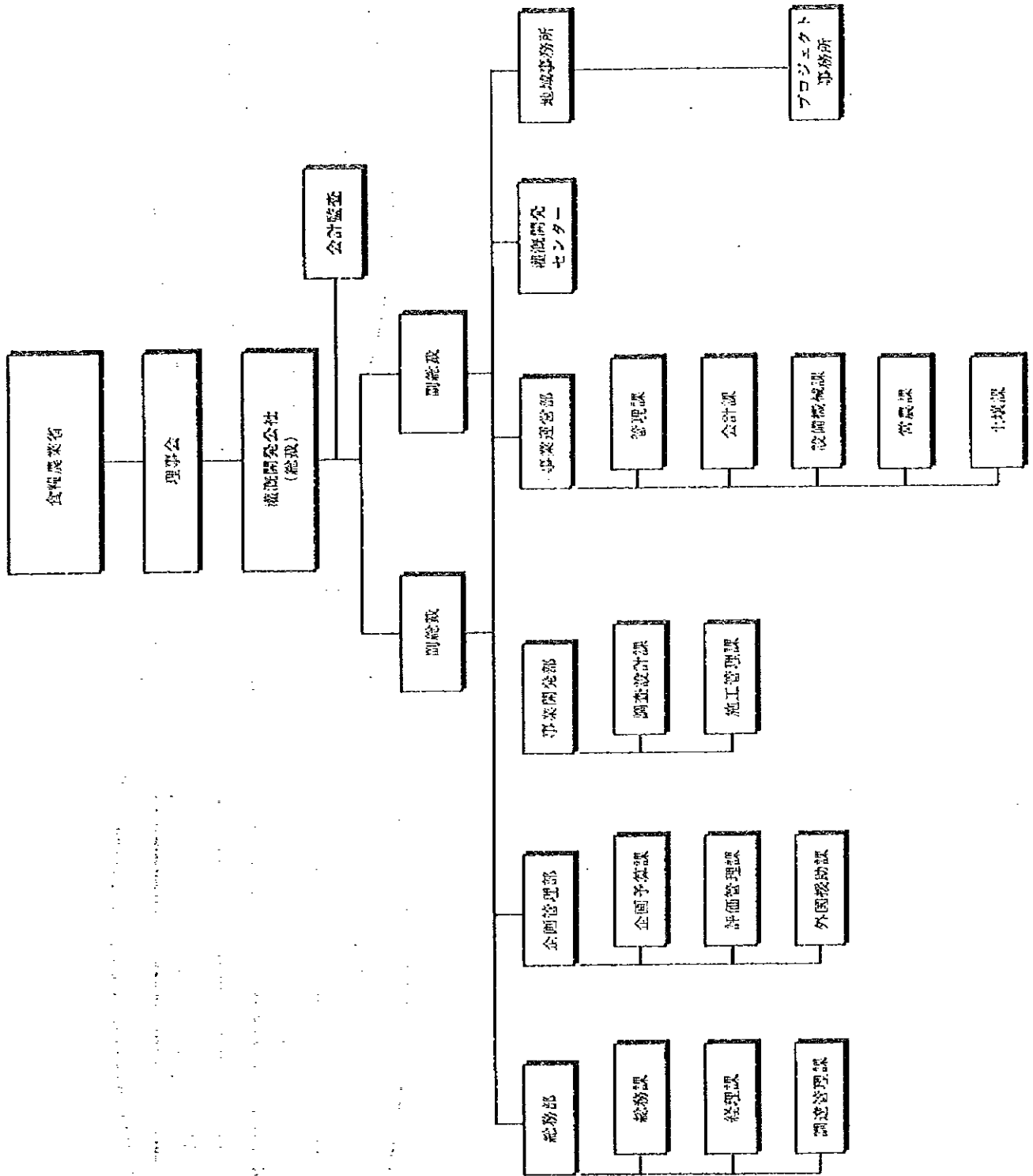
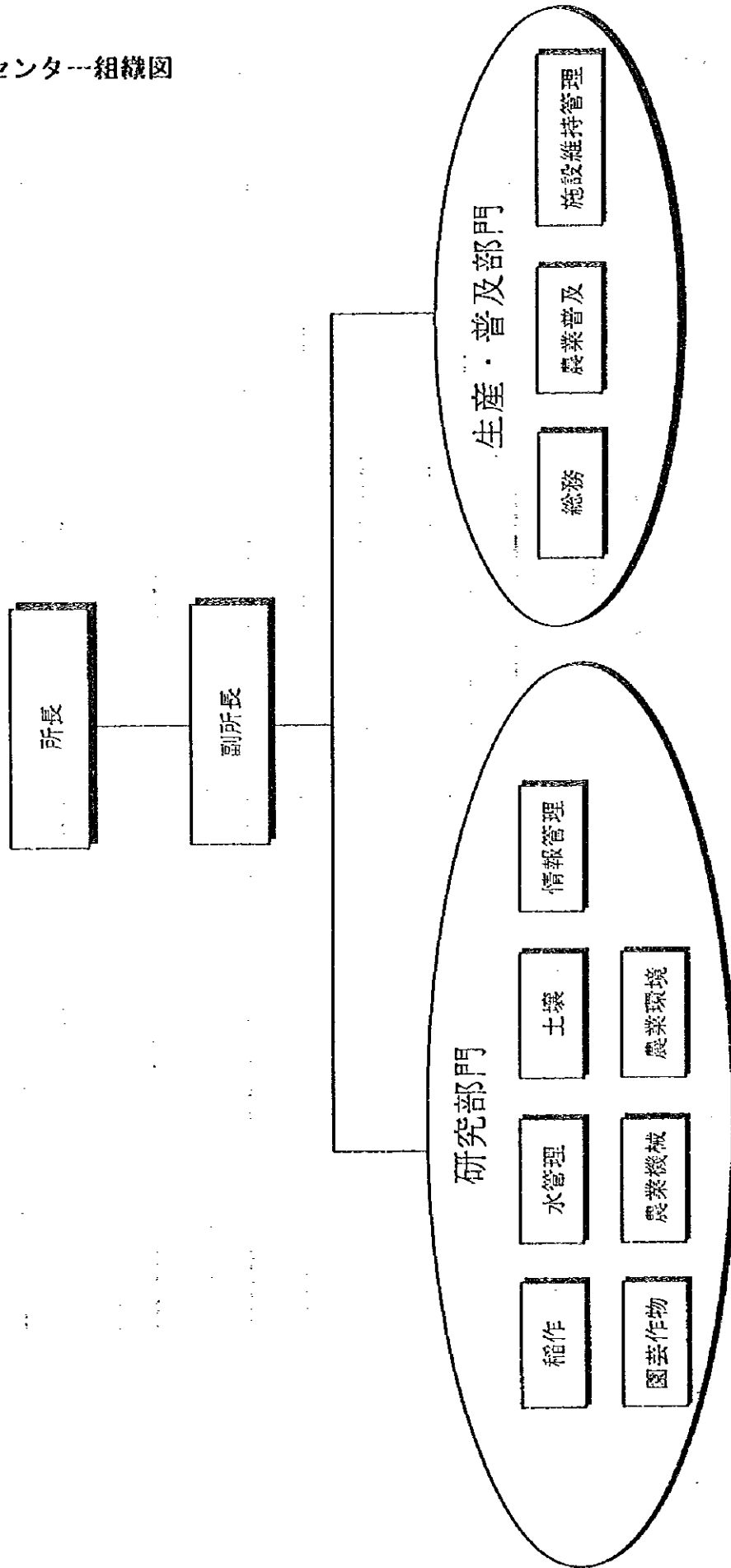


② 灌漑開発公社組織図



③ 灌溉開発センター組織図



④ 要請書

105. 3. 2

長官印
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部 長	総務課長	経理課長	課長	課長代理	担当者

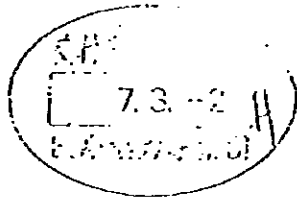
09978

第 115 号

平成7 年 2 月 24 日

外務大臣 殿

在ガーナ大使
小嶋大使



件名

プロジェクト方式技術協力（平成7年度要請案件取り付け）

引用公・電信

8年6月17日付電信第278号、8年8月12日付電信第406号及び8

主管課（文書記号）
経協技

日付・番号

8年10月13日付電信経協技第20289号

本件必要書類が漸く先方政府より提出されたところ、別添送付す

るので、宜しくお取計らい願いたい。

なお、本件書類の提出が大幅に遅れ、本省に対して多大な御迷惑

をおかけしたと承知致すも、当館としては、本件プロ技協は当国

経済の根幹をなす主要産業である農業関連プロジェクトであり、現

在、灌漑開発公社に対して実施しているミニプロに派遣されている

長期派遣専門家、短期派遣専門家及び青年海外協力隊員の各種活動

本館送付先：

付戻係

本館互送付先：

付戻空袋（行）

省内互配希望先：

付戻空袋（DP）

GA-12-1

在外公館

は、当国農業分野において高く評価されており、当地マスコミでも
取り上げられるなど、当国国民の本件技協援助に対する期待は大き
いものがあるので、^{是非}推進したいと考える。²

(了)

CA-10

外務省

ガーナ共和 国

平成7年度プロジェクト方式技術協力要綱案件総括表

7年2月2/日現在

案件名(邦・英文共)	区分	要綱番	T o R	円算表	1111111111		備 考
					先方	員数	
灌漑農業開発計画 (Irrigation Development Project) in Ghana	新	○	○	往信 第406号	1199 1位	1199 1位	
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- (注) 1. 区分については、前年度よりの継続案件は「続」、新規案件は「新」と記入。
 2. 公式要綱番、T o R及び円算表については、既に送付済みのものは送付した公定番号を、今回送付分については「○」を記入。

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

O-Ref. No.

JAP/G/00.1

Your Ref. No.

Tel. No.



REPUBLIC OF GHANA

MINISTRY OF FINANCE AND
ECONOMIC PLANNING
P.O. BOX M.40
ACCRA

17-2-1995

Dear Sir,

PROJECT TYPE TECHNICAL COOPERATION
IRRIGATION DEVELOPMENT PROJECT.

I enclose herewith for your consideration and further processing, a request from the Irrigation Development Authority (IDA), for Japanese Government's Project-Type Technical Cooperation assistance.

It is our hope that this request will receive your favourable attention.

Yours faithfully,

KWASI OPORU

for: MINISTER OF FINANCE

✓ THE EMBASSY OF JAPAN
ACCRA

(ATTN: MR. IZUMIKAWA)

cc: THE RESIDENT REP.
J I C A
ACCRA

**TECHNICAL COOPERATION
BY THE GOVERNMENT OF JAPAN**

PROPOSAL

By the Government of the Republic of Ghana to the Government of Japan for the Project-Type Technical Cooperation.

1. **PROJECT TITLE:** Project-Type Technical Cooperation on the Irrigation Development Project in Ghana.
2. **PERIOD OF COOPERATION:** Five (5) years from January 1996 to December 2000
3. **EXECUTION AGENCY:** Ghana Irrigation Development Authority (GIDA)
4. **RESPONSIBLE AGENCY:** Ministry of Food and Agriculture
5. **PROJECT SITE:** Irrigation Development Centre (IDC). Ashaiman Tema District. Greater Accra Region, Ghana

6. **OBJECTIVES OF THE PROJECT:**

1. To enhance the adaptive research cooperation at IDC to develop the appropriate technology which is suited to the local conditions.
2. To strengthen the capability of irrigation extension staff by the training programmes at the centre and
3. To demonstrate the recommendable project management system and sustainable irrigated farming technology after rehabilitation of the existing facilities of the Ashaiman Irrigation Project as a model project.

7. **BACKGROUND AND JUSTIFICATION OF THE PROJECT:**

The Ghana Irrigation Development Authority (GIDA) was established in 1977 as an executing body of planning, designing and implementation of irrigation projects as well as operation and management of the irrigation projects. To give the technical support to the GIDA staff and farmers in the project areas, the Irrigation Development Centre (IDC) was established at Ashaiman in 1991.

In accordance with the privatization programme of state-own enterprises, the strategies of GIDA is being changed. The major task of GIDA is to give the necessary technical guidance to the farmers' groups to be organized and to be handed over the management

of the project by themselves.

Under the Mini-Project type technical cooperation, the adaptive research and training on irrigated farming were started in the beginning of 1993 in cooperation with JICA experts and JOCV members at IDC. The Mini-Project will be terminated in December 1995.

The management of irrigation projects will be handed over to the farmers' group, therefore, the role of IDC should become more important as a centre of research and training for extension staff and farmers.

8. SCOPE OF TECHNICAL COOPERATION

1. Adaptive Research

- To develop appropriate irrigation technology ✓
- To develop sustainable irrigated farming ✓
- To accumulate the fundamental information on irrigation farming to be used for training purposes

2. Training for extension staff and farmers

- To train on facilities and machinery operation and maintenance
- To train on farming technology. ✓
- To train on integrated farm management systems. ✓

3. Demonstration

- To rehabilitate existing irrigation facilities as model project
- To demonstrate appropriate technology on irrigation, farming and project management.

9. PROJECT

1. Japanese experts to be dispatched

Long-term experts:

Leader/Agronomist	one
Irrigation engineer	one
Coordinator	one

Short-term experts:

Soil scientist	at least one
Crop production	at least one
Agricultural economist	at least one
Mechanical engineer	at least one

PROJECT INPUT

Project Period	First	Second	Third	Forth	Fifth
----------------	-------	--------	-------	-------	-------

1) Expert Assignment

(Long-Term Experts)

Leader/Agronomist	XX				
Irrigation Engineer	XX				
Coordinator	XX				

(Short-Term Experts)

Soil Scientist	xxx	xxx			
Crop Production	xxx	xxx	xxx	xxx	xxx
Agric. Economist	xxx			xxx	
Mechanical Engineer		xxx	xxx		

2) Counterpart Training

(one or two Ghanaian counterparts annually)

XX

3) Equipment Provision

(Equipment to be provided annually within budgetary allocation)

XX

4) Facility Rehabilitation

Irrigation/On-farm	xxxxxxx
Post-harvest	xxxxxxx
Training	xxxxxxx

Additional short-term experts may also be assigned when necessary for the project.

2. Trainees to be accepted

One or two trainees per year: (soil analysis, hydrology, rice production, farm mechanization, extension and training etc.)

3. Equipment to be provided

Equipment for experiments: (laboratory analysis, crop quality tests, pest management etc.)

Equipment for extension and training: (training materials preparation, audio-visual etc.)

Equipment for facilities and machinery maintenance

4. Facilities to be rehabilitated

Irrigation and drainage facilities: (intake structure, main and lateral canals etc)

On-farm facilities: (farm road network and trial plots etc.)

Post-harvest facilities: (mill and simple processing plant etc.)

Training facilities: (lecture hall, workshop and dormitory etc.)

10. ADMINISTRATION OF THE PROJECT

The Chief Executive of GIDA will bear overall responsibility for implementation of the project. The director of IDC will be responsible for the administrative and managerial matters of the project.

The Japanese experts will give necessary technical guidance and advice to Ghanaian counterpart staff on matters relating to the project.

PROJECT IMPLEMENTATION SCHEDULE

Annual Work Plan

Project Period	First	Second	Third	Forth	Fifth
----------------	-------	--------	-------	-------	-------

Project Activities

1) Adaptive Research

Irrigation Technology	xx
Crop Production	xx
Data Collection	xx

2) Training

Engineering	xx
Agronomy	xx
Farm Management	xx

3) Demonstration

Rehabilitation Works	xxxxxxxxxxxxxxxx
Facilities	xx
Farm Management	xx

⑤ 事前調査ミニッツ

MINUTES OF UNDERSTANDING
ON
THE JAPANESE TECHNICAL COOPERATION
FOR
THE IRRIGATED AGRICULTURE DEVELOPMENT PROJECT
IN
THE REPUBLIC OF GHANA

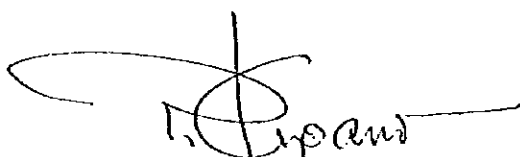
In response to the request made by the Government of the Republic of Ghana for the Irrigated Agriculture Development Project (hereinafter referred to as "the Project"), the Government of Japan sent, through the Japan International Cooperation Agency (hereinafter referred to as "JICA") which is an official agency for implementing technical cooperation programs of the Government of Japan, a preliminary study team (hereinafter referred to as "the Team") headed by Mr. Takahisa Kusano from December 9, 1995 to December 25, 1995.

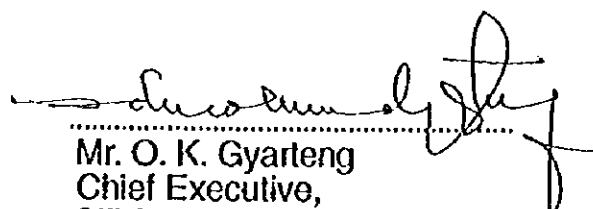
During its stay in Ghana, the Team had a series of discussions with authorities representing the Government of the Republic of Ghana, especially with Ghana Irrigation Development Authority (hereinafter referred to as "GIDA"), and conducted field surveys, in order to clarify the background and rationale of the Project and the conditions relevant to the proposed technical cooperation program.

As a result of the discussions, both sides came to an understanding described in the minutes attached hereto.

Both sides have agreed to recommend to their respective Governments to take further steps towards the implementation of the technical cooperation for the Project, based on the findings and results of the preliminary survey.

Accra, December 21, 1995


.....
Mr. Takahisa Kusano
Leader,
The Preliminary Study Team,
JICA
JAPAN


.....
Mr. O. K. Gyarteng
Chief Executive,
GIDA
Ministry of Food and Agriculture
The Republic of Ghana

Attachment

**Minutes of Understanding
on
the Japanese Technical Cooperation
for
the Irrigated Agriculture Development Project**

1. Scope of the Understanding

- 1.1. The views expressed hereinafter are merely the tentative observations of the Team and GIDA, and are subject to change after further study, and are not representing the views of the Japanese nor the Ghanaian Government.

2. Rationale of the Project

- 2.1. Irrigation development is required to make more concrete contributions to the objective of the present national agricultural plan. The Medium Term Agricultural Development Program (MTADP) is targeting to achieve self-sufficiency and food security by the year 2000.
- 2.2. GIDA established in 1977 has planned and developed irrigation facilities for 22 project sites in the past years. The management of farming activities as well as operation and maintenance of the irrigation facilities has been executed by GIDA. To support the project sites technically, the Irrigation Development Center (hereinafter referred to as "IDC") was established in 1991. The Japanese Government has been assisting financially and technically to develop IDC.
- 2.3. Nevertheless, irrigated agriculture is facing difficulties in increasing both the crop production and productivity. The farmers are not adequately benefiting from irrigation. In this context, irrigated agriculture in Ghana is yet to be proven to be economically sustainable.
- 2.4. Hence, the Goal of irrigated agriculture development in Ghana is;
"To make irrigated agriculture economically sustainable"
The Project shall be contributing to this Goal.
- 2.5. In line with the structural adjustment policy of the Government, GIDA is at a stage of preparing to transfer farm management systems from the present way of direct involvement of GIDA staff to the new form of management by farmers' organizations at every irrigation site. In the new system, GIDA will

only be involved in operation and maintenance of irrigation facilities and technical support in farming.

- 2.6. The major reason for the proposal by the Ghanaian Government to the Japanese Government for a technical cooperation was to establish the new system and to build the institutional capability of GIDA and farmers.

3. Major Constraints

- 3.1. The major reasons why irrigated agriculture has not become economically sustainable in Ghana are understood to be the following;

3.1.1. The farmers have not put in much confidence in irrigated agriculture because they are not sure of adequate water for cultivation coupled with low profitability of rice production on some projects. The farmers have become too dependent on GIDA after being accustomed to its free services for a long time. Additionally, they have not understood well the economic advantages of intensified agriculture.

For these reasons, the farmers have fewer incentives to practice irrigated agriculture.

- 3.1.2. Training programs and supporting system for extending the available irrigated agriculture technologies and for serving farmer's needs have not been established within GIDA's organizational set-up.

GIDA's project site officers, in general, are not capable of effective extension activities to further promote irrigated agriculture development, because there is no institutional framework to support their activities. The field officers and technicians, in general, have insufficient knowledge and experiences in both cultivation and water management technologies and extension methodologies.

GIDA has not imposed strict obligations to pursue such extension duties on the field officers and technicians. Moreover, the human resource development program for GIDA employees including field officers and IDC staff is not existing.

- 3.1.3. The guidelines for efficient water management based upon the calculation of unit-water-requirement at field level is not available. This makes it difficult for the project to manage the use of water from intake facilities to end-fields efficiently, resulting in water wastage. Water management organizations have not worked well since farmers do not recognize the necessity of managing water.

An irrigation system, if not maintained appropriately, often suffers from physical deterioration. Non-repaired canal causes much waste of water and consequently spoils the economy of irrigation.

3.1.4. A package of cultivation techniques suitable for each irrigation project site has not been prepared for the farmers. As a result, farming practices are only based on their experiences.

The farmers have no access to the techniques proven to be superior and adopted on the other project sites, because no information is gathered nor prepared by GIDA. Such database building and extension systems using the collected information are not in practice.

3.1.5. The specific problems in cultivation techniques are viewed as follows;

- (i) The timing, quantity and volume of fertilizers do not seem to be right.
- (ii) Homogeneity of seeds does not seem to be secured.
- (iii) Number of hand tractors is not enough to the area of agricultural fields to cultivate in a project.
- (iv) Drying floor space for rice is too small to properly dry rice in most projects. Excessive rice drying causes the high ratio of rice cracking. During post-harvest handling, much stone and trash are mixed in rice.
- (v) Identification of disease and pests and use of agro-chemicals are not properly done.

3.1.6. The technologies for irrigated agriculture, such as cropping systems including fertilizer application and water management, to be applicable and appropriate in the Ghanaian environment have not been fully developed and the profitability is yet to be proven. No research institute pursues the research on establishment of cost effective irrigated agriculture cropping systems in Ghana.

3.1.7. In the context of the above mentioned constraints, the roles and functions of IDC in the development of irrigated agriculture in Ghana are not clearly stated by GIDA. Accordingly, the staff of IDC do not have clear orientation on their obligations. The objectives and direction of their research duties are not integrated towards the development of applicable and appropriate irrigated agriculture technologies.

3.2. A more intensive and extensive study to analyze the situation is suggested to be carried out jointly by concerned Ghanaian personnel and a Japanese expert group before formulating the approaches of the Project.

4. Objective of the Project

4.1. Considering the long-term Goal of the irrigated agriculture development in Ghana mentioned in section 2. and the constraints to achieve the Goal as described above in section 3., the appropriate objective within the short period of 5 years is;

"To establish a model system to promote an economically sustainable agriculture at the existing irrigation sites."

4.2. The Model System should include;

- (i) A sound network of individual farmers, farmers' organizations, the GIDA project site offices, IDC, GIDA headquarters and other research institutions to bring an efficient and effective technical support mechanism to respond to the needs of farmers and to guide the farmers,
- (ii) Human resource development programs for the GIDA project site officers and technicians,
- (iii) Comprehensive programs for extending technologies and problem solving techniques through training of farmers and the other extension approaches such as demonstration, field visits etc.,
- (iv) A sound function of IDC as a center of applied research and training through human resource development and institutional capacity building, and
- (v) Effective and efficient management of the farmers' organizations through financial and technical support.

4.3. It is believed that there is a need to put more emphasis and attention on the socio-economic and human factors of irrigated agriculture development. Considerations on gender in irrigated farming and extension system would also be necessary.

4.4. Attention should be paid to the conservation of natural environment and farmers' health related to irrigated farming.

5. The Expected Results of the Project

5.1. The Project is expected to establish such a model system capable of solving or reducing the major constraints described in section 3. At the end of 5 year-project-period, indications of the effectiveness of the Model System are expected to be seen through the improvement in the economy of irrigated agriculture at least at the selected project sites.

5.2. A further study is necessary before setting the expected results of the Project. Therefore, a joint study prior to the formulation of the Project framework is recommended.

6. Activities of the Project

6.1. The following would be considered when planning the major activities of the Project.

6.1.1. Under the current conditions of farming and water management techniques, it is important for the Project to offer technical advice to extension officers and farmers. In terms of water management, measurement of unit-water-requirement, water allocation schedule in field and canal level control are needed. The improvement of techniques for rice production, including fertilizer management, operation and maintenance of agricultural machinery, seed management, management of agricultural chemicals is highly expected.

6.1.2. The Project should offer training programs and then develop the human resources for specialization of field officers and technicians in the following three categories;

- (i) Crop cultivation skills
- (ii) Water management of field and canal level
- (iii) Operation and maintenance of agricultural machinery

6.1.3. The Project should offer relevant training programs for farmers both at IDC and selected project sites.

6.1.4. Demonstration farm is an effective tool to let the farmers see the performance of improved agricultural practices, in addition to planting of higher yielding varieties, experiment in field level water management and fertilizer management and so forth.

6.1.5. Provision of agricultural machinery and materials such as fertilizer and demonstration of improved agricultural practices are effective for farmers who have no experience in intensive agriculture. A good milling machine and its proper operation add value to rice.

6.1.6. The Project should try to ease the difficulties which farmers have, find solutions and countermeasures to eliminate the difficulties and feed them back to the farmers. In this connection, the collaboration between the Project and research institutes such as Crop Research Institute, University of Ghana, WARDA, is crucial to the success of the Project. In addition, the Project should have the role to quicken the exchange of techniques among GIDA's irrigation projects and to store the information of the techniques that are now scattered in Ghana and not uniformly managed.

6.1.7. The Project should carefully study socio-economic aspects of farmers and cooperatives, and utilize the outcomes of the study in each activity. In

addition, the Project should positively assist water management activities of the cooperatives.

7. Organizational Set-Up for the Project

- 7.1. The owner of the Project is the Government of Ghana and GIDA is responsible for its execution. Japanese technical cooperation may only be rendered to assist the planning, implementation, and monitoring and evaluation.
- 7.2. For smooth implementation of the Project, the following organizational set-up and improvement will be considered.
 - 7.2.1. GIDA should clarify the role, objectives, and functions of IDC in the development of irrigated agriculture in Ghana. A concrete action plan in short- and medium-term including budgetary and staff allocation should be made.
 - 7.2.2. GIDA should promote setting up of a research consortium formed by various related research institutions targeting for irrigated agriculture in Ghana. Development of cropping systems and water management technologies suitable for the Ghanaian setting will be pursued from the viewpoint of agro-ecology, engineering and socio-economics in the consortium.
 - 7.2.3. At least IDC and the training and extension functions of GIDA remain permanent and as a part of the governmental organization, irrespective of any structural changes in GIDA.
- 7.3. The Project will be under the direct supervision of the Chief Executive of GIDA.
- 7.4. There is the need for future study on organizational set-up to have the best institutional framework for the implementation of the Project.

8. Pre-conditions for Technical Cooperation

- 8.1. The owner of the Project is the Government of Ghana and Japanese technical cooperation will only be rendered to assist it. In that context, the following measures are to be taken by the Ghanaian Government as a pre-condition for the technical cooperation program.
 - 8.1.1. To allocate and provide personnel for managerial, technical and clerical staff with suitable qualification in the required fields of specialization on a full-time basis for the implementation of the Project,



- 8.1.2. To provide land, buildings and facilities necessary for the implementation of the Project,
- 8.1.3. To provide machinery, equipment and other materials necessary for the implementation of the Project other than those provided by Japan,
- 8.1.4. To provide travel allowance for the Japanese experts for their official travel within Ghana,
- 8.1.5. To provide vehicles with drivers for the Japanese experts during their working hours and to and from their residences,
- 8.1.6. To bear expenses necessary for the domestic transportation of machinery and equipment provided by Japan as well as for their installation, operation and maintenance, and all running expenses necessary for the implementation of the Project,
- 8.1.7. To exempt the machinery and equipment provided by Japan from customs duties, internal taxes and other charges,
- 8.1.8. To provide the Japanese experts and their families with the privileges, exemptions and benefits such as exemptions from income tax and customs duties no less favorable than those granted to the experts of third countries or international organizations performing similar missions,
- 8.1.9. To guarantee the security of Japanese experts in all activities of the Project,
- 8.1.10. To bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions within and outside the sites of the Project except for those arising from the willful misconduct or gross negligence of the Japanese experts, and
- 8.1.11. To ensure that the knowledge and techniques acquired through the technical cooperation by the involved personnel are utilized effectively to keep the effects of the Project sustainable .

9. Possibility of Japanese Assistance

- 9.1. "Project-Type Technical Cooperation" (hereinafter referred to as "PTTC") is the JICA's most comprehensive scheme to assist a certain development project at national level. Under this scheme in general, the Government of Japan will provide, through JICA, services of Japanese experts, training of Ghanaian

personnel in Japan, equipment and other supports necessary for effective implementation of the Project.

9.2. The Japanese cooperation under PTTC scheme will be possible, if the framework of the Project including all the elements discussed above is refined and found to be effective through a future joint study and discussions.

10. The Joint Study

10.1. A preparatory study for the Project will be carried out;

- (i) To analyze the problems extensively and intensively especially in the fields of management of agricultural research and development, farming skills, irrigation facility and water management, farmer training and organizations, and farming economics and credit,
- (ii) To formulate a most feasible framework of the Project, and
- (iii) To identify the areas which Japanese assistance may be effective.

10.2. The study will be conducted by;

- (i) Joint activities of the concerned Ghanaian personnel and a JICA expert group to be dispatched for this purpose,
- (ii) Including participatory problem analysis by the farmers, the officers and technicians of the project sites, and IDC staff, and
- (iii) Taking the progress report of "The Study for The Rehabilitation of Irrigation Projects" into the consideration.

10.3. The Team will recommend to the Japanese Government to dispatch such a group consisting of the experts to cover the fields mentioned in section 10.1.(i). above and "participatory problem analysis," by late March or early April of 1996 for about one month period. The schedule and composition of the group will be made available by JICA in due course.

10.4. The Ghanaian side will prepare for the joint study by;

- (i) Forming a preparatory committee of the Project consisting of executive level representatives from the concerned organizations such as Ministry of Food and Agriculture, Ministry of Finance, National Agricultural Research Project (NARP), GIDA and IDC,
- (ii) Appointing counterpart personnel corresponding to each member of the group to-be dispatched by JICA for the study, and
- (iii) Allocating necessary budget at least to cover the cost incurred by the Ghanaian participants in the study such as their travelling expenses.

{End of the Attachment}

⑥ 分野別報告関連資料

(1) 稲作栽培状況調査結果

Dahwenya-1

No.	1	2	3
農家氏名	Felix Koh Sosw	Richard M. Darpot	Eruestina Doku
水田面積	0.9ha	0.9ha	1.0ha
品種	CIAT 19970	ITA 304	ITA 222
理由	高収量	高収量, 食味	高収量, 食味
種籾入手	Proj供給	IDA	IDA
更新	Yes	Yes	Yes
種子消毒	Y Fungurn	Y Fungurn	Y Fungurn
田植え	Yes	Yes	Yes
正条or乱雑	乱	正 (15 x 20cm)	乱
苗代日数	14days	14days	14days
田植え費用	78000/ha	61000/ha	50000/ha
直播き	No	No	No
播種量	91kg/ha	91kg/ha	96kg/ha
耕起作業	耕耘機 (賃耕)	耕耘機 (賃耕)	耕耘機 (賃耕)
賃耕費用	135000/ha	90000/ha	75000/ha
代掻き	↑	↑	↑
均平	↑	28000/ha	25000/ha
施肥量 (kg)	88-42-42 NPK/ha	88-42-42 NPK/ha	119-45-45 NPK/ha
NPK (15%)	278kg/ha	278kg/ha	300kg/ha
Urea (46%)			
A. S. (21%)	222kg/ha	222kg/ha	350kg/ha
施肥時期 (a)			
NPK	TP, 14DAT	TP, 14DAT	TP, 14DAT, 32DAT
尿素/硫安	28DAT, 42DAT	28DAT, 74DAT	32DAT, 46DAT, 60DAT
除草			
手取り	1回	No	1回
費用	6000x8=48000/ha		25000/ha
除草剤	Gramaxon? 5.6L/ha	Basagram 5.6L/ha	Basagram 5.6L/ha
殺虫剤	Furadan 10kg/ha	必要に応じて	No
殺菌剤	Dursbag 1L/ha	No	No
水	十分	十分	no, 漏水
水利費	82200/ha	82200/ha	82200/ha
刈り取り	雇用労働	雇用労働	雇用労働
費用	40000/ha	61000/ha	56000/ha
脱穀	40000/ha	61000/ha	50000/ha
袋詰め	↑	39000/ha	35000/ha
乾燥	2bag/ha	自家労働	35000/ha
風選・袋詰め	↑	39000/ha	↑
貯蔵		Proj	
収量・雨季	5.7t/ha	7.1t/ha	5.5t/ha
収量・乾季	3.9t/ha	3.6t/ha	4.0t/ha
販売・雨季	4735kg	5986kg	ND
販売・乾季	3116kg	2870kg	2378kg
自家消費	410kg/作	410kg/作	410kg/作
籾、白米販売	籾	籾	籾
誰に売るか	マーケットミ-	GNPA	マーケットミ-, GNPA
販売価格	96-DS:35500/82kg	96-DS:35500/82kg	96-DS:35500/82kg
	95-WS:30000/82kg	95-WS:29000/82kg	95-WS:29000/82kg
稲作の問題	害虫の被害	耕耘機の不足 停電による水不足	耕耘機の不足 資金不足 圃場の漏水

a TP: 田植え時 DAT: 田植え後日数 DAS: 播種後日数

Dahwenya-2

No.	4	5	6
Name	Victor Kwame Atatsi	Theophilus Charway	P.L. Adiku
	1.0ha	1.0ha	0.65ha
品種	ITA 304	ITA 222	ITA 222
理由	稔実良、粒重大	高収量	精米歩合良
種初入手	IDA	組合	Proj
更新	No	Yes	No
種子消毒	No	Y Furadan	No
田植え	Yes	Yes	Yes
正条or乱雑	乱	乱	乱
苗代日数	14days	14days	21days
田植え費用	65000/ha	70000/ha	86000/ha
直播き	No	No	No
播種量	103kg/ha	84kg/ha	150kg/ha
耕起作業	耕耘機 (賃耕)	耕耘機 (賃耕)	耕耘機 (賃耕)
賃耕費用	65000/ha	130000/ha	74000/ha
代掻き	65000/ha	↑	↑
均平	40000/ha	↑	自家労働
施肥量 (kg)	115-23-23 NPK/ha	91-45-45 NPK/ha	188-46-46 NPK/ha
NPK (15%)	150kg/ha	300kg	308kg/ha
Urea (46%)	200kg	100kg	308kg/ha
A.S. (21%)			
施肥時期			
NPK	14DAT	14DAT, 28DAT	14DAT, 28DAT
尿素/硫酸	28DAT, 42DAT	56DAT	42DAT, 56DAT
除草			
手取り	1回	1回	3回
費用	70000/ha	60000/ha	自家労働
除草剤	Furadan 10kg/ha	Rilof 5L/ha	no
殺虫剤	Dursban 5L	Furadan 10kg/ha	Dursban 5L/ha
殺菌剤		No	No
水	十分	十分	十分
水利費	82200/ha	82200/ha	82200/ha
刈り取り	雇用労働	雇用労働	雇用労働
費用	65000/ha	90000/ha	60000/ha
脱穀	65000/ha	↑	60000/ha
袋詰め	↑	↑	↑
乾燥	自家労働	70000/ha (2bag)	自家労働
風選・袋詰め	35500/ha	↑	自家労働
貯蔵			
収量・雨季			
収量・乾季	5.7t/ha	4.4t/ha	5.7t/ha
販売・雨季			
販売・乾季	5395kg	1764kg	3569kg
自家消費	82kg	84kg	166kg
籾、白米販売		籾	籾
誰に売るか	マーケットマミー	GNPA	マーケットマミー
販売価格	45000/82kg	35500/83kg	33000/83kg
稲作の問題	資金不足	資金不足 労力不足 通勤 (家→園場遠い)	酸性土壌 資金不足

Okyereko-1

No.	1	2	3
Name	Comfort Sarfo	R. R. Aggrey	Charles Adjei
水田面積	0.4ha	0.4ha	0.4ha
品種	ITA 304	ITA 304	CK 88
理由	高収量、病気抵抗性	高収量	高収量、食味良
種初入手	Dawhenya	Proj	IDC
更新	No	Yes	Yes
種子消毒	No	No	No
田植え	No	No	no
正条or乱雑			
苗代日数			
田植え費用			Yes
直播き	Yes	Yes	70kg/ha
播種量	87.5kg/ha	105kg/ha	
耕起	トラクタ	トラクタ	トラクタ
賃耕費用	50000/ha	37500/ha	45000/ha
代播き	25000/ha	37500/ha	22500/ha
均平			
施肥量	95-38-38 NPK/ha	90-38-38 NPK/ha	90-38-38 NPK/ha
NPK(15%)	250kg/ha	250kg/ha	250kg/ha
Urea(46%)	125kg/ha	250kg/ha	250kg/ha
A. S. (21%)			
施肥時期			
NPK	21DAS3/5, 56DAS2/5	21DAS1/2, 63DAS1/2	35DAS1/2, 56DAS1/2
硫酸, 尿素	56DAS	63DAS1/2, 77DAS1/2	77DAS1/2, 84DAS1/2
除草			
手取り	2回	2回	2回
費用	60000/ha	30000/ha	110000/ha
除草剤	No	Stam 34 5L/ha	No
殺虫剤	No	No	Y ? -1kg 4000
殺菌剤	No	No	No
水	不足	不足	不足
水利費	50000/ha	50000/ha	50000/ha
刈り取り	家族労働	雇用	雇用
費用	家族労働	60000/ha	45000/ha
脱穀	家族労働	↑	22500/ha
袋詰め	家族労働	家族労働	家族労働
乾燥	家族労働	家族労働	家族労働
風選・袋詰め	家族労働	家族労働	12500/ha
貯蔵	自宅	自宅	自宅
収量・雨季	5.2t/ha	4.6t/ha	4.3t/ha
収量・乾季			
販売・雨季	1764kg	1680kg	1517kg
販売・乾季			
自家消費	84kg, 252kg→労賃支払い	168kg	205kg (41kg→種初)
初、白米販売	白米	白米 2200/bag	白米 2100/bag
誰に売るか	マーケットミー	マーケットミー	マーケットミー
販売価格	40000/bag	30000/bag	27000/47kg
稲作の問題	水不足 農機トラクタ 資金	水不足 資金 倉庫	農機トラクタ 水不足 資金

Okyereko-2

No.	4	5	6
Name	Kofi Acquah	Aba Yaa Nowa	Esther Byah
水田面積	0.4ha	0.4ha	0.4ha
品種	ITA 304	知らない(ITA 304?)	知らない(ITA 304?)
理由	高収量	高収量	高収量
種初入手	Dawhenya	IDC	Proj
更新	Yes	No	Yes
種子消毒	No	No	No
田植え 正条植え 苗代日数 田植え費用			
直播き	Yes	Yes	Yes
播種量	103kg/ha	103kg/ha	200kg/ha
耕起	トラクタ	トラクタ	トラクタ
賃耕費用	40000/ha	62500/ha	45000/ha
代掻き 均平	20000/ha		
施肥量 NPK(15%) Urea(46%) A.S.(21%) 施肥時期	64-38-38 NPK/ha 250kg/ha 125kg 28DAS1/2, 56DAS1/2 77DAS	103-19-19 NPK/ha 125kg/ha 125kg/ha 125kg/ha 28DAS 56DAS~70DAS	103-19-19 NPK/ha 125kg/ha 125kg/ha 125kg/ha 28DAS 56DAS~70DAS
除草 手取り 費用 除草剤 殺虫剤 殺菌剤	2回 62500/ha No No No	2回 50000/ha No No 手取り No	2回 100000/ha No No No
水 水利費	不足 50000/ha	不足 50000/ha	不足 50000/ha
刈り取り 費用 脱穀 袋詰め 乾燥 風選・袋詰め 貯蔵	雇用 37500/ha 37500/ha 15000/ha 家族労働 25000/ha 自宅	雇用 62500/ha ↑ ↑ 家族労働 家族労働 自宅	雇用 105000/ha ↑ ↑ 50000/ha ↑ 自宅
収量・雨季 収量・乾季	2t/ha(水不足)	4.6t/ha 0.82t/ha(水不足)	6.9t/ha 2.1t/ha
販売・雨季 販売・乾季 自家消費 籾、白米販売 誰に売るか 販売価格	656kg 164kg(41kg→種籾) 白米 1600/bag マーケットミー 30000/47kg	1558kg 164kg 白米 2200/bag マーケットミー 40000/bag	5330kg 164kg 籾, 白米 マーケットミー 30000/bag-95(籾)
稲作の問題	水不足 資金 農機トラクタ	水不足 資金 土壌の問題	面積不足 圃場の均平 土壌の問題

Ashaiman

No.	1	2
Name	Attah Kamassa	Maxwell Owasn
水田面積	0.6ha	0.6ha
品種	GK 88	GK 88
理由	高収量、食味良	高収量、食味良
種初入手	マーケットミー	マーケットミー
更新	No	yes
種子消毒	No	No
田植え	No	No
正条or乱雑		
苗代日数		
田植え費用		
直播き	Yes	Yes
播種量	187kg/ha	93kg/ha
耕起	耕耘機	耕耘機
賃耕費用	87500/ha	87500/ha
代掻き		
均平	17000/ha	
施肥量	228-75-75 NPK/ha	85-50-50 NPK/ha
NPK (15%)	500kg/ha	333kg/ha
Urea (46%)	333kg/ha	
A. S. (21%)		167kg/ha
施肥時期		
NPK	14DAS, 30DAS	14DAS, 42DAS
硫安, 尿素	49DAS, 71DAS	74DAS
除草		
手取り	1回	1回
費用	家族労働	家族労働
除草剤	Basgram 5L/ha	Basgram 5L/ha
殺虫剤	No	Yes Karate 0.83L/ha
殺菌剤	No	No
水	十分	十分
水利費	58000/ha	50000/ha
刈り取り	雇用	雇用
費用	40000/ha	45000/ha
脱穀	40000/ha	37500/ha
袋詰め	家族労働	↑
乾燥	家族労働	40000/ha
風選・袋詰め	家族労働	↑
貯蔵	IDA 倉庫	IDA 倉庫
収量・雨季	5.6t/ha	5.3t/ha
収量・乾季		
販売・雨季	3192kg	2520kg
販売・乾季		
自家消費	168kg (84→種初)	420kg (210kg→種初)
初、白米販売	初	初
誰に売るか	マーケットミー	マーケットミー
販売価格	35000/bag	35000/bag
稲作の問題	資材高い 資金不足 農機 (耕耘機不足)	資金不足 農機 (耕耘機不足) 資材高い

(2) 農家経営関連資料

(1) ガーナの植生と土地利用

	面積 (1,000ha)	対総面積 割合 (%)
Total Land Area	23,854	100.0
(Vegetation)		
Guinea Savanna woodland	14,790	62.0
Deciduous forest		
Celtis-Triplochiton Asscn.	3,730	15.6
Antiaris Chlorophora Asscn.	2,700	11.3
Rain/Deciduous forest ecotone	840	3.5
Rain forest	750	3.1
Thicket and Grassland	450	1.9
Sudan Savanna woodland	190	0.8
Swamp and Lagoonal vegetation	130	0.5
Others	270	1.1
(General land use)		
Savanna woodland	7,100	29.7
Bush fallow and other uses	6,000	25.1
Unimproved pasture	3,600	15.1
Forest reserves	2,600	10.9
Tree crops	1,700	7.1
Annual crops	1,200	5.0
Wildlife reserves	1,200	5.0
Underserved forest	500	2.1
(Specific to agriculture land use)		
Agricultural Land Area	13,628	57.1
Area under cultivation	5,300	22.2
Total area under IRRIGATION	11	0.04
Area under inland waters	1,100	4.6
Other	9,126	38.3
(Area planted to selected food crops)		対耕作面積 割合 (%)
Root and Tubers		
Cassava	520	9.8
Cocoyam	179	3.4
Yam	154	2.9
Plantain	184	3.5
Cereals		
Maize	629	11.9
Millet	191	3.6
Rice	81	1.5
Guinea Corn	299	5.6

資料: Agriculture in Ghana, Nov. 1995 (Policy planning, Monitoring and Evaluation, Ministry of Food and Agriculture)

(2) 人口

1984年センサス結果	1,220万人
1994年	1,670万人
人口年増加率	3.2%

資料: 前掲表に同じ。

(3) 人口1人当たり年間消費量

(単位: kg, m. t.)

	1980年	1985年	1990年	1995年	(参考 1994年)	
					生産量+輸入	一人当たり消
(Roots & Tubers)						
Cassava	145.2	146.3	148.0	149.7	6,025,000	360.8
Yam	44.2	43.8	43.3	42.8	1,700,100	101.8
Cocoyam			54.0	55.0	1,147,700	68.7
(Plantain)						
Plantain	82.2	82.5	83.0	83.5	1,474,700	88.3
(Cereals)						
Maize	38.4	39.2	40.3	41.4	939,900	56.3
Rice	12.4	12.0	13.3	13.9	443,412	26.6
Millet	17.0	17.1	17.3	17.4	167,800	10.0
Sorghum	17.0	17.1	17.3	17.4	323,900	19.4
(Pulses & Nuts)						
Groundnuts	21.5	21.6	21.7	21.8		
Cowpeas	0.9	0.9	0.9	0.9		
(Meat)						
Cattle					78,610	4.7
Sheep					50,900	3.0
Goat					57,880	3.5
Pig					13,160	0.8
Fish =1993年)						
Marine					319,000	19.1
Inland					52,000	3.1

資料: 前掲表に同じ。

(4) 熱量対価格の農産物比較

	100g 当たり	2,000kcal	卸売価格 (1995年3月～1996年4月)			1kg 当たり	2,000kcal
	熱量(kcal)	必要量(g)	単位 (g)	最高価格	最低価格	平均価格	必要価格
さつまいも	123	1,626	800			300	610
里芋(Cassava)	60	3,333	91,000	13,500	7,500	10,500	385
バナナ	87	2,299	400			150	862
トウモロコシ	350	571	109,000	44,000	30,500	37,250	195
米 (精白米)	356	562	100,000	65,000	51,000	58,000	326
粟	307	651	93,000	48,000	33,500	40,750	285
もろこし	336	595	100,000	36,000	17,500	26,750	159

注：さつまいも、バナナは、小売価格に基づいているのでやや高めの価格である。

資料：熱量は、科学技術庁資源調査会編「4訂 日本食品標準成分表」による。

価格は、Monthly market information bulletin(Credit and Marketing Services Division, Policy Planning, Monitoring and Evaluation Department, Ministry of Food and Agriculture)による。

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