive, GIDA	01/08/97 - Present	Technical Exchange (Tanzania & Kenya)
Project Manager	Mr. Daniel N. OHMENG	Director, Project Operation, GIDA	01/08/97 - 17/12/99	Technical Exchange (Tanzania & Kenya)
	Mr. Sammy M. AKAGBOR	Acting Director, Project Operation, GIDA	01/11/99 - Present	
Planning and Management	Mr. Adam AL-HASSAN	Acting Director, Planning and Management, GIDA	01/08/97 - Present	Technical Exchange (Tanzania & Kenya)
Deputy Director of IDC	Mr. James AKATSE	Principal Agronomist	01/08/97 - 01/01/98	
	Mr. J. K. ANTWI	Principal Agronomist	01/03/00 - Present	
Cultivation	Mr. Peter M.D. ABUGAH*	Senior Agronomist	01/08/97 - Present	
	Mr. Albert F. SWATSON	Assistant Agronomist	01/01/99 - Present	
	Mr. Bans AKUTEY*	Senior Technical Officer	01/08/97 - Present	
	Mr. Prosper AKUMANI*	Assistant Agronomist	01/08/97 - Present	
	Mr. S.K.A. BONNEY	Assistant Agronomist	01/10/99 - Present	
	Mr. Felix FYNN	Agronomist	01/08/97 - 31/08/98	
	Mr. Cephas AMETEFEE**	Principal Production Officer	01/08/97 - Present	
	Mr. Wisdom TULASI	Production Officer	01/08/97 - 01/04/99	

*On course in Japan

**On leave

ANNEX 6

List of Counterpart Personnel Assigned (2/2)



Field	Name	Rank	Duration of Assignment	Remarks
Water Management	Mr. Thomas A. ODONKOR*	Engineer	01/08/97 - Present	
	Mr. George OSEI	Senior Agricultural Engineer	01/08/97 - 31/03/99	
	Mr. S. N. A. ARTHUR	Senior Agricultural Engineer	01/08/97 - 30/07/99	
	Mr. Busia D. NAMBU	Assistant Agricultural Engineer	03/06/99 - Present	
	Mr. Emmanuel SACKY	Assistant Agricultural Engineer	01/09/99 - Present	
Farmers' Organization / Farm Management	Mr. Damien A. AMOATIN	Principal Agricultural Economist	01/08/97 - Present	
	Mr. Kwasi A. MINTAH	Senior Agricultural Economist	01/08/97 - Present	
	Mr. Isaac N.Y. ANNANG	Assistant Agronomist	01/08/97 - Present	
	Mr. Samuel B. BOAKYE	Assistant Agronomist	01/01/99 - Present	
Agricultural Machinery	Mr. Simon APIO	Principal Agricultural Engineer	01/03/00 - Present	
	Mr. Raphael K. DENUTSUI	Assistant Chief Technician Engineer	01/08/97 - Present	
	Mr. Peter OFORI-ATTAH	Assistant Chief Technician Engineer	01/08/97 - Present	
	Mr. A. K. FORDJOUR	Principal Technician Engineer	02/07/99 - Present	
Training	Mr. Chris K. FERUTA-BENEE	Senior Agronomist	01/08/97 - Present	
	Mr. Sammy DEKYI	Senior Agronomist	01/08/97 - Present	

*On course in Japan

**On leave

ANNEX 7

List of Budgetary Allocation

Unit: Ghana Cedis



Description	1997	1998	1999	Total	Remarks
Personnel Emoluments	100,000,000	150,000,000	180,000,000	430,000,000	
Fuel	16,000,000	48,000,000	50,000,000	114,000,000	
Maintenance of Vehicles	25,000,000	42,000,000	50,000,000	117,000,000	
Administrative Expenses	20,000,000	38,000,000	48,000,000	106,000,000	
Utilities	11,000,000	21,000,000	26,000,000	58,000,000	
Operation and Maintenance of Irrigation Systems	15,000,000	20,000,000	15,000,000	50,000,000	
Total	187,000,000	319,000,000	369,000,000	875,000,000	

ANNEX 8

Project name: Small-scale Irrigated Agriculture Promotion Project in the Republic of Ghana

Duration: August 1, 1997 to July 31, 2002

Project areas: Mainly two model schemes

Target group: GIDA Staff and farmers in irrigation schemes

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal 1. Farming system in respective irrigation schemes under GIDA is improved. 2. Farmers' income is increased.	1. Improvement of farming system and its components observed in irrigation schemes. 2. Improvement in farmers living standard.	• Survey by the Project, GIDA and/or JICA. • Agricultural Statistics.	a. The Ghanaian Government does not bring unfavourable agricultural policy.
Project Purpose A model farming system is established in irrigated agriculture area under the supervision of GIDA.	Percent of farmers in the two schemes who follow the model farming system proposed by the Project.	Survey by the Project, GIDA and/or JICA.	a. Ex-participants of training collaboratively carry out farming system improvement.
Outputs 1. Farmers' situation and farming systems of irrigation schemes are analyzed. 2. Component technology is improved. 3. Farming system is verified in the two model schemes. 4. Farming supporting system is improved in the two model schemes. 5. Extension officers, staffs of farmers' organizations and farmers are trained.	1. Usefulness of data of base line survey as references at the different stages of evaluation. 2. Productivity and economics of component technologies proposed to or adopted by farmers in comparison with those of the conventional ones. 3. Sustainability of the farming systems proposed to or adopted by farmers in comparison with those reported in the baseline survey. 4. Effectiveness and sustainability of introduced supporting systems in comparison with other irrigation schemes. 5. Change of farming and its validity in other irrigation schemes in comparison with those of before attending the training course of the Project.	Baseline survey reports and other Project documents.	a. Enough number of Ghanaian officials and personnel for the Project implementation are retained.
Activities 1. Analysis farmers' situation and farming system. 1-1 Conduct, analyze and evaluate baseline survey in the two model schemes. 1-2 Survey of farming situation of rainfed field around the two model schemes. 1-3 Collection of information on farming situation of other irrigation schemes. 2. Improvement of component technology. 2-1 Crop cultivation. 2-2 Water management. 2-3 Agricultural machinery. 2-4 Farm management. 3. Verification of farming system in the two model schemes. 3-1 Verification of integrated technology at experimental field. 3-2 Verification of farming system on farmers' fields in the two model schemes. 4. Improvement of farming supporting system in the two model schemes. 4-1 Operation and maintenance system of irrigation facilities. 4-2 Agricultural credit system. 4-3 Extension system. 4-4 Mobilization of farmers' organization. 5. Training of component technology, farming system and operation of supporting system. 5-1 Training for extension officers of irrigation schemes. 5-2 Training for staff of farmers' organizations in irrigation schemes. 5-3 Training for farmers in irrigation schemes.	Inputs		a. MOFA and GIDA provide training facility without delay. b. Irrigation facilities of the proposed Model Schemes are rehabilitated by GIDA. c. Enough budget is allocated to training of concerned people.
	Japanese Side <Dispatch of Experts> • Long-term experts 1. Team Leader 2. Coordinator/Training 3. Cultivation 4. Water Management 5. Farmers' Organization/Farm Management 6. Agricultural Machinery • Short-term experts Dispatched if required. <Procurement of the Equipment> Required equipments are procured within the annual budget. <Training in Japan> 2-3 personnel annually <Local Cost Expenditure> Improvement of experimental field	Ghanaian Side <Land, Building and Facility> • Land and building for the Project and 2 Model Schemes • Other required building and facility on mutual agreement <Placement of personnel> (Counterparts) • Project Directors 1. Chief Director, MOFA 2. Chief Executive, GIDA 3. Director, IDC/Department of Project Operation • For technical fields 1. Cultivation 2. Water Management 3. Agricultural Machinery 4. Farmers' Organization 5. Training <Other Equipment not Procured by Japan> <Running Expenses> • Enrolment • Operation and management of facilities • Utilities • Administrative fees for training • Other running expenses	Preconditions a. Farmers accept the Project. b. GIDA continues its governmental role.

SMALL SCALE IRRIGATED AGRICULTURE
PROMOTION PROJECT (SSIAPP).

MIDTERM REPORT

APPROACH AND DIRECTION

January 2000

INTRODUCTION

The main goal of Small Scale Irrigated Agriculture Promotion Project (SSIAPP) is to establish a sustainable farming system for small scale irrigated farming, and consequently, to increase farmers income.

The project started with the sectional activities, where each section conducted a baseline survey to analyze and evaluate the present farmers' situation and farming system.

Based on these baseline studies, problems were identified, and various recommendation were made by sections to address the problems raised in their studies

After the baseline studies were conducted, the original (Project Design Matrix) PDM was reviewed in line with the existing situation, drawing on the findings of the baseline surveys and the contribution of the major stakeholders (farmers) during the PDM review exercise. These recommendations resulted in the drawing up of detailed activity plans by sections (TSI).

This report seeks to address the issue of integration and directional approach towards the achievement of goals set up by the project in establishing a sustainable farming system.

BASELINE SURVEY

The socio-economic and socio-cultural background of the two communities, Ashaiman and Okyereko is quite different. The social background of these farmers has a big influence on adoption of technology, organization of farmers, farm management behaviour of farmers etc. Technology development, extension and farm management should therefore take specific social sites into consideration.

The following conditions are necessary for the development of appropriate technology for increased and stable agricultural productivity in the farming systems:

- i. Introduction of multiple cropping, crop diversification and the establishment of appropriate cropping patterns are necessary to allow farmers to look for more marketable and more profitable crops in order to increase farm income. Crop diversification will also help the farmers to reduce risks of low yields due to soil depletion etc. and also smoothen their consumption.
- ii. Improvement in cultural practices, especially labour and cost saving technologies are necessary because farmers have adopted direct sowing due to the high cost of transplanting and the lack of labour. Also factors such as the removal of subsidies on agricultural inputs, the ever rising cost of imported inputs due to the cedi depreciating against the dollar and other major currencies of the world and the low prices offered locally produced rice have combined to result in low incomes for the farmers at all times.
- iii. Partial mechanization of farm operations should be studied and introduced where economically viable. This is because more often than not, the start of farm operations are delayed due to lack of machinery and production credit. In addition land preparation which is poorly done, post harvest operations are inefficient resulting in high losses. Partial mechanization should help to overcome some of these problems.
- iv. There is the need to improve the management of water on the project since this is a pre-requisite for the success of the above mentioned recommendations.
- v. It is important that the farm management capabilities of farmers are improved so that farmers are able to develop their own farm plans and budgets.
- vi. An extension system should be studied and developed and existing appropriate extension methods should be improved. The survey revealed that existing improved technology that has not been adopted by a considerable number of farmers. This means that either the IDC extension system is weak or that farmers do not have access to improved technology or both. Therefore linkage between extension and research should be strengthened and integrated to allow the feedback mechanism to achieve the desired result.

The farmers' associations need to be strengthened. Promotion of irrigated agriculture is related to farming system of the area and individual farmers' families. It is therefore necessary for farmers to engage in a guided shift from the single crop management style to a diversified farming system. Moreover, there is an excellent possibility to improve family incomes as well as generate employment opportunities in Ashaiman and Okyereko. More importantly, the women in the village will be given the chance to improve their living conditions and be recognized as equal partners in the development process. It is therefore extremely important to promote the strengthening of the farmers' co-operatives as the core organization in both areas.

The following are the areas that need to be particularly strengthened:

- The members should be educated in co-operative management and administration.
- The co-operatives should be re-oriented so that they act as business entities. An initial capital should be secured to finance the activities of the co-operatives in order to implement the activities necessary to reinforce the co-operative business.
- A responsibility chart involving among others, cost sharing between GIDA and the farmers co-operative for water management and the maintenance of facilities should be drawn up.

Institutional Capacity Building

- Supporting systems for farmers in areas such as credit and machinery are needed. These could be provided for under the Revolving Fund of KR2.
- Research, extension and training systems in IDC need to be strengthened. Close linkages among all sections and units of SSIAPP should be encouraged for the development of appropriate technologies and extension systems.

FARM MANAGEMENT, EXTENSION AND FARMERS' ORGANIZATION

It could be inferred from the farming systems survey, that irrigated agricultural technology transfer, have been developed and extended without due consideration to location specific factors like farmers' farming systems and level of development in the area. Specifically, farm capital, budget/expense, acquisition of agricultural machinery, agricultural inputs acquisition and utilization and the use of family and hired labour, which are very important in farm operations, and reflect in the farmers economic and social well-being, were not being addressed. Technology transfer therefore, did not have the desired impact of increasing productivity and farm income. For instance, based on the analysis of rice technology, limiting factors that directly affect yield such as seed variety, seed selection, cultural practices, land preparation and plant protection, could not be identified.

It could also be inferred that, the technology being transferred is either inappropriate or is improperly and incorrectly extended, to make any meaningful contribution to productivity. It can however be mentioned that, because of the difficulty involved in obtaining farm capital, farmers are unable to carry out farm work on schedule. Farm activities such as machinery hire for land preparation, fertilizer and agro-chemical application as well as the effective use of hired labour. These factors affect technology adoption, the establishment of a cropping pattern and the effective and smooth running of the farm.

From this viewpoint, farmers require an institutional support system such as input supply, machinery hire services etc. that would strengthen the farmers' co-operatives as well as the extension delivery system. These support structures in place would facilitate the application of irrigation and cultivation technology effectively.

The study also reveals that farmers do not operate and manage their farms as a business. The Ashaiman farmers, however, are more commercially oriented with most of their operating capital requirements coming from the informal sector, notably the market mummy. The farmers' dependence on the market mummy results in tying arrangements in the sale of produce. After such transactions, farmers do not reserve any funds for the next cropping season and always have to go back to their creditors for financing. Their activities therefore, follow the pattern of a flow economy rather than of a stock economy. The reason is that farmers still follow the traditional behaviour of subsistence crop cultivation.

It is thus essential that the farmer be educated to change his/her attitude to farming, and to see and manage it as a business through proper farm planning, budgeting and expense management.

Also, continuous farm surveys and farming systems research/extension activities are necessary for technology development and establishment in the area of production costs, farm incomes and labour utilization.

General extension delivery in and around the project has been rather poor. Extension activities were concentrated on unstructured visits, and only discussed technical issues with farmers. This brings into focus, the fact that there is no properly established extension system and methods, leading to the poor and ineffective technology transfer and farm guidance to farmers.

Practical on-farm training and demonstration activities are also very weak in the extension delivery system.

Again, extension does not grasp problems such as biological, socio-economic and institutional factors that may be fed back to research for technology development and thereby establish a linkage between extension and research. The development of an appropriate extension system and method in irrigated agriculture, involving the active participation of farmers where applicable, needs to be established.

CULTIVATION

The baseline survey has indicated that rice has been the major cash crop produced under irrigation at most of the irrigation sites including Ashaiman and Okyereko over a period of time. However, the introduction of vegetables over the years has been on the increase. The main vegetables include okro, chilies, cabbage, tomatoes etc. for the local market.

The introduction of other exotic vegetables for export is also on the ascendancy at Ashaiman site as fallout of the non-traditional agricultural export drive by the nation.

One of the major constraints to an effective crop production is that there is no cropping calendar/pattern for either the whole project nor the individual farmers. This haphazard crop production of both rice and vegetables have adverse effects on both effective water management and land utilization.

This multiple cultivation of crops produces a mosaic pattern of crops and fallow lands on the projects and creates favourable conditions for the proliferation of both diseases and pests on the projects. Apart from the broad farming system, technological limitations to both rice and vegetable production have some peculiar difficulties. Many of these factors also influence the poor water management and overall productive capacity of the projects.

Rice: Source of seed is one of the major problems affecting rice production. To this end, the project research activities efforts is directed towards the production of foundation seed purposely for multiplication by trained farmers on farmers' fields. Further to this a technical assistance was extended to 20 farmers at Kpong Irrigation project to train them produce seed rice for the 1,500 ha project.

Land leveling of paddy fields was encouraged in the research programme. This was done in collaboration with the farm machinery section and thus encouraging a better on-farm water distribution and therefore a better establishment of crops. Activities in the planting methods in relation to plant population density trials have led to the recommendations that have reduced seeding rates by 40 – 50%.

Soil improvement trials involving the use of available crop residue and other sources of organic matter were found to reduce the high fertilizer application rates currently applied. Further work of this component is being encouraged with the active participation of farmers.

The dry season rice production has confirmed the susceptibility of this crop to bird damage coupled with other adverse climatic conditions with corresponding low yields. This emphasizes the necessity for the development of a cropping calendar and plan to avoid the production of rice in the dry season.

Vegetables (Horticulture): Similar cultural problems associated rice was observed for the vegetable production from the baseline survey.

A critical point to note was the impurity of vegetable crops on the different vegetable farms visited on the projects, there were at least 10 different varieties of the crop on these farms.

Since okro is one of the main vegetables in the Ghanaian food culture, the production of pure okro seed for onward distribution to farmers was one of the main research activities undertaken.

Vegetable varietal trials were made to select the most promising varieties for the different climatic seasons.

Other activities were directed toward plant density and the use of organic matter to improve the soil fertility and physical characteristics. Trials were also made on different types and sizes of furrows and their suitability for the irrigation of vegetable crops.

There was one collaborative Farmers' Field school on okro production at Ashaiman with National Integrated Pest Management (IPM) programme on a wholistic approach to the production of vegetable.

WATER MANAGEMENT

Most of the irrigation projects in the country failed to achieve their potential benefits not because of the principle but rather the unmeasured and generally excessive application of water to land. There is little or no regard for the cost of water from its source and delivery. In a nutshell this is the summary of the analysis of the baseline survey.

An important aspect of the water management component is the data on the overall storage capacity of reservoir and the monitoring of the water delivery through the canals. To this end, work has been done on both the Okyereko and Ashaiman dams. This has enabled the projects to effectively plan and determine the irrigable area based on crops.

Water measuring devices have also been installed in the canals at both pilot sites and the valves were calibrated. It is possible now to quantify the amount of water released at each irrigation.

Hitherto, at Ashaiman, outgrowers at the tail end of the project are able to produce vegetables on a large scale from the excess water flowing in the drain. Collaborative studies were conducted with the main stream IDA to install and calibrate structures at the Afife Irrigation project for a better planning of the project.

The section has contributed immensely in the development and finalizing the determination of irrigation service charges based on the factors that go into the distribution of irrigation water. With the establishment of the overall irrigation water

plan for the projects, emphasis will shift to the on-farm water requirements of both paddy and upland crops. In this way a comprehensive water management system delivery is envisaged.

The preparation of water management manuals to indicate when and how much to irrigate will be produced.

The training of farmers and their active participation in the operation and maintenance of the irrigation system to supplement the activities of the IDA is a core area for farmer participation.

The need to set up other meteorological stations to provide the necessary climatic data is vital. The station at Ashaiman managed by the section is of immense help by providing adequate data.

FARM MACHINERY

From the analysis of the baseline survey it was realized that factors affecting the unavailability of machinery for crop development include poor maintenance culture of the machines. The misuse of machines and inappropriate land preparation technology due to the lack of training of machine operators is also a major factor contributing to the lack of machines.

The unavailability of simple tools to augment efficient hand operated cultural activities was also noted. Post harvest operations of rice were also given prominence in developing appropriate technologies for rice production.

The section emphasized the fabrication of many simple hand tools, as sickle, line markers and seeding buckets to support rice production.

Improvement of Tilling and Leveling was a major component of the research activities. The section organized a land tilling and leveling training with the farmers at Ashaiman by tilling the field once and leveling with a board attached to the machine to complete the land preparation. A method which reduces cost and machine work hours.

A fabricated depth control device to check the depth of the tilling on the paddy field to a depth of 10-13 cm was developed and introduced for adoption.

Floater and cage wheels have been fabricated for attachment onto the powertiller to augment the support of these machines in wetland preparation conditions. These activities were done to support the crop section in defining rice system improvement. Rice quality in the country is usually low as a result of various interrelated post harvest practices. To this end, presently the sections have worked on a metal winnowing machine to improve the quality of paddy after drying.

Aug-97 Year

Items/Activities	1	2	3	4	5
I. Analysis and Evaluation of Farmers' Situation and Farming System					
1. Conduct, Analyze and Evaluate Baseline Survey	■	■			
2. Survey of Farming Situation of Rainfed Field in the Model Sites.	□	■	■		
3. Study on Farming Situation of Other Irrigation Sites		■	■		
II. Improvement of Component Technology					
1. Crop Cultivation	□	■	■	■	
2. Utilization of Water and Operation and Maintenance of the Facility	□	■	■	■	
3. Efficient Farm Operation and Farm Machinery Utilization	□	■	■	■	
4. Farm Management/Extension	□	■	■	■	
III. Verification of Farming System					
1. Verification of Integrated Technology at Experimental Field		■	■	■	
2. Verification of Farming System on Farmers' Field			■	■	■
IV. Supporting System for Sustainable Farming System					
1. Operation and Maintenance System of Irrigation Facilities	□	■	■	■	■
2. Agricultural Credit System	□	■	■	■	■
3. Extension System	□	■	■	■	■
4. Mobilization of Farmers' Organization	□	■	■	■	■
V. Training (Component Technology, Farming System, and Operation of Supporting System)					
1. Training for Extension Officers of GIDA Irrigation Sites	□	■	■	■	■
2. Training for Farmers	□	■	■	■	■
3. Training for Farmers' Organization	□	■	■	■	■

Note: IV-2 includes agricultural input supply and revolving fund.

V-3 includes operation and maintenance of facility.

Major activities ■

Preliminary activities □

Follow up activities □

☒ - | Tentative Schedule of Implementation of Project (改訂)

PROBLEMS

1. Insufficient funds
2. Poor irrigation water management
3. Poor farmer extension research linkage
4. Poor land preparation
5. Salinity
6. Weak farmer organization

SOLUTIONS TO PROBLEMS RAISED IN THE PDM

Farmers would have sufficient funds to operate if the following were in place

1. Improved planting material
2. Improved cultural practices
3. Adherence to cropping pattern
4. Improved access to inputs
5. Improved produce quality
6. Availability of market information
7. Credit worthiness and disbursement enhanced

Poor irrigation water management would be overcome if:

1. If O&M division is put in place in GIDA, to improve water distribution
2. Catchment area should be protected to reduce soil erosion and make water in reservoir adequate
3. There should be permanent land allocation to ensure proper bund maintenance which would minimize bund leakages
4. Irrigation service charge (ISC) policy should be improved to ensure increase in ISC payment, to make adequate funds available for canal maintenance
5. Provision of adequate machinery

To solve the poor farmer-extension-research linkage

1. Funds should be made available for research in GIDA
2. There should be improved remuneration and adequate training for GIDA staff to enhance research and appropriate technology development
3. Extension should be strengthened
4. Farmer participation needed recognition

Poor land preparation could be addressed through

1. Appropriate machinery selection
2. Development of appropriate machinery
3. Provision of adequate training for operators
4. Improved land preparation

Salinity on projects could be minimized if;

1. Fields are properly levelled
2. Drains maintenance is improved
3. Improved cultural practices by farmers

On weak farmer organization, the following would result in strengthening the farmers organization

1. The farmers organization's financial base strengthened
2. Improved management
3. Provision of adequate training for leaders
4. Support from GIDA is increased

DEVELOPMENT OF COMPONENT TECHNOLOGY

Based on the recommendation of the sectional baseline surveys, each section recommended areas of technology improvement, which were reviewed at a Technical Committee meeting, participated in by the farmers representatives. At the end of this exercise the following recommendation were accepted as areas for which the sections could concentrate their effort in the development of component technologies.

FARM MANAGEMENT, EXTENSION & FARMER ORGANIZATION SECTION

- Institutional capacity building (input supply, machinery hire services) for farmers, research, extension & training systems to be strengthened in IDC
- Strengthen farmers organization through
 - improving management ability in good records keeping, budgeting and expenditure
 - control
 - farmer orientation along business lines
- Develop appropriate extension system
 - extension materials
 - methodology
- Development of a monitoring system

CULTIVATION

- Establish a cropping calendar taking into consideration upland crops and vegetables
- Establish high cropping intensity involving multiple cropping (land use), due to small landholdings.
- Conducting varietal to select good quality rice.
- Herbicide trials to combat numerous weeds identified

- Methods and timing of fertilizer application to be improved eg. basal fertilizer application to be practiced and proper timing of top-dressing
- Production of foundation seed for distribution to farmers for multiplication.
- Train farmers on techniques of good seed production
- Flooding of saline fields to improve condition after rehabilitation

WATER MANAGEMENT

- Enhance water management to improve water utilization
- Study irrigation water requirements by crop types
- Improve water monitoring system in reservoir
- Improvement in water delivery
- Study relationship between soil improvement and water consumption
- Operation and maintenance (O&M) of facilities to be joint responsibility of GIDA and Cooperatives
- Preparation of O&M manuals

FARM MACHINERY

- Improve effectiveness in maintenance and utilization of agricultural machinery and land preparation
- Introduction and modification of appropriate machinery and farm tools
- Improvement in post-harvest and rice milling techniques
- Training of operators on various equipment
- Improve field levels by teaching on the use of levelling board

PROJECT ACTIVITY PLAN - DIRECTION

To give directional guidance on how to ensure that technology development is in line with project objectives, all sectional recommendations were summed up into the project activity plan. The project activity plan listed below is therefore to give project direction between now and in the future. The working mechanism of this concept is illustrated in the attached figure.

APPROPRIATE TECHNOLOGY DEVELOPMENT

- Introduce multiple cropping
- Introduce crop diversification
- Establish a cropping calendar
- Improved cultural practices (labour and cost saving techniques)
- Partial mechanization of farm operations
- Improved water management

- Strengthen farmers in good farm management capabilities
- Establish appropriate extension system

STRENGTHEN FARMER CO-OPERATIVES

- Co-op management & admin
- Co-ops oriented along business lines
- Responsibility sharing in water management between coops and GIDA
- Secure good capital base for co-op activities

INSTITUTIONAL CAPACITY BUILDING

- Institute a supporting system for farmers (credit, land preparation)
- Research, extension and training system strengthened

PRIORITIZATION OF PROJECT ACTIVITY PLANS

The Technical Committee would review the project activities and come out with a priority listing based on importance and farmers needs. This way, project direction would be streamlined.

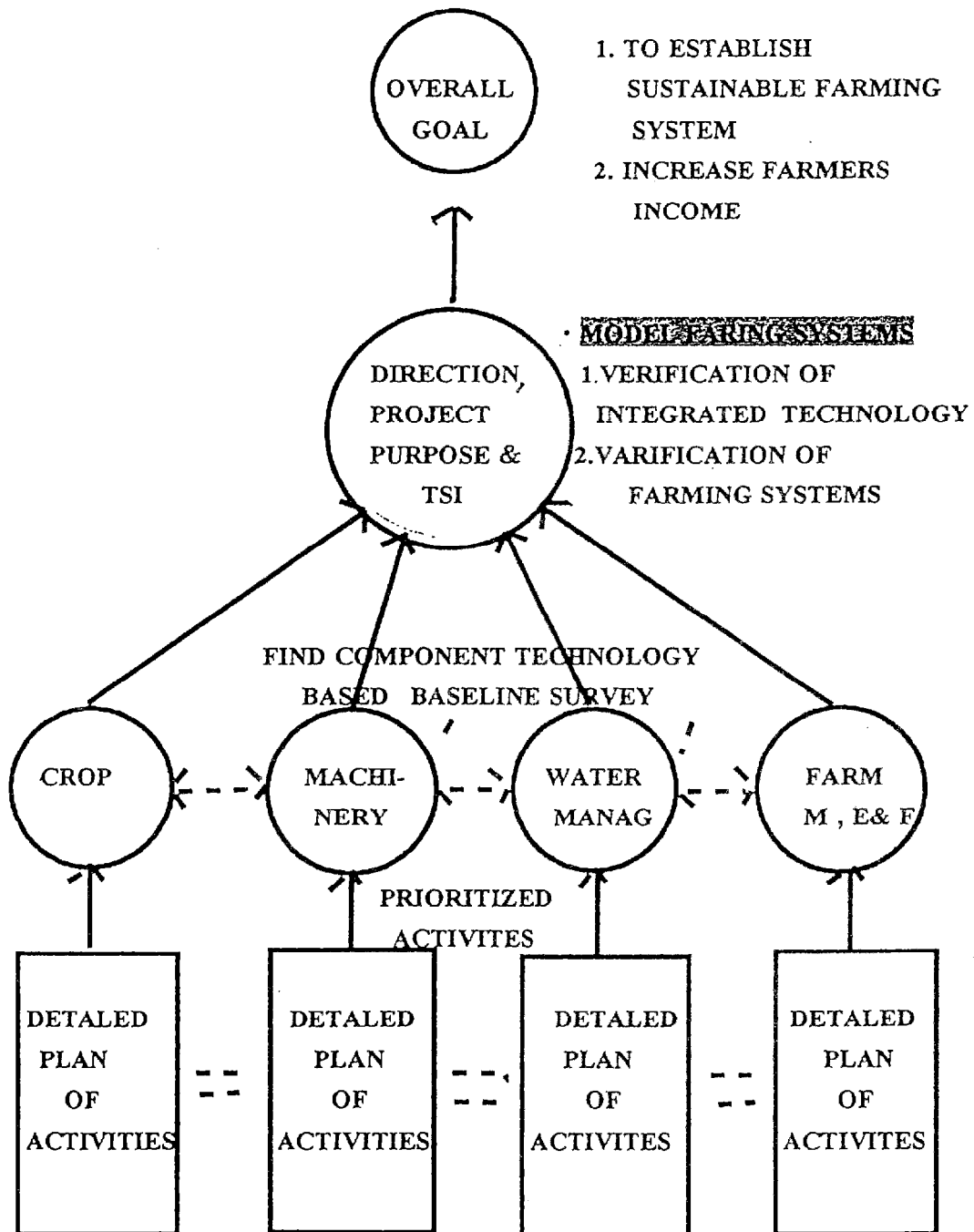
CONCLUSION

- Based on degree of importance and farmers immediate needs, all sectional activities should be prioritized by the Technical Committee
- The technical Committee would consider areas of collaboration among sections/units during the priority listing exercise
- Activities that seek to address soft technology, need to be strengthened at this stage, for example, credit input acquisition and machinery services for land preparation.

Again, since SSIAPP is responsible for the day to day administration as well as the financial administration of the model sites, it is also recommended that:

- The two model sites should be placed under particular units or sections in SSIAPP for proper integration of activities. For example, the scheme coordinator and the project extension, should be under the Farm Management and Extension Section.
- For research activities, sections/units could deal directly with project extension, scheme coordinator or farmers cooperatives. However, normal project activities on farm, should be coordinated by the Farm Management & Extension Section

DIRECTION OF PROJECT ACTIVITES



**ACCELERATED AGRICULTURAL GROWTH
AND DEVELOPMENT STRATEGY IN SUPPORT
OF GHANA VISION 2020**

DRAFT

MINISTRY OF FOOD AND AGRICULTURE

OCTOBER, 1997

EXECUTIVE SUMMARY

After significant growth in the immediate post independence decade of the 1960s the economy of Ghana suffered a sustained decline starting in the early 1970s and lasting until the introduction of the Economic Recovery Programme (ERP) in 1983.

The improvement in macroeconomic stability resulting from the introduction of the ERP made it possible for farmers and firms to respond to the shift in production incentives induced by the policy reforms. Specifically in the agricultural sector, good weather combined with incentive prices and flexible exchange rates led to significant increase in both domestic and export marketing of the major crops cocoa, maize, millet, tuna and other fish, forestry products and non-traditional exports such as horticultural products. For example, average annual agricultural growth increased from -1.2% during 1970-80 to about 2.4% between 1983 and 1988, a turn around of 3.6%.

Under the conviction that there was the need to make more progress towards a meaningful food and agricultural policy in the country, a Medium Term Agricultural Development Programme (MTADP) was initiated in 1988 as a joint GOG/World Bank project and put in place in 1991 to consolidate the gains made under the ERP during 1983-1988.

This strategy provided a rolling 5-10 year programme starting from 1991. The general objective of the strategy was to establish and support market-led growth in agriculture whereby the private sector will invest substantial financial resources and skills that will be necessary to ensure sustainable agricultural growth and development. Government accordingly reduced interventions in input and output markets while increasing support for the private sector by providing the enabling environment for efficient and profitable agricultural development through public goods and services including especially feeder roads, marketing infrastructure, irrigation, research and extension. MTADP also projected an annual agricultural growth of 4 percent over the period 1991 - 2000.

During the 1990s, government policies and programmes for agricultural development have been guided by the MTADP. It has thus far provided a framework for more efficient allocation of public and private sector resources and also provided a focus for policy and institutional reforms in the agricultural sector in order to fully realize Ghana's agricultural potential. In addition the MTADP has provided a coordinating mechanism for donor assistance in the agricultural sector and rationalisation of the rather uncoordinated activities of the several agencies that operate in the sector. Significant improvements have been achieved in the agricultural sector through the implementation of a number of project that were initiated under the MTADP. Although some of these projects are continuing many are nearing completion. Despite the general increases in agricultural production the rate of agricultural growth in the mid 1990s and the rural transformation envisaged under the MTADP has been slow.

A major reason for the slow growth in the agricultural sector in the 1990s have been adverse macroeconomics conditions: large increases in government deficit which pulled resources away from the private sector, weakening stimulus that was available from trade liberalization and other policy reforms. At the same time, the high rate of inflation and high interest rates discouraged private investment and eroded the purchasing power of consumers.

Comparison of Ghana's performance with that of Asian countries, Thailand, for example, indicates that Ghana will need to do more during the next 10 years in order to accelerate the pace of its economic development. The question is what must Ghana do during the Post Structural Adjustment Period (1997-2020) in order to move into a period of economic transformation and sustained accelerated growth and development?

It is in attempt by Government to find answers to these Post Structural Adjustment problems that in 1995, the Government launched its Vision 2020 document, a twenty-five year perspective plan for national development which identified basic objectives to increase employment and average incomes and to reduce poverty and inequities. The overall perspective of Vision 2020 is that Ghana would be transformed from a poor low-income country into a prosperous middle-income country by the year 2020. In line with this objective, overall GDP is targeted to increase at an average annual growth rate of 8% over the period compared with the Structural Adjustment period average annual rate of 4 - 5%, with population growth rate falling from 3 to 2 percent by 2020.

Under Vision 2020, the agricultural sector is targeted to grow at an annual growth rate of 4%. The sector is also expected to ensure food security and adequate nutrition for all Ghanaians; to supply raw materials and other inputs to other sectors of the economy; to contribute to an improvement in balance of payments; and to provide producers with farm incomes comparable to earnings outside agriculture. It is also expected that as agricultural productivity increases and access to markets improve for the majority of Ghana's poor and for women who live in the rural areas and derive most of their incomes from agriculture, farm incomes would increase, thus contributing substantially to poverty reduction.

The most important implications of the Vision for the agricultural sector are therefore derived from the critical role agriculture has to play in bringing overall economic growth, and its consequent impact on poverty reduction and human development. In a country such as Ghana in which about 60% of the labour force is engaged in agriculture, the sheer size of the agricultural GDP dictates that accelerated growth of the economy, increased employment, and reduction in poverty cannot be attained without high growth in agriculture.

If in addition to ensuring food security and adequate nutrition for all, supplying raw materials and other inputs to the manufacturing and services sectors, agriculture is to contribute adequately to the improvement of balance of payments through increased export earnings as well as provide farm incomes comparable to income in the other sectors, then Vision 2020's projection for 4% growth in agriculture may not be sufficient to achieve an overall 8% GDP growth, poverty reduction and equity. In any case agriculture attained a 4.1% average annual growth rate from 1995 to 1996 with only overall GDP growth rate of 4.9% which is far below

the 8% envisaged under Vision 2020. Thus, the strategy proposes a higher agricultural growth of about 6% rate in order to achieve Vision 2020's targets. This 6% target is consistent with world-wide observation that overall GDP growth rates tend to be within 2% of agricultural growth rates for developing countries dependent on agriculture such as Ghana.

Consistent with the critical role agriculture has to play in bringing about overall economic growth and its consequent impact on poverty alleviation, the Ministry of Food and Agriculture (MOFA) has formulated an Accelerated Agricultural Growth and Development Strategy designed to increase the sector's annual growth rate from the current 2-3 percent (1990-96) to 5-6 percent in order to achieve rapid, sustainable and equitable growth. The strategy covers all agriculture including crops, livestock, fisheries, forestry and cocoa. It is consistent with two basic orientations of government: (i) reliance on the private sector to lead investment and economic growth and, (ii) devolution of significant responsibilities from central government to District Assemblies. It also assumes that a supportive macroeconomic framework will be developed.

The overall goal of the Accelerated Agricultural Growth and Development Strategy is to provide a framework within which agricultural development policies and programmes in support of Vision 2020 can be designed and implemented. The programmes will be demand-driven, agricultural productivity enhancing and competitiveness promoting in the domestic, regional and global market.

The strategy is based on the realization after several years of experience that, Ghana's vast agricultural potential can only be exploited in a systematic, cost effective and sustainable manner if and only if Ghana's agricultural production and distribution processes are driven by significantly improved access to domestic and foreign markets in response to changing consumer demands.

The strategy in the medium term is to increase agricultural GDP from US\$2.9 billion to about US\$5.5 billion by 2007 within an overall GDP of about US\$15 billion. This will imply a relative decline of agriculture's contribution to GDP from an average of 45% per annum between 1991 and 1996 to an average of 37% between 1997 and 2007.

The key to achieving a 6% average annual agricultural growth rate is significant increase in the growth of merchandise exports over the rates achieved in the past with non-traditional agricultural exports playing a leading role so that foreign exchange earnings not only increase over time but are also less dependent on cocoa and timber.

The emphasis on creating improved access to domestic and foreign markets is consistent with Ghana's endorsement of the principles of open market economy which require that agricultural production and growth be market access driven and demand-satisfaction dependent.

The policies and programmes designed to achieve the objective of the accelerated growth and development strategy are based on five major elements:

- i. Promotion of selected products through improved access to markets
- ii. Development and improved access to technology for sustainable natural resource management
- iii. Improved access to agricultural financial services
- iv. Improved rural infrastructure
- v. Enhanced human resource and institutional capacity.

Promotion of Selected products through Improved access to markets

One of the major features of the Ghanaian economy between 1991 and 1996 has been the relatively large negative annual resource balances. Since it is not realistic to expect significant increases in official capital grants and it will also be difficult to reduce merchandise imports significantly over the medium term, the most rational alternative is to significantly increase Ghana's merchandise exports from the current 18% of GDP to about 50% of GDP by 2007. This will imply a 15% average annual growth in Ghana's export earnings over a 10 year period.

The strategy is to promote selected agricultural commodities for which Ghana has or can develop comparative advantage to satisfy domestic requirements for food and industrial raw materials and for exports into regional and international markets. This will be achieved by improving private sector access to these markets through information, regional negotiations and adjustments in regulations, selected taxes etc. The far reaching pro-trade reforms that have been already introduced will be intensified and cross-border and other regional trade arrangements facilitated.

The specific programmes to facilitate the attainment of this goal include

- a. Ghana Programme for Sustainable Food Security (GPSFS)
- b. Accelerated Agricultural Non-Traditional Exports (AANTEP)
- c. Youth in Agriculture Programme (YAP)
- d. Agro-Processing Promotion Programme (APPP)
- e. Export Credit Guarantee Programme (ECGP)
- f. Market Promotion Programme
- g. Agricultural Export Promotion Programme

Improving Access to Technology for Sustainable National Resource Management

Agricultural growth in Ghana has been achieved mainly from area expansion with negative impact on the natural resource base and the environment. Accelerated agricultural growth at the rate proposed in the strategy will intensify pressures on the natural resources of the country. This strategy will seek to improve the generation, transfer and dissemination of cost-effective technologies that are responsive to the needs of farmers and processors and to changing conditions in the sector while still ensuring the sustainable use of natural resources.

The agricultural research strategy will focus on profitability and acceptability of improved technology to farmers and processors and on the relationship between increased agricultural production and the maintenance of the natural resource base.

The decentralisation of MOFA will devolve the responsibility of provision of extension service to the District Assemblies and release staff to increase the number of front-line staff and subject matter specialists available for the unified agricultural extension system (UAES). This will significantly improve the coverage of farmers contacted by UAES. The strategy will consolidate the gains made under the National Agricultural Extension Project (NAEP) and devote considerable resources to improving the diffusion of technology and improvement in the methods of delivery.

The management of the natural resources including land, soils, forests and water will be strengthened. In view of the limited scope for area expansion, the strategy will emphasize intensification of land use rather than extensification. The amelioration of the decline in soil fertility will be given priority. This will involve devoting much attention to soil and water conservation practices and integrated nutrient management systems.

A land use policy that specifies uses of land based on capabilities will also be developed. Considerable attention will be given to land and water conservation practices and integrated nutrient management. Government and NGO extension in agro-forestry and erosion control will be strengthened and the role of District Assemblies and NGOs in the Management of the environment and natural resources will be enhanced.

As a deliberate policy to move away from rainfed agriculture to reduce risk in farming, the Government has drawn up a programme to substantially increase the area of agricultural land under irrigation from the estimated 10,000 hectares out of the 13.7 million suitable for agricultural production to about 100,000 hectares by 2020. As a first step, all the existing irrigation projects will be rehabilitated and expanded where feasible. Studies for re-evaluation of the viability of the Accra and Afram Plains and Fumbisi Valley Irrigation Projects. In specific terms, Government will seek assistance in determining the economic, financial and environmental viability of providing canals from the Volta River to the various plains.

Improved Access to Agricultural Financial Services

Financing of the continuum of production and distribution of agricultural inputs, on farm production, processing and marketing of agricultural products is critical to accelerating agricultural growth. With the abolition of administered interest rates and quotas, commercial bank lending to the agricultural sector has been drastically reduced in real terms. The main factors limiting the supply of credit to agriculture are the high risk and low returns. The World Bank estimated total demand for production credit for key agricultural activities at US\$136 million in 1995 while the Bank of Ghana puts all commercial bank loans and advances to the agricultural sector at US\$29.13 million in 1995. This only represented about 21.4% of the production credit demand. The current situation where ADB which has just about 6% of the country's loanable funds provides about 80% of total institutional credit to agriculture is not acceptable. We are aware that the high cost of agricultural inputs

coupled with the risks involved in rainfed agriculture tend to make investments in commercial production unattractive at the prevailing interest rates of more than 45% per annum and hence the large unmet demand. The strategy therefore seeks to reduce risks associated with the agricultural production processes in order to attract additional resources into the sector.

The strategy for improving access to financial services will concentrate on programmes that will specifically serve each segment of the chain effectively. These approaches including group lending, inventory credit and nucleus outgrower schemes aim at reducing the cost of servicing credit and minimizing the risk of default. Both domestic and external sources of on-line credit will be mobilised to increase loanable funds for financial institutions servicing the agricultural sector. Other approaches such as special tax relief and low minimum reserve ratio requirement for banks lending to agriculture will be pursued to provide an incentive framework to lending to agriculture.

The supply of loanable funds to agriculture will be further improved through more vigorous deposit mobilization by encouraging the establishment of more rural banks and community banks that are better placed to improve access of rural areas to financial services. The regulations and other conditions affecting the viability of rural banks would also be reviewed to improve the opportunities of these banks to expand within a sound legal and regulatory framework. Steps will be taken to build stronger links between formal sector institutions and informal sector savings and loans associations. Farmer groups and trade associations will be trained in financial management and sensitized on their responsibilities in loan processing, handling and repayment.

Improved Rural Infrastructure

Achieving broad-based and accelerated agricultural growth will require not only substantial increase in on-farm productivity but also a major improvement in rural infrastructure - increased network of feeder roads and tracks, improved market structures, developed fish landing sites, and expanded storage and processing facilities. Improvement in rural access roads lead to reduced transport costs, increased access to markets and market information, and reduced post-harvest losses. These in turn increase profitability and spur expansion in agricultural output. Increased market access not only enhances rural farm incomes, but also empowers rural people to better manage the risks associated with rainfed agriculture through crop diversification and better off farm employment opportunities. When investment in rural transport infrastructure is linked to complementary facilities such as rural water supply and village storage, important synergies occur, resulting in significant multiplier effects in rural communities: improved health enables the poor to engage in productive activities such as farming, which in turn increase rural incomes and food security.

In order to reduce transportation costs which account for about 70% of marketing costs by about 50% and hence improve Ghana's competitiveness both domestically and in international markets, the strategy will provide support for the private sector to organise agricultural trucking and haulage systems to enable special purpose and multiple purpose trucks to be made available to individuals or

organisations to significantly reduce the cost of transportation and post-harvest losses, improve product quality and shelf-life, lower food prices and thus help accelerate agricultural growth and development.

Government in collaboration with private investors will develop inland container ports to take advantage of lake transport services. This will ensure the link between marine transport and road transport using containers so that the cost of agricultural inputs and exports will be reduced.

The strategy for rural roads development will be for Department of Feeder Roads (DFR) to work closely with the District Assemblies and in consultation with MOFA to agree on priority target feeder roads to be rehabilitated. Feeder road maintenance work will be increasingly transferred from DFR to District Assemblies through training and logistic support.

The programme for destumping trees and constructing landing sites on the Volta Lake will be intensified and the private sector encouraged and assisted to operate barges to transport goods including farm inputs and produce. Airport facilities for cargo handling and cold storage will be expanded. Fish landing sites will also be expanded for industrial fleet and new ones constructed.

Extension services will be intensified and credit made more accessible to enhance large scale adoption of efficient but low cost farm and village level storage structures and processors. Agro-processing will be promoted to benefit from the Free Zone Act which seeks to promote Ghana as a Gateway to West Africa through the provision of incentives for manufacturers to process local and imported raw materials and goods for export and re-export.

Enhanced Human Resource And Institutional Capacity

Well trained and competent manpower and strong institutions are required for implementing the strategy. The capacity of human resources and institutions within the sector will therefore be enhanced to enable government play its role of providing the enabling environment within which producers and processors can perform efficiently.

Special training and technical assistance will be provided to District Assemblies for general planning and implementation of development programmes and to MOFA for special tasks associated with this Strategy. Under the governments policy for decentralisation, some of the key activities in this strategy, e.g. rehabilitating feeder roads, managing forests, and extension, are to be assigned to District Assemblies. Private institutions to be strengthened include, producer and trader associations and rural banks.

Curricula for formal and non-formal agricultural education at all levels including agricultural extension will be reviewed and revised to train farmers, businessmen and women, and government officials to contribute effectively to Ghana's accelerated agricultural development.

The strategy calls for the distribution of agricultural growth along with the benefits from growth as widely as possible, through special programmes for poor communities and disadvantaged people within communities, including women.

Details of the programmes to achieve these objectives are to be found in the Agricultural Services Sector Investment Programme (AGSSIP) which will provide a menu of projects that donors may select from.

d. Water for Agricultural Production

253. Rainfall is sufficient for at least one successful cropping every year throughout Ghana. Unfortunately, poor distribution and the erratic nature of rainfall makes the achievement of the above objective difficult. For instance, the interior savannah zone has between 90 and 120 days when soil moisture is favourable for crop growth. However, within this growing period dry spells often occur at critical stages of the plant growth thus increasing the probability of crop failure. Supplemental irrigation would therefore reduce the risk of crop failure. Furthermore, irrigation could allow more than one crop to be produced within the year and also increase productivity by making it possible for greater use of purchased inputs such as fertilizer.

254. Rice has been the principal crop grown on almost all existing Government-financed irrigation infrastructural schemes in Ghana. Unfortunately, the cropping of irrigated rice under the prevailing macro-economic climate of Ghana has proved to be non-competitive. It is clear that the only economical option left for the promotion of rice production in the country is to crop on the flood plains developed using simple engineering methods for effective water control, through the construction of structures such as bunds to facilitate water control in valley bottoms and areas inundated during the rainy season.

255. It has been proven that the cropping of high value exportable vegetables, fruits, bananas and cut flowers have comparative economic advantage and viability on irrigation schemes instead of rice.

256. Despite the low investments in irrigation, the drought of 1983 brought to the fore the need for the continuation, and where possible, the acceleration of the development of some more irrigation facilities whilst at the same time making positive attempts at meeting the challenges posed by the efficient management of the existing and new irrigation schemes. It is projected that the current total area of irrigation infrastructural

facilities of the country of about 10,000 hectares could be increased to at least 100,000 hectares by the Year 2000.

Constraints

257. Since the 1960's, the bold attempts by the Government of Ghana, through MOFA, to introduce and promote irrigation culture into the agriculture through the resettlement of a number of small scale farmers on irrigation facilities constructed with public funds at various location of the country have been frustrated by the following:

- the high capital outlay required for putting up any form of irrigation infrastructure. Currently, examples abound to show that cropping on irrigation schemes of high value (especially exportable) commodities such as vegetable, bananas/plantains, fruits and flowers and not local staples such as rice and maize, is economically and financially viable.
- socio-cultural obstacles and mentalities militating against the efficient management of existing Government of Ghana-funded irrigation schemes. The major bottleneck has been the beneficiaries reluctance to underwrite adequately towards the cost for the regular and appropriate operation and maintenance (O&M) programme which ensure the economic sustainability and a longer term usage of the infrastructure.

Strategies for Developing Irrigation

258. i) Existing Irrigation Development Authority (IDA) Projects - Funds will be sought to rehabilitate the existing irrigation to attract private sector management and privatization of the management of the existing GOG/IDA irrigation schemes through leasing to Nucleus-outgrower farmers, groups of small scale farmers and co-operative societies to ensure smooth take-over of the operation and maintenance of the facilities.

259. ii) New Projects - Funds, preferably grants, will be sought to update all available feasibility reports on all proposed projects. Identification and feasibility studies in the preparation of and development of more irrigation projects in the future will be conducted as follows:

- Canalization Systems for Irrigation - This method has the advantage of its being suitable for use by not only small but medium and large scale irrigation farmers. The farmers will take over the responsibility for developing lands allocated to them along the canal systems to suit chosen irrigation needs viz. furrow, flood, sprinkle, drip etc. This enhances the prospect of the canalization system being potentially cost effective could be cheaper per unit area for investment and attractive for funding.
- Development of Shallow Aquifers for Irrigation - This technology of utilizing shallow wells and tubules/washbores on suitable flood plains of rivers (fadama) and etc. for irrigation in the dry season is to be propagated to mainly small scale farmers for whose micro-farming operations it has been found to be most suitable.
- Water Harvesting for Dry Season Gardening - This technology will continue to be made available to the peasantry who will impound rainfall and surface runoff using simple structures such as ponds, dugouts, small dams and other reservoirs. The

impounded water will be used for dry seasons gardening especially in the drier unimodal seasonal rainfall areas particularly in the northern savannahs.

- Use of Bunds, Contour Ridges or Small Narrow Terraces for Moisture Retention - These structures will continue to be used to check and slow down the flow of high rainfall runoff in order to hold back available moisture in the optimum rooting zones of the soil profiles for as long as possible for effective crop production during the rainy season. Such an application becomes useful especially in the unimodal seasonal rainfall areas of adequate rainfall which happens to be more than the evapo-transpiration only during 4 to 5 months of the 5 to 6 month rainy season.
- Development of Small Valley Bottoms for Irrigation - This is relatively low cost harnessing of water-logged river valleys for the management of the wet season soil water for cultivation of rice and other crops and for some irrigation via canals in the dry months will continue to be propagated for application by groups of community based small scale farmers for whom it is well tailored.
- Sourcing of public funds to start the construction of irrigation schemes for which full feasibility reports, including detailed designs, have already been completed and found to be viable e.g., the Kpong Left Bank (3,500 ha) and the Small Scale Irrigation Project (4,000 ha aggregate).
- Clearly demarcated blocks for private operator management within the Nucleus-out grower farming scheme in all newly commissioned irrigation project will be leased. Thus at each scheme, IDA's role will be mainly two fold: (i) general inspectorate and supervision of project structures to ensure that they are duly and promptly maintained by the lessees, and (ii) maintenance of the most common but major infrastructural components of each scheme e.g. the main canal, the dam and the main water pumping facility. Also the supply and billing for water being supplied to lessees irrigation blocks, land rent, investment cost, etc., will continue to be the responsibility of IDA.

260. iii) Incorporation of Aquaculture and Livestock Watering in Irrigation

Infrastructural Development: It has been the case for quite sometime the policy of MOFA to ensure the incorporation of aquaculture in all irrigation development proposals/programmes. The strategy will continue in the same direction. It is also intended that consideration will be given to the provision of livestock watering points in the planning and execution of irrigation development projects.

261. iv) Training in Irrigation Development Planning, Construction and Management for Effective Cropping: Farmers will need to have continuous training through participation and involvement from the onset in project identification and planning through construction and appropriate management before taking over. Building contractors interested in taking part in construction of irrigation infrastructure especially dam construction will also require adequate training. The IDA and MOFA field staff will continue to undertake the assignment.

262. In order to perform the above function effectively, provision will be made for the continuous in-service training for the field staff by subject matter specialists from IDA

who in turn will require appropriate refresher courses to regularly update their knowledge base.

Management of Water Resources

263. In its natural form, water is an abundant resource in Ghana. However, seasonal shortages are quite common. From an environmental standpoint, land degradation practices have led to the destruction of watersheds and hence availability of water for agricultural purposes.

264. Water resources need be managed sustainably by ensure its availability and quality for agricultural and other purposes. Water resource management strategies that have to be adopted include:

- supporting District Assemblies to assist in the provision of water harvesting and storage facilities like dugouts and small dams in highly water deficient areas for farming and domestic use.
- enhancing the capacity of the local communities to develop water catchment areas protection of dams and dugouts as well as watershed management for streams and rivers.
- advising and assisting communities to carry out sound cultural and agronomic practices such as minimum tillage, mulching and ploughing in the right direction, to enhance soil water conservation.
- establishing vegetative and other physical barriers along the contours and at appropriate intervals on farms and grazing lands to reduce runoff rates and increase infiltration, thereby enhancing availability of soil water for crop use.
- developing low cost water impounding and storage structures where the topography and geological conditions will permit, to be use in farming and related activities during dry weather periods.

*In case of reply the
number and date of this
letter should be quoted*

Telephone: 665421
Telex: 2583 MINAG GH

My Ref. No. SCR.6126/V.3

Your Ref. No.



REPUBLIC OF GHANA

M.A. Form 7
MINISTRY OF FOOD & AGRICULTURE

P. O. BOX M. 37
ACCRA

14th March, 1997

**PROPOSED PRIVATIZATION OF GHANA
IRRIGATION DEVELOPMENT AUTHORITY (GIDA)**




My attention has been drawn to concerns raised by Japanese officials in respect of the Government of Ghana's intention to privatize the Ghana Irrigation Development Authority (GIDA).

I am aware that under the proposed Japanese grant aid assistance to the irrigation sub-sector, the GIDA has been nominated as the Government of Ghana's executing agency for the implementation of the programme. No doubt the privatization of GIDA would have implications for the programme since recipients of Japanese Grant Aids are usually Government agencies.

In the light of the foregoing my Ministry has submitted a Memorandum to Cabinet to authorise the deletion of GIDA from the list of subvented organisations due for privatization as contained in the schedule of the Government of Ghana's Statutory Corporation ACT 461 of 1993.

I therefore wish to assure you that the necessary amendment in ACT 461 would duly be made and that GIDA would remain a Government subvented organization.

RR	DRR	ARR	CO-ORDINATORS				PC
			1	2	3	4	


CDRE. S. G. OBIMPEH (RTD), MP
MINISTER

THE RESIDENT REPRESENTATIVE
JICA
ACCRA

cc: The Chief Executive
Irrigation Development Authority
Accra

付属資料5．成果品リスト

成果品リスト

(栽培)

March 2000

Title	Time Published	Remarks
1. MAJOR WEEDS IN ASHAIMAN IRRIGATION PROJECT	Mar. 1998	
2. アシャマン・オチェレコ地区における稲作栽培の現状	Des. 1998	
3. 栽培部門写真集	Jan. 1999	
4. Rice Cultivation In Ohyereko and Ashaiman	Jun. 1999	
5. RICE CATALOGUE	Nov. 2000	
6. HOW TO USE NEEM FOR INSECTS CONTROL IN CABBAGE CULTIVATION	Jan. 2000	
7. Teaching Materials for Farmers School In Okyereko	Mar. 2000	

成果品リスト
(水管理)

March 2000

Title	Time Published	Remarks
1. 他の灌漑事業地区調査報告書	1-4. 1998	
2. オクラ栽培における水管理	5-8. 1998	
3. 国際農業工学学会発表論文：EFFICIENT WATER MANAGEMENT ON SSIAPP MODEL	5-8. 1998	
4. ベースラインサーベイ報告書：水管理分野調査結果および活動計画に関する報告書（英文・和文）	9-12. 1998	
5. 他の灌漑事業地区調査報告書：REPORT ON STUDY BY THE WATER MANAGEMENT SECTION OF THE IDC TO SELECTED GIDA PROJECTS IN THE BRONG AHAFO REGION	1-4. 1999	
6. 技術交換報告書：技術交換報告書ガーナ国灌漑小規模農業振興計画	1-4. 1999	
7. 灌漑計画作成マニュアル：Manual for Water Requirement Calculation	5-8. 1999	
8. 水利用規約書：Rules for Water Users	5-8. 1999	
9. アシャマン右岸灌漑計画および施設操作・維持管理に関する提案書：Irrigation Schedule on Right Bank In Ashaiman Project	9-12. 1999	
10. オチエレコ既存地区の試験栽培における灌漑計画および維持管理提案書：Water Management on Okyereko Irrigation Site for the cropping In 1999	9-12. 1999	
11. アシャマン地区における無償工事期間中のポンプ利用に関わる計画書：Schedule of Pump Operation	1-3. 2000	
12. 水利費に関する報告書：MINI-EVALUATION WORKSHOP REPORT ON IRRIGATION SERVICE CHARGE	1-3. 2000	
13. アシャマン水管理ワークショップ報告書		

成果品リスト
(営農・農民組織)

March 2000

Title	Time Published	Remarks
1. STUDY ON MICRO-CREDIT SCHEME (Input sales and Joint-use of Farm Machiner)	Apr. 1999	
2. Socioeconomic and Farming Systems (Information of Ashaman and Okkyereko)	Jan. 1999	
3. Preliminary Report on Farming Systems Research and Extension (FSR/E) Based on Farming Type	Aug. 1999	
4. Agricultural Extension System and Methods	Apr. 1999	
5. 12.4Ha Farming system Preliminary Trial Okkyereko Irrigation Site	Jan. 2000	
6. STRENGTHENING OF FARMERS' ORGANIZATION	Feb. 2000	
7. Summary of Primary Report on Farming System Survey	Dec. 1998	
8. BASELINE SURVEY REPORT ON FARMING SYSTEMS	Dec. 1998	
9. Farmers Cooperative Communication for Progress and Development "AYEKOO"	Dec. 1999	
10. Summary of Detailed Report on the Achievement of the Farm Management, Extension and Farmers' Organization	Mar. 2000	

成果品リスト
(農業機械)

March 2000

Title	Time Published	Remarks
1. DEVELOPMENT OF A HAND WINNOWER MACHINE	Dec. 1998	
2. 耕耘機の操作法マニュアル (英文)	Apr. 1999	
3. EFFECT OF DIFFERENT LAND PREPARATION METHODS	Aug. 1999	
4. 耕耘機性能試験 (日文)	Sep. 1999	
5. 動力脱穀機性能試験 (日、英)	Sep. 1999	
6. 脱穀箱性能試験 (日文)	Sep. 1999	
7. 石板脱穀性能試験	Oct. 1998	

プロジェクト名：ガーナ共和国灌漑小規模農業振興計画

期間：1997.8.1 ～ 2002.7.31

プロジェクトエリア：2モデル地区

ターゲットグループ：GIDA スタッフ、灌漑事業区農民

プロジェクトの要約	指標	指標データ入手手段	外部条件
上位目標 1. 灌漑公社管轄下の各灌漑事業地の営農システムが改善する。 2. 農民の収入が増加する。	1. 灌漑事業区において遵守される営農システム及びその個別技術の改善 2. 農民の生活水準の向上	プロジェクト、GIDA、JICA による調査 農業統計	a. ガーナ政府が望ましからざる農業政策を採らない
プロジェクト目標 灌漑公社管轄下の灌漑農業地域においてモデル営農システムが確立する。	2モデル事業地においてプロジェクトによって提案されるモデル営農システムを採用する農民の割合	プロジェクト、GIDA、JICA による調査	a. 研修修了者が協力して営農システムの改善を実行する
成果 1. 灌漑事業地における農民の状況と営農システムが調査・分析される 2. 個別技術が改善される 3. 2モデル事業地での営農システムが実証される 4. 2モデル事業地での営農支援システムが改善される 5. 普及員、農民組織職員、農民が研修される	1. 各評価段階において参考となるベースライン調査データの有用性 2. 従来採用された技術と比べて農民へ提案し採用された個別技術の生産性及び経済性 3. ベースライン調査により報告された営農システムと比べて農民へ提案し採用された営農システムの持続性 4. 他の灌漑事業区と比べて導入された営農支援システムの効率性及び持続性 5. プロジェクトの研修コースに参加した他の灌漑事業区における営農の変化とその有効性	・ベースライン調査報告 ・プロジェクト書類	a. プロジェクト運営に重大な悪影響を及ぼすような人事異動は行われない
活動 1. 農民の状況と営農システムの調査 1-1 2モデル事業地におけるベースライン調査の実施・分析・評価 1-2 2モデル事業地周辺の天水畑地の営農状況調査 1-3 他の灌漑事業地の営農状況に関する情報収集 2. 個別技術の改善 2-1 栽培 2-2 水管理 2-3 農業機械 2-4 営農 3. 2モデル事業地での営農システムの実証 3-1 試験圃場における総合技術の実証 3-2 2モデル事業地の農家園場における営農システムの実証 4. 2モデル事業地での営農支援システムの改善 4-1 灌漑施設の維持管理 4-2 農業融資システム 4-3 普及システム 4-4 農民組織の活動強化 5. 個別技術、営農システム、支援システム運営の研修 5-1 灌漑事業地の普及員研修 5-2 灌漑事業地の農民組織職員研修 5-3 灌漑事業地の農民研修	投入		a. MOFA and GIDA により遅滞なく研修施設が供与される b. GIDA によってモデル地区の灌漑施設が改修される c. 研修に係る十分な予算が割り当てられる
	日本 <人材> ・長期専門家 1. チームリーダー 2. 調整員／研修 3. 栽培 4. 水管理 5. 農民組織／営農 6. 農業機械 ・短期専門家 必要に応じ <機材> 年間予算内で必要な機材を調達 <研修員受入> 年間2～3名 <ローカルコスト負担> 試験圃場の改良	ガーナ <土地、予算、施設> ・プロジェクト及び2モデル地区に係る土地、建物 ・合意に基づく必要な建物、施設 <人材> (カウンターパート) ・プロジェクトダイレクター 1. Chief Director, MOFA 2. Chief Executive, GIDA 3. Director, IDC/Department of Project Operation ・技術分野 1. 栽培 2. 水管理 3. 農業機械 4. 農民組織 5. 研修 <日本側が供与しない機材> <ローカルコスト> ・ Emolument ・ Operation and management of facilities ・ Utilities ・ Administrative fees for training ・ Other running expenses	前提条件 a. 農民がプロジェクトを受け入れる b. GIDA がその行政的役割を継続する