

Chapter 1

Historical Changes in Technical Cooperation Provided to Ghana's Irrigated Agriculture Sector

Aim of this chapter: As one of the settings for JICA's technical cooperation, which is the subject of this study, this chapter summarizes the history and the issues of Ghana's irrigated agriculture sector, and outlines the flow of technical cooperation undertaken by JICA.

1-1 Overview of Ghana's Irrigated Agriculture

1-1-1 General Overview

Agriculture is a key industry with a central socioeconomic position in Ghana. According to statistics from the year 2000, Ghana's agricultural sector accounts for about 65 % of the work force, about 40 % of the gross domestic product, and about 40 % of foreign currencies acquired through exports. Although this demonstrates that the agricultural sector is the key industry of Ghana, the structure of the industry is vulnerable because the industry relies on rain-fed agriculture during a roughly 6-month rainy season when almost all of its production is conducted. There is also a high risk of droughts and other types of unseasonable weather. Under these conditions, irrigation development has been implemented as a national policy for food security and the development of rural areas, by means of agricultural production that is conducted throughout the year.

The history of irrigation development in Ghana is quite short. For roughly 40 years since its inception in the 1960s, approximately 19,000 hectares (ha) of land has been developed. Of the land, approximately 9,000 ha have been developed by the Government of Ghana, with the remainder of the land having been developed by the private sector. At present, there are 22 public irrigation districts in the whole country. Most of the development of these public irrigation districts has been conducted with financial and technological support through bilateral cooperation with foreign countries including China, the former Soviet Union, Taiwan, Japan and Republic of Korea, or from international organizations, including the UN Food and Agriculture Organization (FAO) and the World Bank. The reasons for the support are: Ghana lacked the financial capacity to bear the costs of irrigation development (current development costs are between approximately US\$ 4,000 and US\$ 10,000 per ha); and Ghana lacked accumulated technology and systems necessary for irrigation development.

After World War II, irrigated land areas increased rapidly in the world. In particular, the increase of irrigated land was phenomenal after 1960. In 1961, the area of irrigated land measured 139 million ha, and by 1996, this increased to 263 million ha. Of this, irrigated land in developing countries accounted for approximately 70 %. It is estimated that the area of irrigated land on the African

continent is approximately 12.4 million ha, or 7.5 % of arable land.¹ However, the rate of increase peaked in the mid-1970s with an annual rate of 2.3 %, and since then it has slowed. A number of reasons can be cited for this deceleration, including a rise in construction costs, a decline in market prices for crops, an increasing recognition of environmental and social costs, and a slump in the performance of irrigation. The rise in construction costs was, in part, brought about by the decline in land suitable for development. Under these circumstances, the World Bank and other organizations have been curtailing their investment in agriculture since 1980, especially in irrigated agriculture. This has been one of the direct causes for the declining rate of increase in irrigated land areas in developing countries.²

Irrigation development in Ghana has also followed the global movements, with a peak in 1970. However the scale of overall development has remained incredibly low. Irrigated land, measuring approximately 19,000 ha, represents a mere 1 % of approximately 1.9 million ha of land suitable for development, and only approximately 0.36 % of approximately 5.3 million ha of agricultural land.

1-1-2 Implementing Agency of Irrigated Agriculture (Outline of GIDA)

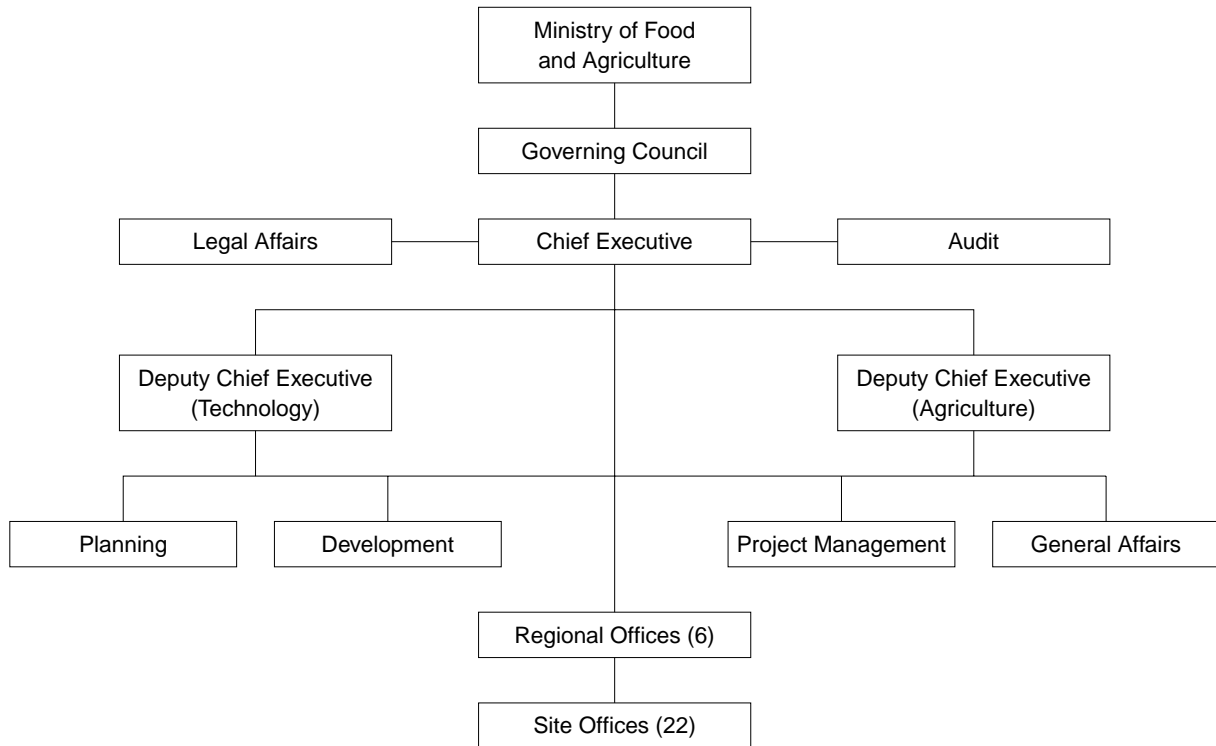
JICA's technical cooperation for irrigated agriculture in Ghana, which commenced in 1988, has been implemented with the Ghana Irrigation Development Authority (GIDA) as JICA's counterpart organization. GIDA is a government organization that comes under the jurisdiction of the Ministry of Food and Agriculture, and the only public organization linked to irrigated agriculture. GIDA's forerunner was the Land Improvement and Preservation Unit, which was established in the early 1950s within the Department of Agriculture for the purpose of soil conservation in the northern part of Ghana. This was promoted to the Irrigation Development Department within the Ministry of Agriculture in 1965, and then established as GIDA by government decree in 1977. GIDA is in charge of surveying candidate sites for irrigation development across Ghana, designing and constructing facilities, managing and maintaining irrigation-project districts under further development, and disseminating farming technology among farmers. GIDA has actually developed 22 irrigation-project districts of varying sizes in a total developed area of 8,800 ha across the country.

Figure 1-1 describes the organizational structure of GIDA. Under the Chief Executive sits, 2 Deputy Chief Executives (technology and agriculture) who oversee their respective fields. GIDA's head office is comprised of 4 departments: Planning, Development, Project Management, and General Affairs. Throughout Ghana, there are 6 Regional Offices and 22 Site Offices. In the Site Offices, there are project managers and agricultural extension officers, and they are in charge of managing the irrigation districts and providing technical guidance to farmers.

¹ Tsutsui (2000), FAO (1996).

² Oga (1998).

Figure 1-1 GIDA Organizational Chart



Source: Created by author

Since its establishment, GIDA has been developing and managing the public irrigation districts with a tremendous amount of government subsidies, and the staff assigned. However, as part of its policy for structural adjustments, the number of personnel at GIDA was reduced. The roughly 1,500 personnel of the 1980s were cut sharply to 739 in 1993, 441 in 1994, and 377 in 1995; now in 2004, there are no more than 304 personnel. This number is made up of 121 head office personnel (including Irrigation Development Center (IDC) staff), 73 personnel at the Regional Offices, and 110 personnel at the Site Offices. GIDA's budgets have also been continually cut since the structural adjustments. Its financial conditions, as presented in Table 1-1, portray an especially harsh picture, with personnel expenses accounting for 82 % of the total expenditure. The aggregate of administrative expenses and

Table 1-1 Breakdown of GIDA Expenditure in 2003

Account	Expenditure (US\$)	
	Government of Ghana	Aid agencies
Personnel expenses	548,183 (82 %)	
Administrative expenses	78,045 (12 %)	
Service expenses (project expenses)	43,974 (6 %)	
Investment (facilities construction)		2,699,093
Total	670,202 (100 %)	

Source: Created by author

project expenses is no more than about US\$ 120,000, so it is extremely difficult to manage the public irrigation districts appropriately.

1-1-3 Outline of Public Irrigation Districts

Table 1-2 outlines the public irrigation districts managed by GIDA. These public irrigation districts are scattered around Ghana, and they cover a total of approximately 8,800 ha. The number of farming families that benefit from the districts amount to approximately 11,000, and the average cultivated area per household is approximately 0.8 ha. In other words, Ghana's irrigated agriculture is comprised of small-scale farmers. It is for this reason that JICA's project-type technical cooperation offered from August 1997 to July 2004 was titled "The Small-scale Irrigated Agriculture Promotion Project". The 22 public irrigation districts are classified into 13 small-scale irrigation districts (about 60 % of all the districts) of 100 ha or less, 5 medium-scale irrigation districts of between 100 and 500 ha, and 4 large-scale irrigation districts of 500 ha or greater. By type of irrigation, there are 8 districts irrigated by pump, 5 districts irrigated both by pump and gravity, and 9 districts irrigated by gravity. Ghana has a large number of irrigation districts that use pumps, which are costly to operate and maintain facilities. The reason for this is that much of Ghana is topographically flat, and hence there is little land suitable for gravity-type irrigation development.

Ghana's irrigated agriculture aims to produce rice and vegetables. With recent urbanization and the growth of the middle class, the amount of rice consumed is steadily increasing. Along with these structural changes of Ghana's society, the consumption of rice is growing in comparison with its staple food of yams and other tubers because rice has the advantages of being easy to cook, and easy to store. In the year 2000, the consumption of rice per capita was 20 kg, and the total national consumption of rice was approximately 400,000 tons per year. However, rice production has not been able to keep up with the increasing consumption, so Ghana is reliant on imported rice for about 50 % of its domestic consumption, or 200,000 tons, and consequently expends approximately US\$ 100 million each year.

Ghana's Ministry of Food and Agriculture has set one of its key policies to ameliorate this situation, in other words, to reduce the amount of imported rice by increasing its domestic rice production. Nonetheless, increased rice production based on this policy has not been made smoothly. Its problem lies in the declining profitability of rice cultivation. Incentives for farmers to cultivate rice are on the decline because of competition with imported rice (an influx of better quality and less expensive rice), and the soaring prices of imported agricultural materials and equipment which farmers rely on.

Under these circumstances, farmers' interest is being shifted to the cultivation of more profitable vegetables (including okra, fresh maize, cabbages, red peppers, tomatoes, and onions). However, there

Table 1-2 Outline of Public Irrigation Districts (as at June 30, 2003)

No.	District	Area of developed land (ha)	Area of actually irrigated land (ha)	Irrigation type	Target crop	Remarks
1	Ashaiman	155	56	Gravity-type	Rice and vegetables	
2	Dawhenya	200	150	Combination of gravity-type and pump-type	Rice	
3	Kpong	2,786	616	Gravity-type	Rice and vegetables	
4	Weija	220	0	Pump-type	Vegetables	Abandoned irrigated agriculture in 2003
5	Afife	880	880	Gravity-type	Rice	
6	Aveyime	60	0	Combination of gravity-type and pump-type	Rice	Abandoned irrigated agriculture in 1998
7	Kpando Torkor	40	6	Pump-type	Vegetables	
8	Mankessim	17	17	Pump-type	Vegetables	
9	Okyereko	81	42	Gravity-type and pump-type	Rice	
10	Subinja	60	6	Pump-type	Vegetables	
11	Tanoso	64	15	Pump-type	Vegetables	
12	Sata	34	24	Gravity-type	Vegetables	
13	Akumadan	65	0	Pump-type	Vegetables	Abandoned irrigated agriculture
14	Anum Valley	89	0	Combination of gravity-type and pump-type	Rice	Abandoned irrigated agriculture
15	Amate	101	0	Pump-type	Rice	Abandoned irrigated agriculture
16	Dedeso	20	8	Pump-type	Vegetables	
17	Kikam	27	0	Combination of gravity-type and pump-type	Rice	Abandoned irrigated agriculture
18	Bontanga	450	390	Gravity-type	Rice and vegetables	
19	Golinga	40	16	Gravity-type	Rice and vegetables	
20	Libga	16	16	Gravity-type	Rice and vegetables	
21	Tono	2,490	2,450	Gravity-type	Rice and vegetables	
22	Veaa	850	500	Gravity-type	Rice and vegetables	
	Total	8,745	5,192			

Source: Created by author

are many problems of pests, and it could be argued that the cultivation of perishable vegetables still involves taking risks.

1-1-4 Transition of the Management Framework for Irrigation Districts

As previously mentioned, GIDA's personnel and budget were substantially reduced as a part of the government's structural adjustments. As a result, in early 1990, fundamental changes were also made to the management framework of the public irrigation districts. In terms of finance and personnel,

keeping the previous “government-led management” system going had become difficult, and so a “Participatory Irrigation Management” was introduced whereby beneficiary farmers and others could manage the irrigation facilities.

This transition from “government-led management” to “farmer-led management” has become a major trend in the irrigated agriculture sectors of developing countries. In many developing countries, government financial and human resources were used for almost everything from the construction to the maintenance of the majority of irrigation facilities developed under state projects after World War II. Therefore a situation has been brought about where farmers who are the beneficiaries of the facilities have a poor awareness of the responsibility toward the management of the facilities, and making disbursements for maintenance costs has become difficult because of financial constraints. As a result, many of the irrigation districts are now confronted with the problems of inappropriate water and facility management. Against this kind of backdrop, there are an increasing number of developing countries that started to adopt the system of “Participatory Irrigation Management,” which is designed to cut government expenditure and to improve water management.

In Ghana, since the introduction of the system of “Participatory Irrigation Management” in early 1990, the operation and maintenance of irrigation facilities in the public irrigation districts has been mostly conducted with funds sourced from irrigation service charges collected from the beneficiary farmers. Irrigation service charges are determined with consideration given to the irrigated land area of each farmer, the irrigation type of the district in question (by pump, and/or gravity), and the standard of the facilities. Therefore irrigation service charges per unit area (ha per season) differ by several ten to several hundred US dollars.

1-1-5 Transition of Policies for Irrigated Agriculture, and Japan’s Technical Cooperation

Irrigated farmland accounts for no more than 17 % of the world’s farmland, but supports approximately 40 % of the world’s food production. In this sense, irrigated agriculture performs a large role in food security and its productivity is quite high in comparison with rain-fed agriculture. For this reason, as mentioned previously, despite development costs being high, developing countries have promoted irrigation development in order to increase food production in response to population growth. With this ongoing trend, Ghana has been promoting irrigation development policy since the 1960s, and the country conducted new development-oriented projects until the 1980s.

It is not until the mid-1980s that the focus finally turned to the “effective utilization of existing irrigation districts”. What triggered this was the World Bank’s review on Ghana’s irrigated agriculture issued in 1986. In the review, the World Bank assessed Ghana’s irrigated agriculture as having “not showing achievements which adequately reflect the investment.” Based on this achievement, the World Bank then issued recommendations to the Government of Ghana with regard to the “functional

recovery of existing irrigation districts” and “promotion of the operation and maintenance of facilities by farmers themselves.” Behind the recommendation for the “extended participation of farmers” was the “curtailment of the government’s role” driven by its structural adjustments.

Subsequent to receiving these recommendations from the World Bank, in February 1990, Ghana formulated the Medium Term Agricultural Development Plan (MTADP), which indicates the direction of “a policy of focusing on the functional recovery of existing irrigation facilities and on improvements to their productivity by repairing and improving them, and of promoting the operation and maintenance of irrigation facilities by promoting small-scale irrigated agriculture with the participation of farmers” rather than a policy of promoting new irrigation development projects.

At that time, the following problems were pointed out at the sites of the irrigation districts: unskilled water management and farming techniques; the decline of facility functions due to a lack of thorough maintenance; and the decline of agricultural productivity. Against this background, Japan’s series of technical cooperation got underway with the dispatch of an individual expert in 1988. What the Government of Ghana sought in Japan’s technical cooperation was the functional recovery of existing irrigation districts, the promotion of the operation and maintenance of facilities by farmers themselves, the establishment of a sustainable farming system for small-scale farmers, and the enhancement of GIDA’s technical support framework for farmers.

1-1-6 Issues of Ghana’s Irrigated Agriculture

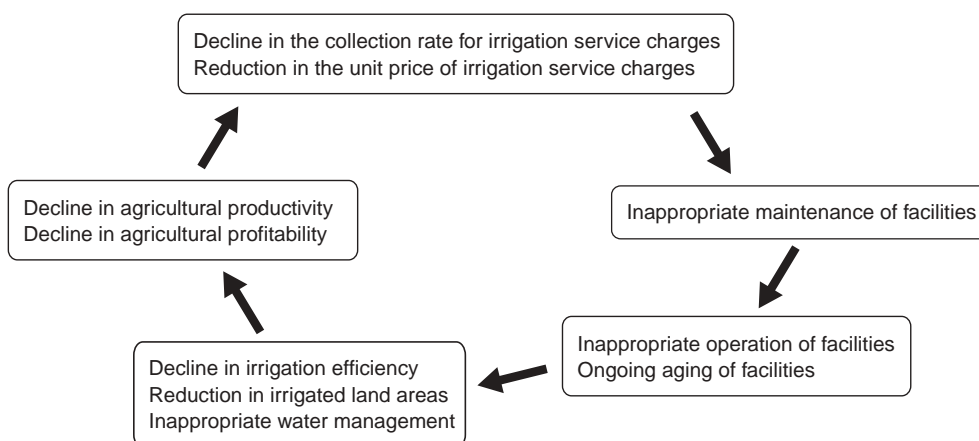
In this section, we will highlight the conditions under which Japan’s technical cooperation was provided, by describing in detail the specific issues related to Ghana’s irrigated agriculture.

(1) The issue of sustainability (a decrease in actual irrigation land areas), and the negative cycle

As mentioned previously, the total developed land area in the public irrigation districts is approximately 8,800 ha, but actual irrigation land areas have been decreasing year after year. As of 2003, they decreased to approximately 5,200 ha. In this way, Ghana’s irrigated agriculture has a serious problem in terms of its sustainability. The decrease of actual irrigated land areas is being caused by such problems as a decline in the capacity to convey and distribute water due to aging facilities, the abandonment of irrigated agriculture due to the complete collapse of facilities (pumps, etc.), and the suspension of irrigated agriculture (due to inability to bear the costs of operating pump stations).

It can be argued that these problems have become chronic owing to the emergence and acceleration of a “negative cycle,” as shown in Figure 1-2. The inappropriate maintenance of facilities causes such problems as the inappropriate operation of facilities, and the facilitation of their aging. Eventually these problems, in turn, trigger a decline in agricultural profitability, and further accelerate the problem of the inappropriate maintenance of facilities partly due to a decline in the collection rate

Figure 1-2 Negative Cycle in Ghana's Irrigated Agriculture



Source: Created by author

for irrigation service charges. This vicious cycle is a “negative cycle.” The issues surrounding the sustainability of Ghana’s irrigated agriculture can be explained using this kind of “negative cycle.”

(2) Deficiency in irrigated farming technology and fragile farmers’ organizations

Like other developing countries, Ghana had also been implementing irrigation developments with a focus on the construction of facilities, so this caused major lags in the development and dissemination of software-related technology which was necessary for the effective utilization of existing irrigation districts. To be more precise, there was a considerable shortage of technology related to water management, the operation and maintenance of facilities, cultivation, farming, agricultural machinery, etc. The shortage of irrigated farming technology was one of the factors in triggering the “negative cycle,” and it was also partly responsible for “not showing achievements which adequately reflect the investment” as criticized by the World Bank. The “vulnerability of farmers’ organizations” was also continuously pointed out as a point of issue. Irrigated agriculture is a kind of communal farming. Since beneficiary farmers who engage in irrigated agriculture share the same water resources and facilities, they must organize themselves and jointly manage irrigation facilities in order to maintain the continuation of irrigated agriculture and to raise its efficiency. If farmers’ organizations are not active, it becomes difficult to distribute water fairly, and to appropriately operate and maintain facilities funded by irrigation service charges. In other words, enhancing the development of farmers’ organizations is fundamental to promote irrigated agriculture.

Nonetheless, as stated previously, like in other developing countries, irrigation development in Ghana had been implemented without the participation of farmers and burden charges. Therefore beneficiary farmers had a poor awareness as parties involved, and were heavily dependent on the government. This fact was a major hurdle to the development and enhancement of farmers’ organizations.

(3) Absence of a farming support system

In addition to the farming technology mentioned above, a so-called farming support system is necessary for the advancement of irrigated agriculture. The farming support system refers to a financing system for farming funds, the joint procurement of agricultural materials and equipment, the joint shipment of agricultural produce, and the group usage of agricultural machinery, etc.

We will explain by taking the example of farming funds. It would appear that, not only in Ghana, but also across developing countries in general, it is extremely difficult for farmers to get loans from banks, so they end up raising funds at high interest rates from “market mummies” (agricultural produce purchasers and distributors). As a result, farmers are placed in a situation where they are forced to sell their agricultural products to market mummies under disadvantaged terms. This cycle of financing, purchasing agricultural products, and refinancing by “market mummies” has become one of the major factors for hindering the increase of farmers’ income. Even if farming techniques are disseminated and agricultural productivity is improved, the sustained advancement of irrigated agriculture will not be achieved as long as necessary farming support systems remain unimproved. In Ghana’s irrigated agriculture, most irrigation districts totally or partially lack these farming support systems. This fact has become a major obstacle to the advancement of irrigated agriculture.

(4) Lack of systems

The lack or vulnerability of systems that are necessary to implement policies for irrigated agriculture is also one of the problems Ghana’s irrigated agriculture sector face. What is particularly notable relates to the “Participatory Irrigation Management.” As discussed earlier, in the early 1990s, Ghana introduced “Participatory Irrigation Management,” under which farmers’ organizations assume responsibility for the management of facilities. However, no systems, laws or technical support that were essential in firmly establishing this management framework and increasing its effectiveness were provided. This resulted in a situation where neither farmers nor the government took responsibility for the management of irrigation districts, and Ghana’s irrigated agriculture grew stagnant.

1-2 Overview of the Transition of JICA’s Cooperation in the Irrigated Agriculture Sector

Japan’s technical cooperation for the advancement of Ghana’s irrigated agriculture got underway with the dispatch of an individual expert (from 1988 to 1991), followed by a mini project (from 1992 to 1995), and the Small-scale Irrigated Agriculture Promotion Project (the Main Phase from 1997 to 2002, and follow-up cooperation from 2002 to 2004). In this way, 16 years have passed since the inception of Japan’s technical cooperation through JICA. In 2004, a new project started in order to create a system for the management of irrigation facilities. Table 1-3 represents these series of technical cooperation in each phase from the perspective of CD. Like this, Japan’s technical

Table 1-3 Transition of Technical Cooperation from the Perspective of Capacity Development

Cooperation Scheme	Timeframe	Targets of Capacity Development
The Age of the Individual Expert	1988 ~ 1992	Formation of a base for the development and dissemination of irrigated farming techniques through organization-building (IDC)
The Age of the Mini Project	1992 ~ 1995	Establishment of a base for the development and dissemination of irrigated farming techniques through the strengthening of the organization (IDC), and the development of human resources (counterparts)
Main Phase of the “Small-scale Irrigated Agriculture Promotion Project”	1997 ~ 2002	Formation of model irrigation districts for the advancement of irrigated agriculture through the development of human resources (counterparts, farmers from model districts), and the building of farmers’ organizations (model districts)
Follow-up cooperation for the “Small-scale Irrigated Agriculture Promotion Project”	2002 ~ 2004	Formation of a nationwide framework for the advancement of irrigated agriculture through the development of human resources (farmers from all the districts), the building of farmers’ organizations (all the districts), the formulation of technical guidelines, as well as the formulation of action plans for the amelioration of farming, and subsequent assistance in the implementation of the plans
“Project for Improving the Farmer Participatory Irrigation Management System” (New project)	2004 ~ 2006	Formation of a sustainable framework for the implementation of irrigated agriculture through assistance in institution-building (system for the management of irrigation facilities), the development of human resources (farmers from all the districts nationwide), and organization-building (all the districts)

Source: Created by author

cooperation has continued in a larger scale up until now. We would now like to turn to a description of its transition.

(1) The age of the Individual Expert (from 1988 to 1992)

As previously mentioned, as a result of the World Bank’ review on irrigated agriculture in 1986, the Government of Ghana adopted the sustainable improvement of productivity in existing irrigation districts as its key policy; and to this end, the focus was then placed upon the development and dissemination of requisite irrigated farming techniques. However, at that time, GIDA possessed neither frameworks nor human resources to carry out the development and dissemination of such irrigated farming techniques. Therefore, it could be argued that, under these circumstances, the individual expert virtually approached CD for the advancement of Ghana’s irrigated farming techniques from scratch.

The most notable achievement of this expert is the establishment of the IDC. Through the vigorous efforts of the expert, who considered the establishment of a “base for the development and dissemination of irrigated farming techniques” as a starting point for everything, it was decided to construct the IDC in the Ashaiman Irrigation District (approximately 20 km from Accra, the Ghanaian capital). The establishment of the IDC from nothing was fraught with difficulties. It took approximately 3 years to develop its framework, including securing the site, constructing the building, providing electricity, water and other infrastructure, securing personnel, and building a base for

development and dissemination projects. The framework was developed mostly by the Japanese expert, and he also served as the center's founding Director General during this period. Members of the Japan Overseas Cooperation Volunteers (JOCV) program were also dispatched (forestry, rice cultivation, and farming), and they made great contributions to the establishment of the IDC. During the period while the individual expert was in Ghana, the framework of the IDC was developed; various fields, such as rice cultivation, soil, the environment, farming and general administration, were established organizationally; and personnel training was also commenced.

At that time, GIDA's civil engineers, who took charge of the planning, design and construction of facilities, held positions of absolute authority within the authority. Meanwhile, its agronomists, who took charge of the development and dissemination of irrigated farming techniques, were considered comparatively low in position. The latter did not even have their own offices, and it appeared that they did not fit within the organization. With the establishment of the center, a base for the agronomists was provided, and the first step toward the advancement of Ghana's irrigated agriculture was taken both in name and substance. It could be argued that, from the perspective of CD, the dispatch of the individual expert made remarkable achievements in "foundation-building (organization-building)" geared toward the advancement of Ghana's irrigated agriculture.

(2) The age of the Mini Project (from 1992 to 1995)

After the individual expert left, a Mini Project focused on the IDC was implemented between 1992 and 1995. 2 experts (irrigated agriculture and water management) and 2 members of JOCV (rice cultivation and afforestation) were sent from Japan. Their activities included research on irrigated farming techniques at the IDC, technical guidance at 4 irrigation districts, and seminars on rice cultivation. From about this time, rice consumption in Ghana was on an ever-increasing upward trend, and increased rice production was one of the great hopes for irrigated agriculture. Furthermore, counterpart training was also conducted in Japan, and personnel training was provided in addition to technical guidance at the IDC. At that time, the IDC was also operated mainly by Japanese. During the initial phase of the Mini Project, the position of center director was held by an expert.

It could be argued that, from the perspective of CD, the age of the Mini Project was focused on the development of irrigated farming techniques and the establishment of a framework base for the dissemination of such developments, through the strengthening of the IDC as an organization, and personal training for counterparts.

(3) Main Phase of the "Small-scale Irrigated Agriculture Promotion Project" (5 years from 1997 to 2002)

The Main Phase of the Small-scale Irrigated Agriculture Promotion Project was launched after a blank of about 2 years following the completion of the Mini Project (1995). This new project was

operated for 5 years from August 1997 through July 2002. The overall goal of the project was for technical cooperation to “improve farming systems for each irrigated agricultural district under the jurisdiction of GIDA,” and the project purpose was for technical cooperation to “establish model farming systems in the irrigated agriculture districts under the jurisdiction of GIDA.” A model farming system was defined as “a system to attempt to establish farming systems required for the implementation of combined paddy and upland crop farming with the use of irrigation facilities; and the establishment of a farming support framework (including GIDA’s technical and systematic aspects) for individual farmers and farmers’ organizations, required for the maintenance and development of farming that is conducted under those farming systems.”

The 2 irrigation districts of Ashaiman and Okyereko were selected as model districts to pilot the establishment of the model farming systems. The 2 districts are outlined in Table 1-4. The specific activities of the Main Phase were a study of farmers’ situation and the farming systems (2 model districts), the improvement of individual technology (cultivation, water management, agricultural machinery, and farming), the demonstration of the farming systems in the 2 model districts, the improvement of farming support systems in the 2 model districts, and training for farmers, government personnel, and staff from farmers’ organizations. Because this was the Main Phase of a technical cooperation project, a significant input was provided by the Japanese side, as indicated in Table 1-5. At the same time, Ghana also allocated over 20 counterpart staff, and a portion of the project costs (fuel costs, purchase of materials and equipment, etc.)

The focus of activities in this phase was the establishment of farming systems in the 2 irrigation districts, Okyereko and Ashaiman. Consequently, about 70 or 80 % of activities went to the construction of the model districts. Other activities included a variety of cultivation experiments (rice and vegetables) and research at the IDC test fields, as well as national training (technical training for

Table 1-4 Outline of the Two Model Irrigation Districts

Ashaiman Irrigation District	Okyereko Irrigation District
The Ashaiman Irrigation District is located approximately 20 km from Accra, the capital of Ghana. It is a settlement precinct on land purchased by the government, and the settlers are comprised of natives from each region. The irrigation districts with reservoirs are gravity-fed irrigated land with a developed land area of 155 ha, and an actually irrigated land area of 56 ha. The number of beneficiary farming families is 94. Originally, the irrigation district was developed for paddy rice farming, but there has recently been a shift to upland crop farming (vegetables) because of the declining profitability of paddy rice cultivation.	The Okyereko Irrigation District is located approximately 65 km from Accra, the Ghanaian capital. Unlike Ashaiman, this district is a tribal society which is centered around a chief. The irrigation district is also gravity-fed irrigated land with reservoirs (and a pump station for supplementary irrigation) with a developed land area of 81 ha, and an actually irrigated area of 47 ha. The number of beneficiary farming families is 131. The Okyereko Irrigation District is in a region surrounded by large rain-fed fields.

Note: Grant aid provided by the Japanese government was applied to both districts, and irrigation and drainage facilities were repaired and upgraded (work completed in March 2000).

Source: Created by author

Table 1-5 Input from the Japanese Side

Item	Description
Dispatch of long-term experts	Team leader; coordinator/training; cultivation; water management; farmers' organizations and farming; and agricultural machinery
Dispatch of short-term experts	Total: 16 persons
Provision of machinery and equipment	Vehicles, and machinery and equipment for research, farming, training, administration, etc. in a total of approximately JPY 104 million
Counterpart training in Japan	Total: 17 persons
Share of local costs	Approximately JPY 91 million; Other: approximately JPY 25 million

Source: Created by author

Table 1-6 Achievements of Japan's Technical Cooperation in the Model Districts

Achievement of a high collection rate for irrigation service charges and farmer-led facility management in model irrigation districts

In Ghana, the general rule is that the operation and maintenance of irrigation facilities is done using irrigation service charges collected from beneficiary farmers. However, in general, collection rates for irrigation service charges for irrigation districts remained quite low, and this caused problems such as the improper maintenance of facilities. In the 2 model districts, Japan's technical cooperation led to the successful development and reinforcement of farmers' organizations, as well as their vigorous activities. These resulted in a notable improvement to the collection rates for irrigation service charges, and substantiated what the Government of Ghana had sought in Japan's technical cooperation, in other words, the operation and management of irrigation facilities by farmers' organizations.

Increase in rice productivity, and improved farming-related revenue

The yield of rice per unit area improved considerably in the 2 model districts thanks to Japan's technical cooperation. In Ashaiman, the yield of rice was 3.6 t/ha during the rainy season at the start of the Main Phase, and increased by close to 1 t/ha to 4.7 t/ha by the final year of technical cooperation. Meanwhile, in Okyereko, productivity similarly increased by about 0.5 t/ha. These increases in rice productivity have a direct bearing on the farming-related income of each farmer. According to the results of an impact study of the assessment survey at the end of the project, most farmers responded that their income increased. Furthermore, in both irrigation districts, more than 10 % of all the farmers achieved a yield of in excess of 6 t/ha, which is on a par with Japanese farmers. This reflects the fact that Japan's technical cooperation is leading to the steady fostering of devoted farmers who possess high levels of cultivation techniques.

Operation of the Farmers' Bank, and continuous activities of farmers' organizations

As described previously, one of the major points of issue in Ghana's irrigated agriculture is the "procurement of farming funds". In order to resolve this issue, as part of Japan's technical cooperation, the "Farmers' Bank" was established in the 2 model irrigation districts. Its role is to provide loans to farmers for farming inputs such as fertilizers and pesticides. The bank works with a revolving funds system whereby farmers who get the loan of actual things make repayments with interest (at the same rate as commercial banks, and used to offset inflation and for the running costs of the Farmers' Bank). The Farmers' Bank was established in 2001, and its board of governors which is comprised of representatives from the 2 irrigation districts takes the responsibility for its operations. Full-time employees are employed by the Farmers' Bank, and the bank is being operated smoothly.

Furthermore, based on the achievements of Japan's technical cooperation, vigorous activities essential for the advancement of irrigated agriculture are being performed by the farmers' organizations. The respective farmers' organizations in the 2 model districts set up sections (farming, the operation and maintenance of facilities, marketing, etc.) respectively, and have been developing activities. They conduct general meetings, board meetings and reelections for executive officers independently, and "autonomous activities" whereby the organizations review and resolve issues related to their irrigation district by themselves have been firmly established.

Source: Created by author

representatives from irrigation districts across the nation during the project's 4th and 5th years). As a result of the project's strategic cooperative activities, numerous achievements were accomplished in the 2 model irrigation districts, as outlined in Table 1-6. They include the enhancement of the irrigation facilities management framework, and the improvement of the collection rate for irrigation service charges through the reinforcement of farmers' organizations, the improvement of the productivity of rice (yield per unit area), the establishment of a lending system for farming investments following the establishment of the Farmers' Bank, and the improvement of farmers' earnings.

It can be argued that the very model for the "promotion of facilities that are operated and managed by farmers themselves" and the "establishment of a sustainable farming system for small-scale farmers," which the Government of Ghana originally requested the Japanese side to establish through technical cooperation was established through activities in the model districts, as stated in 1-1-5. However, it is true that, throughout the period of the project, there were differing opinions among relevant parties over the interpretation of "model farming systems" as expressed in the overall goal and the project purpose, and that they went through a difficulty that prevented the efficient implementation of technical cooperation. (Refer to Chapter 2 for details.) From the perspective of CD, it could be argued that this Main Phase of this project left its mark on human resources development directed at counterparts and farmers, and on the building of farmers' organizations in the model districts.

(4) Follow-up cooperation for the "Small-scale Irrigated Agriculture Promotion Project" (2 years from 2002 to 2004)

As discussed previously, technical cooperation during the 14 years from the dispatchment of the individual expert to the Main Phase (including the 2-year interruption partway) was devoted to the creation of foundations for the advancement of farming in existing irrigation districts. Remaining issues are compiling the achievements of a series of technical cooperation, and raising the overall level of Ghana's irrigated agriculture through the nationwide dissemination of the achievements of technical cooperation. During follow-up cooperation, there was a strong awareness for efforts dedicated toward these 2 issues from the stage of formulating cooperation plans. Consequently, technical cooperation that unfolded had a project purpose to "formulate technical guidelines and strategies for the amelioration of farming systems in the irrigation districts under the jurisdiction of GIDA," with specific activities being follow-up for the amelioration of farming systems in the 2 model irrigation districts (Ashaiman and Okyereko), the formulation of technical guidelines that will contribute to the betterment of farming, the formulation of strategic papers for the betterment of farming, and the implementation of training and workshops. Table 1-7 shows Japan's input for the implementation of these follow-up activities. The details of Ghana's input are virtually the same as the Main Phase.

The nationwide dissemination of irrigated farming techniques through the implementation of

Table 1-7 Input from the Japanese Side

Input item	Description
Dispatch of long-term experts	Chief advisor; coordinator / training; cultivation; farmers' organizations / farming
Dispatch of short-term experts	Total: 9 persons
Provision of machinery and equipment	Spare parts, etc., for equipment provided
Counterpart training in Japan	Total: 4 persons
Share of local costs	Approximately JPY 34 million

Source: Created by author

Table 1-8 Examples of the Achievements of the Follow-up Cooperation

<p>Formulation of technical guidelines</p> <p>Guidelines on irrigated farming techniques were formulated as a complete summary of Japan's previous technical cooperation. Its contents were comprised of water management for irrigation, the operation and maintenance of facilities, cultivation (paddy rice farming, and vegetables), agricultural machinery, and farming/farmers' organizations. The guidelines on irrigated farming techniques were the first of their kind, not only for GIDA, but for Ghana as well. The guidelines with many photos and charts were available to be used by site project managers and agricultural extension officers effectively for the guidance of farmers. 1,000 copies were printed, and they began to be used as training materials in the irrigation districts under GIDA's jurisdiction, and also small-scale irrigation districts overseen by regional administrations.</p> <p>Formulation and the subsequent implementation of strategic plans for the betterment of farming</p> <p>This strategic plan was formulated based on the achievements of "Farmer Participatory Workshops," which were held in all the 22 irrigation districts throughout Ghana. In the workshops, farmers themselves first confirmed needs and issues for the amelioration of farming, and then drew up necessary action plans (short-term and long-term). The action plans described "who should take action, and when and how they should take action." Through the process, great efforts were also made to overcome the adverse effects of a top-down approach which was a conventional development method, and to promote Ghana's irrigated agriculture from the bottom up. Each of the action plans was different in content, but most regions gave their purposes as strengthening their farmers' organizations, increasing the yields of their agricultural products, reducing their production costs, improving their farming techniques, and joint shipping. The action plans began to be implemented half a year into the follow-up cooperation, and many outcomes were achieved. These outcomes included an increase in farming-related revenues (some irrigation districts achieved a 2-fold year-on-year or more increase in revenues due to joint shipping and increased productivity), an increase in collection rates for irrigation service charges, and the revitalization of activities by farmers' organizations. The efforts for the advancement of irrigated agriculture using a bottom-up approach, through the formulation and implementation of these strategies, were the first ever taken in Ghana. The impact they imparted were not only technical in nature, but were also organizational and systematic.</p>

Source: Created by author

training and workshops was also one of the focuses of the follow-up cooperation. The total number of people participating in the training and workshops that were designed mainly for farmers from all the 22 irrigation districts nationwide reached approximately 5,500. Previously, farmers around the nation had barely had any chance to acquire skills and techniques, so the dissemination of technology through direct guidance had a great impact, and the increases of crop yields and other tangible achievements were attained. From the perspective of CD, the follow-up cooperation had significant effects on human resources development for all the irrigation districts (especially for farmers), the building of farmers' organizations, the formulation of technical guidelines and action plans for the betterment of farming,

and the creation of a nationwide framework for the advancement of irrigated agriculture through support for the implementation of those guidelines and action plans. In other words, we could also say that frameworks were built and some efforts were taken toward the overall goal of the project-type technical cooperation that began in 1997, namely to “improve farming systems for each irrigated agricultural district under the jurisdiction of GIDA.”

(5) “Project for Improving the Farmer Participatory Irrigation Management System” (New project from 2004 to 2006)

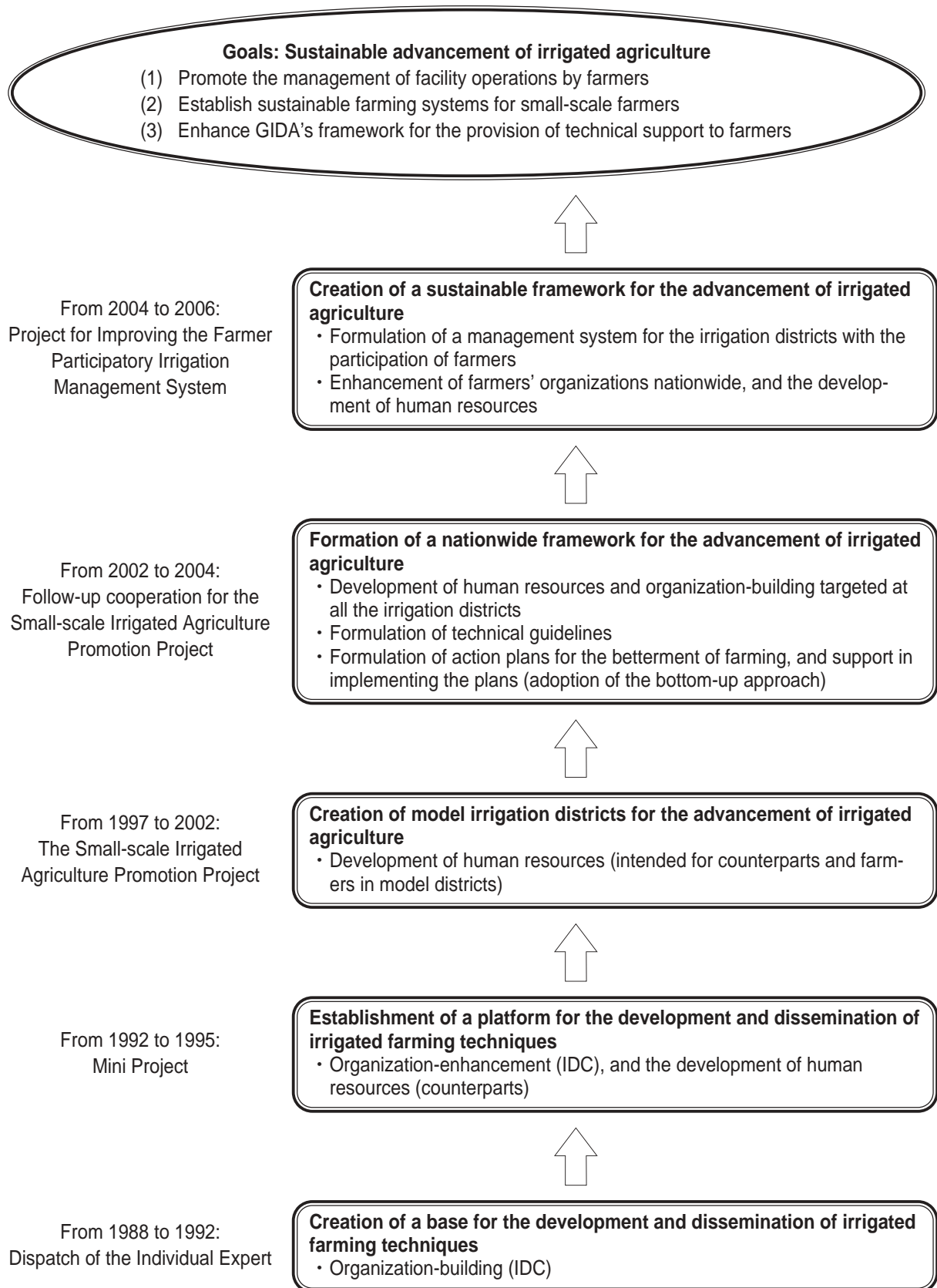
While activities were being expanded in all 22 irrigation districts across Ghana as part of follow-up cooperation for the “Small-scale Irrigated Agriculture Promotion Project,” relevant parties became aware of a significant issue related to Ghana’s irrigated agriculture. The issue was the “inadequacies of the management system of the irrigation districts.” As previously discussed, during the early 1990s, Ghana introduced the “Participatory Irrigation Management,” whereby farmers’ organizations would assume responsibility for the management of the facilities. However, since the system necessary to raise the efficiency of that management remained undeveloped, the responsibility for the management of the irrigation districts remained in limbo, and this caused a major factor for a decline and a slump in Ghana’s irrigated agriculture, as well as a lack of its sustainability. In other words, the concerned parties became aware of the problem that there were no actual frameworks aimed at the advancement of irrigated agriculture. It became evident that, without these frameworks, there would be no prospects of the sustainability or dissemination of achievements attained through the technical cooperation.

Following this sequence of events, it was decided to implement the “Project for Improving the Farmer Participatory Irrigation Management System” scheduled to start in 2004 and complete in 2 years. The project purposes are to “improve a framework for the implementation of the participatory irrigation management based on the new system,” and to “enhance the role in guidance for irrigated agriculture of GIDA.” Specifically, the activities being implemented include the formulation of a proposal for a system that includes the conclusion of an agreement document on the management of irrigation facilities between GIDA and individual farmers’ organizations throughout Ghana, training for farmers, and support for the implementation of action plans for the betterment of farming. Once again, from the perspective of CD, this new project is designed for technical cooperation for the development of systems, manpower and organizations for the sustainable advancement of irrigated agriculture (both manpower and organizations are targeted at farmers’ organizations in all the irrigation districts across Ghana).

(6) Summary

Figure 1-3 shows a summary of the changes in JICA’s cooperation that have been discussed thus far. If viewed from the present perspective, as demonstrated in Figure 1-3, we can see that, since 1988, Japan’s technical cooperation has provided constant support for Ghana toward the goal of the

Figure 1-3 Overview of the Transition in JICA's Efforts for Technical Cooperation



Source: Created by author

“sustained advancement of irrigated agriculture” in spite of the interruption of several years along the way. As a result of this support, a number of concrete outcomes have been delivered with regard to organization-building (technology development center, and farmers’ organizations) and human resource development (counterparts and farmers) that are essential for the advancement of irrigated agriculture. Furthermore, based on the outcomes of these cooperative efforts, further cooperation for “institution-building” is now being implemented to create a sustainable framework for irrigated agriculture. Nevertheless, questions remain as to whether the step-by-step progress of the cooperative efforts over the 16 years has progressed systematically from the very beginning, and as to whether there has been a different way to produce effects more effectively. Furthermore, although various experts have been involved, doubts remain whether their goals and approaches have been consistent, and what extent contexts have been maintained.

In Chapter 2, we will present a detailed analysis of goals and activities undertaken at each phase of technical cooperation, and that of actual approaches taken and their outcomes. We will then summarize this step-by-step flow of technical cooperation once more. Then, in the subsequent Chapter 3, we will analyze these issues in light of local circumstances.