

# Chapter 3 Information Technology (IT)-related Human Resources Development and the Utilization of IT in Various Fields

## 3-1 Outline of Evaluation Study

### (1) Background and Objectives

Prior to the adoption of the Okinawa Charter on Global Information Society at the Kyushu-Okinawa G8 Summit in July 2000, the Japanese government announced its Comprehensive Cooperation Package to Address the International Digital Divide. The four pillars in this comprehensive cooperation package are as follows.

- a. Contributing intellectually to policy and institution-building
- b. Developing and training human resources
- c. Building an information technology (IT) infrastructure and providing assistance for network establishment
- d. Promoting the use of IT in development assistance

JICA has so far implemented more than 60 IT-related cooperation projects in about 23 countries. Human resources development for IT that provides training at national research institutes and higher education institutes has been especially promoted in an active way. Recently JICA has promoted IT utilization in its cooperation projects in areas such as education, health and medical care, administration, poverty reduction, and the environment with an aim of enhancing the efficiency and effectiveness of these projects. Consequently, this evaluation study aims to extract lessons and measures to be considered when planning new projects in IT-related fields in the future.

### (2) Evaluation Study Period and Team

#### 1) Evaluation Study Period

October 2003 to March 2004

#### 2) Evaluation Study Team

The evaluation study was organized and supervised by the Office of Evaluation of JICA. The Office of Evaluation and the external consultants (UFJ Institute) conducted the actual study and prepared the report under evaluation policies developed by the Evaluation Study Committee consisting of JICA information technology task team, personnel concerned with evaluated projects, and the following two evaluation advisors.

#### Evaluation advisors

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### (3) Projects Subject to the Study

Taking into account the rapid and global spread of IT utilization, diversified forms of IT application, and advancement of IT in recent years, seven projects completed after 1997 were selected to study IT human development. As for the study of IT utilization in various fields, five projects were selected with specific possibilities of IT application in the four areas of education, health and medical care, poverty reduction, and the environment, all of which are priority areas of ODA (Table 3-18 and 3-19).

## 3-2 Framework of the Study

### (1) Viewpoints in Evaluation

Evaluation questions for IT human development and IT utilization in various fields were as follows.

- a. IT human development  
What approaches were used in JICA's cooperation for IT human development in the past, and how did they contribute?
- b. IT application in various fields  
What are the possibilities for IT utilization to improve efficiency and effectiveness of cooperation projects and what needs to be considered?

### (2) Evaluation Methods and Limitation

Reviews of project-related documents, interviews, and questionnaire surveys with relevant individuals were adopted. As for the seven projects for IT human development, questionnaire surveys were conducted on implementing bodies of the partner countries (Questionnaire surveys were not conducted on the projects for IT utilization because insufficient time had passed after the completion of cooperation). Since field studies were not conducted, there is a limitation to the evaluation study regarding the amount of information and viewpoints obtained from the field.

**Table 3-18** Target Projects for IT Human Development

	Project Title	Period	Country/Region
1	The Research Center for Communication and Information Technology (ReCCIT), King Mongkut's Institute of Technology, Ladkrabang (KMITL)	1997. 1 -2002. 9	Thailand
2	The Computer Software Technology Training Center of SSTC	1993.11 -1998.11	China
3	Software Development Institute	1995. 1 -1999.12	Philippines
4	Information Technology Training	1997. 3 -2002. 3	Viet Nam
5	AI System Development Laboratory	1995. 3 -2000. 3	Malaysia
6	Information Technology Upgrading Project	1999.12 -2002.11	Jordan
7	Polish-Japanese Institute of Computer Techniques Project	1996. 3 - 2001. 3	Poland

**Table 3-19** Target Projects for IT Utilization in Various Fields

	Field	Project Title	Period	Country/Region
1	Education	Information and Communication Technologies (ICTs) Capacity Building at the University of the South Pacific	2002. 7 -2005. 6	The South Pacific Region
2	Health and medical care	Project for Improvement of the Maternal and Child Health In-Service Training System and Programs	1997. 6 -2002. 5	Ghana
3	Poverty reduction	The Project on Strengthening Sulawesi Rural Community Development to Support Poverty Alleviation Programs	1997. 3 -2002. 2	Indonesia
4	Environment	The Forest Fire Prevention Management Project (Phase 1)	1996. 4 -2001. 4	Indonesia
		The Forest Fire Prevention Management Project (Phase 2)	2001. 4 -2006. 4	Indonesia

### 3-3 Evaluation Results: IT-related Human Resources Development

#### (1) Summary and Classification of Projects

##### 1) Classification by Recipients and the Nature of Cooperation

Looking at the seven projects, there are primarily two approaches in JICA's cooperation for IT human development. One is in the area of developing academic capacity to upgrade course programs in schools and the level of research in laboratories, which targets undergraduate and graduate schools in IT. The other is in the area of developing IT professionals who will play an active role in the industry. In the approach to IT professionals, technologies in training management are transferred to the counterparts by setting training institutions as implementing bodies. Then, in order to disseminate the effects of the projects throughout the country, IT professional training is usually offered to external professionals.

##### 2) Conditions after the Completion of Cooperation

Each project was assessed as having achieved certain outcomes. In projects for strengthening the capacity to manage training, more effective results were obtained from the projects that extensively contain activities for establishing the recognition of training institutions, collaborating with other organizations, reviewing course content in response to post-course student questionnaires, and emphasizing development of instructors.

#### (2) Contributing and Inhibiting Factors of Projects and Lessons Learned

##### 1) Analysis by Contents and Development Stages

In some cases, isolated problems result from a lack of information gathered through preparatory studies and an inflexibility in coping with rapid changes in needs, which are unique attributes to the IT area. Preparatory studies (currently renamed ex-ante evaluations) are conducted several times before a project starts; however, most studies are too short to precisely grasp the local needs. Also, due to the rapid pace of change in the IT environment, it is believed important to secure and develop human resources with a full knowledge of local needs. Although some requested technologies are new at the time of preparatory study, they may be obsolete by the time the project starts a year later. Developing countries sometimes request advanced themes even though they have no receiving capacity. Therefore, it is necessary to select technologies and themes that are applicable and potentially useful for the next several years, fully reflecting the needs of partner countries.

Furthermore, when considering the rapid changes in the IT field, it is necessary to formulate and implement projects from broad perspectives and with a practical and strategic approach. Specifically, such perspectives include formulating flexible project plans, dealing with the obsolescence of equipment, capacity building to empower counterparts and implementing bodies to implement research and training on their own after the completion of cooperation, and distinguishing the cooperation projects undertaken by the public sector from IT training undertaken by the private sector so

that duplication of public and private efforts would be avoided (e.g., issuing widely acknowledged certificates, or targeting specific customers by selecting training participants from mainly public servants).

## 2) Equipment and Budget

Similar problems are found in each project concerning procurement, selection, and allocation of equipment. Given the fact that technological innovation in the IT field is rapid in terms of both hardware and software, it is important to supply equipment on a step-by-step basis by keeping the procurement of equipment to a minimum in the initial year and then introducing the rest starting in the second year. For example, it would be effective to set up model standards for the introduction of equipment and apply them in line with the implemented projects.

It is generally said that both hardware and software need to be updated at least once every three years, although it is largely a matter of the purpose of use and conditions in the partner country. Therefore, it is necessary to establish a management system by taking into account software updates and hardware maintenance when formulating projects for IT human development. Also, in order to secure sustainability, a project needs to incorporate a mechanism that allows the counterpart to deal with the update of equipment after completion of cooperation.

## 3) Human Resources

In projects for IT human development, demand and supply of IT experts are not balanced, therefore it is difficult for professionals from Japan with advanced skills to serve as long-term experts overseas. Also, changes in the IT field occur at a considerably fast pace and diversification has further advanced, thus making it impossible for one professional to cover all issues. In response, the number of long-term experts have recently been minimized and more projects employ short-term experts who are well informed in new technologies. It is necessary to fully examine individual cases to gain an insight as to how human resources should be allocated to achieve balance and effectiveness.

## 4) Creating and Sharing Knowledge through Projects (Knowledge Management)

One of the characteristics of projects for IT human development is the turnover in local professionals, as often seen in the area of developing IT professionals. Turnover in personnel means a loss of the knowledge and know-how that was cultivated in the cooperation project. Training programs are basically and easily digitized in many projects for IT human development. It is desirable to periodically digitize the contents of knowledge acquired in education so that knowledge or know-how accumulated thus far by the counterpart can be trans-

ferred to other personnel within the organization or to a new counterpart if the counterpart leaves the job.

However, there are some problems associated with implementing such knowledge management. Digitized teaching materials developed during the project can be easily proliferated outside the implementing body. In considering copyright protection, some organizations are reluctant to digitize teaching materials and other outputs of the project. It is, therefore, necessary to make clear agreements and policies regarding the digitization of teaching materials and other outputs as well as the ownership of copyrights. As IT quickly changes, the knowledge and know-how required in developing countries and international cooperation projects needs to change. Those efforts on knowledge management not only promote information sharing, but can also become a platform on which they can create new community know-how.

In the meantime, management of IT projects requires broad knowledge and information gathering capacity, covering everything from hardware aspects such as procurement and installation of equipment to software aspects that change rapidly. These are attributes that are different from projects in other areas. However, in reality, Japanese personnel involved with the projects are stationed in developing countries where information gathering and communication with Japan are hindered, and they are prone to fall into information isolation. Therefore, in order to smoothly promote IT projects, JICA-Net is expected to be utilized actively as a means of sharing knowledge and disseminating improved methods.

## 3-4 Evaluation Results: IT Utilization in Various Fields

### (1) Projects Subject to Evaluation

#### 1) Education: Information and Communication Technologies Capacity Building at the University of the South Pacific

The University of the South Pacific (USP) is a higher edu-



Ground station of USP-Net (Information and Communication Technologies Capacity Building at the University of the South Pacific)

education institution co-founded by 12 small island countries in the South Pacific region in 1969. The USP provides distance learning courses to students in the region with consideration given to geographic conditions, and 45% of 9,000 enrolled students take classes from remote locations. A distance learning network through satellite communications called the USP-Net was constructed with Japan's grant aid in cooperation with Australia and New Zealand in 1998. However, due to a lack of technical skills and experience, it was difficult for them to develop high quality distance learning course content using multimedia technology. Also, for social and economic development in the South-Pacific region, human resources development and promotion of research and development in the area of information and communication technology are important. Accordingly, cooperation is under way in the areas of (1) computer science, (2) distance education, and (3) research and training in IT for the social and economic development.

## 2) Health and Medical Care: Project for Improvement of the Maternal and Child Health In-Service Training System and Programs in Ghana

The purpose of this project is to develop human resources by developing and introducing a system that effectively implements in-service training for health and medical care professionals in Ghana. Health and medical care staff need to acquire new skills and knowledge on a continuing basis; however, information on in-service training was not thoroughly spread to all the people, and training records were not kept and managed in a uniform manner. Although many training materials had been developed, such efforts failed to deliver sufficient results due to the unsystemized training materials and poor management of training registration and recording system. In view of these factors, in-service training (IST) was developed in three focus regions to establish system components (information system, classification of training courses, development of training logbook, and monitoring and evaluation), issue training logbooks, classify training courses, and construct regional training centers.

## 3) Poverty Reduction: Project on Strengthening Sulawesi Rural Community Development to Support Poverty Alleviation Programs in Indonesia

Under this project, the provincial PMD (Pembangunan Masyarakat Desa, or village development bureau) of South Sulawesi Province and the district PMD (prefecture development bureau) of Takalar District were designated as JICA's counterpart entities. The purpose of this project was to enhance the planning and management capacity of participatory community development programs, including programs to alleviate poverty. The main activities included raising the social capacity building of the community of the targeted four

villages, establishing administrative systems to promote participatory development, and training people related to community development to achieve development administration based on the needs of the community. In this project, a tool called Desa Maju was introduced as an information interface to provide the community with easy access to living-related information, including agriculture, fishery, health and medical care. IT was also used to transmit voice data via telephone lines from the server to public phones or special terminals. This provided the community with a variety of means and more opportunities to access useful information outside the village. The residents are now able to compare their lives with those outside their villages, marking the first step toward improving their own livelihood.

## 4) Environment: Forest Fire Prevention Management Project, Phase 1 and 2 in Indonesia

Every four or five years, forests in Indonesia are damaged by uncontrolled fires during the dry season. Smoke from forest fires reaches neighboring countries, affecting flight schedules and causing health problems, and has become an international concern. Indonesia had to take immediate action to control forest fires. In response, in phase 1 of the project, JICA provided cooperation to improve management methods and promptly respond to forest fires at the central level as well as methods to prevent forest fire and extinguish incipient fire at the regional level. In phase 2, which is currently under way, forest fire prevention and incipient fire fighting measures are promoted to conserve national parks (four designated national parks), using the techniques developed in phase 1. The purpose of this project is to upgrade the capacity to extinguish incipient fire on the scene and prevent forest fires. It employs methods that can be easily implemented, sustained, and disseminated using Indonesian resources.

In this project, satellite data received directly from the NOAA, a US artificial satellite, is analyzed to detect a hot spot. Then necessary warning information, consisting of image data, information on latitude and longitude, the conditions of haze (fog, mist, smoke), and others, are provided to the Ministry of Forest as well as related organizations inside and outside of Indonesia.

## (2) Lessons Learned on IT Utilization from the Projects for IT Utilization in Various Fields

### 1) Lessons Learned from Each Project

This evaluation study chose one project each from the four fields of education, health and medical care, poverty reduction, and the environment. The lessons learned from each project are shown in Table 3-20. The results of the study extracted the following points to be considered for implementing more effective and efficient projects utilizing IT.

In the USP project in Fiji, it was pointed out that it is nec-



essary to establish a mechanism to minimize turnover in staff that's in charge of developing teaching materials for distance education in order to enable users (students) to study on their own. The frequency of updating information was an issue rather than the appropriateness of IT as a means of acquiring information in the Project on Strengthening Sulawesi Rural Community Development to Support Poverty Alleviation Programs in Indonesia. From these two projects, it was found important to establish a support system from a perspective of what the user wants. On the other hand, from the Project for Improvement of the Maternal and Child Health In-Service Training System and Program in Ghana and the Forest Fire Prevention Management Project in the Republic of Indonesia, the importance of establishing a system to convey information from one person to another or from one organization to another was recognized. In addition, the Forest Fire Prevention Management Project in the Republic of Indonesia posed a question as to what to convey, and the importance was emphasized of fostering the ability to make strategic decisions needed to select appropriate information.

Thus, based on the reports of the projects, establishing a support system to fulfill the needs of users, constructing a framework to convey information, and acquiring judgment to make decisions toward achieving their goals based on the information gathered were confirmed as the conditions for effective utilization of IT.

## 2) Need for System Design that Clarifies the Role of IT

In order to promote effective IT utilization in various JICA projects, it is important to clarify the position of IT utilization and design a system that includes a management system for post introduction. Since points of concern at the time of IT installation differ from project to project and affect project activities, it is desirable for IT staff who can deal with

these operations to participate in the projects from the formulation to the implementation stages of projects.

## 3-5 IT-related Human Resources Development and IT Utilization in Various Fields: Prospects from Both Viewpoints

IT professionals nurtured by the IT human development projects undertake operations while promoting IT utilization in various fields of each country. What might be useful as a means of connecting IT human development projects and projects for IT utilization is strategic knowledge management. This method forms two networks: a network for human development targeting various levels (vertical network), and a network of IT utilization in various fields (horizontal network). With these networks, the outcomes obtained from IT human development projects will be shared and utilized by projects for IT utilization. Then, its outcomes will be introduced and fed back as new applications of IT in human development projects. The quality and contents of IT human development projects are upgraded, and this should occur continuously so as to put in motion a positive cycle. Here, new knowledge is created that goes beyond the mere sharing of information and knowledge. The second viewpoint is that the international or regional dissemination developed from collaboration of individual projects. Collaboration within one country will expand to other countries in the region through the sharing of information and knowledge. South-South cooperation such as Third Country Training is a good example.

IT human development projects and projects for IT utilization will expand in a spiral manner through this strategic collaboration in two directions: upgrading content and geographical dissemination. This sense of purpose is important for developing and utilizing JICA's knowledge management.

**Table 3-20** Lessons Learned from Each Project

Field	Lessons for Overall Project	Lessons for the Utilization of IT
Education: USP	It is important to promote the development of teaching materials for distance education.	1) It is necessary to establish a mechanism to minimize turnover of IT staff. 2) It is necessary to create a knowledge management system within the organization. 3) It is necessary to abolish regulations on the network's intersystem control.
Health and medical care: Ghana	It is important to create incentives for utilization of systems, such as the requirement of participation in training to get promotion.	It is important to establish a system to transmit information as a prerequisite for the utilization of IT.
Poverty reduction: Sulawesi	It is important to have easy access to information for sustainable community development.	It is important to develop human resources who can update information frequently and appropriately.
Environment: Forest Fire Prevention	It is necessary to coordinate fire-fighting activities, from discovery to extinction.	It is important to build capacity to analyze collected data as a prerequisite for the utilization of IT.

# Chapter 4 Water and Poverty in Africa

## 4-1 Outline of Evaluation Study

### (1) Background and Objectives

Japan has given top priority to the water sector in providing poverty control measures to address basic human needs (BHN), improve living and hygiene conditions, and generate livelihoods in African countries. Japan has implemented 1,347 projects\* in the water sector since 1974 (at the time of this evaluation study), accounting for about one third of all the projects provided under Japan's ODA. The volume of input from Japan's ODA to the water sector in Africa is large, and the effectiveness and impact that Japan has achieved in the sector are substantial as seen by the number of beneficiaries and implementation systems of projects that focus on sustainability.

In response to global trends, Japan's cooperation in the water sector focuses on integrated water resources management for sustainable development. This is an integrated approach that includes not only hardware assistance but also software assistance such as forming and strengthening water committees, organizational building, enlightening the community, and sanitary education. It is now being applied in Africa. This is expected to bring about the establishment of a sustainable system of water resources development as well as water supply and management systems in the target areas.

JICA launched a thematic evaluation on water and poverty in Africa in October 2002. The evaluation was conducted in preparation for two important international conventions scheduled for 2003 in Japan, the World Water Forum and TICAD III, in order to evaluate their challenges and performance in the water sector in Africa and clarify specific measures for effectively and efficiently supporting sustainable development in the water sector.

The objectives of the evaluation study are to verify the effectiveness of the integrated approach, which consists of several projects and activities, and obtain lessons and recommendations that can be useful for planning and designing similar future projects in the same sector through evaluation of JICA's past projects in the water supply sector targeting the

poverty group in Africa.

### (2) Evaluation Study Period and Team

#### 1) Evaluation Study Period

The study was conducted from October 2002 to March 2003. As part of the study, field surveys were conducted in Zambia and Zimbabwe in November and December 2002.

#### 2) Evaluation Study Team

The evaluation study was entrusted to KRI International Corp.

### (3) Projects Subject to the Study

Zambia and Zimbabwe were selected as the target countries for the study since both countries are located in a highly impoverished area of Sub-Saharan Africa and face various development issues in the water and related sectors, including serious water shortages, difficult supply of safe water, the spread of infectious diseases such as HIV/AIDS and malaria, and limited access to primary education.

In Zimbabwe, the Project for Rural Water Supply in Binga District (grant aid) was targeted in the study (Table 3-21).

In Zambia, three projects, the Water Supply Project in the Satellite Area of Lusaka, the Lusaka District Primary Health Care Project, and the George Community Empowerment Program, were considered as one program and targeted in the study (Table 3-22).

## 4-2 Framework of the Study

### (1) Evaluation Questions

The following evaluation questions and sub-questions were asked to verify the effectiveness of the integrated approach.

#### 1) Evaluation Questions

Is the integrated approach effective for projects regarding sustainable and safe water supply that target the poverty group? Also, how much impact does it have on improving the living conditions of the poverty group in terms of effect

Table 3-21 Target Projects in Zimbabwe

Project for Rural Water Supply in Binga District (Phase 1)	1997-1998	560 million yen	Binga District in Metabeleland North	<ul style="list-style-type: none"><li>• Procurement of borehole drilling equipment (1 set)</li><li>• Construction of 5 borehole water supply facilities</li><li>• Formation of 5 water point committees</li></ul>
Project for Rural Water Supply in Binga District (Phase 2)	1998-1999	170 million yen	Binga District in Metabeleland North	<ul style="list-style-type: none"><li>• Construction of 25 borehole water supply facilities</li><li>• Formation of 25 water point committees</li></ul>

\*This number includes Development Studies, Project-type Technical Cooperation, and Grant Aid.

**Table 3-22** Target Projects in Zambia

Title	Cooperation scheme	Period	Target area	Project summary	Links with other projects
<b>a. Water Supply Project in the Satellite Area of Lusaka</b>	Grant Aid	B/D 1993.3-1993.10 Implementation 1994.4-2000.3	George Compound	Construction of piped water system with ground water as the water source in order to supply safe water in a sustainable manner to the target area where water born diseases such as cholera were prevalent.	The establishment of an operation and management system for the water supply program was implemented in cooperation with CARE, an NGO that was then operating in the area funded by DfID.
<b>b. Lusaka District Primary Health Care Project</b>	Project-type Technical Cooperation	R/D 1997.2 Implementation 1997.3-2002.3	Lusaka District (a pilot project was implemented in George Proper, a part of George Compound)	To improve the PHC management system in Lusaka District, activities such as promoting community-based PHC activities, strengthening referral systems, and promoting school health activities were carried out. The second phase of the project started in July 2002.	George Compound, where the water supply system was provided by the above project, was selected as the pilot area for the community-based PHC activities. Activities such as improvement of safe water usage and sanitary conditions, and growth monitoring of children were carried out with the participation of community groups.
<b>c. George Community Empowerment Program</b>	Community Empowerment Program	1999.10-2003.1	George Compound	For sustainable operation and maintenance of the above water supply system under the partnership of Lusaka City Council, Lusaka Water and Sewage Company, and area-based community groups, capacity building of these organizations and improvement of management system were carried out.	George Compound, where the water supply system was provided by the first project, was selected as the above project. For health education, coordination was carried out concerning its approach with the above PHC project.

and efficiency compared to the traditional sector-wide approach?

**2) Sub-questions**

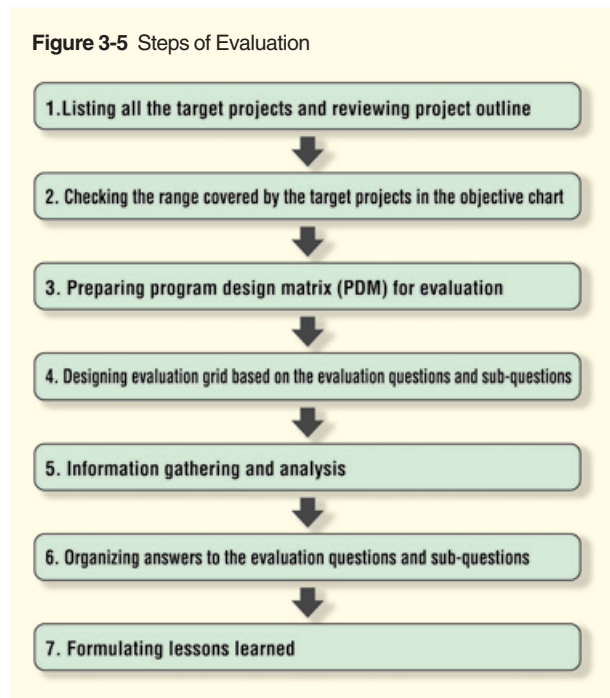
a. What kinds of approaches are effective in efficiently and effectively providing sustainable and safe water supply for the poverty group in the Sub-Saharan Africa?

b. What kinds of approaches, with the establishment of the water supply sector and sustainable management system as the entry point for community development, are effective in increasing not only the direct impact of safe water supply but also impacts that eventually lead to the achievement of overall goals, such as improvements in living conditions for the poverty group and poverty reduction?

c. What social and economic conditions are required from the government of a partner country and community for an integrated approach to be effective for the poverty group in African countries?

**(2) Evaluation Methods**

The steps of evaluation used in the study are shown in Figure 3-5.

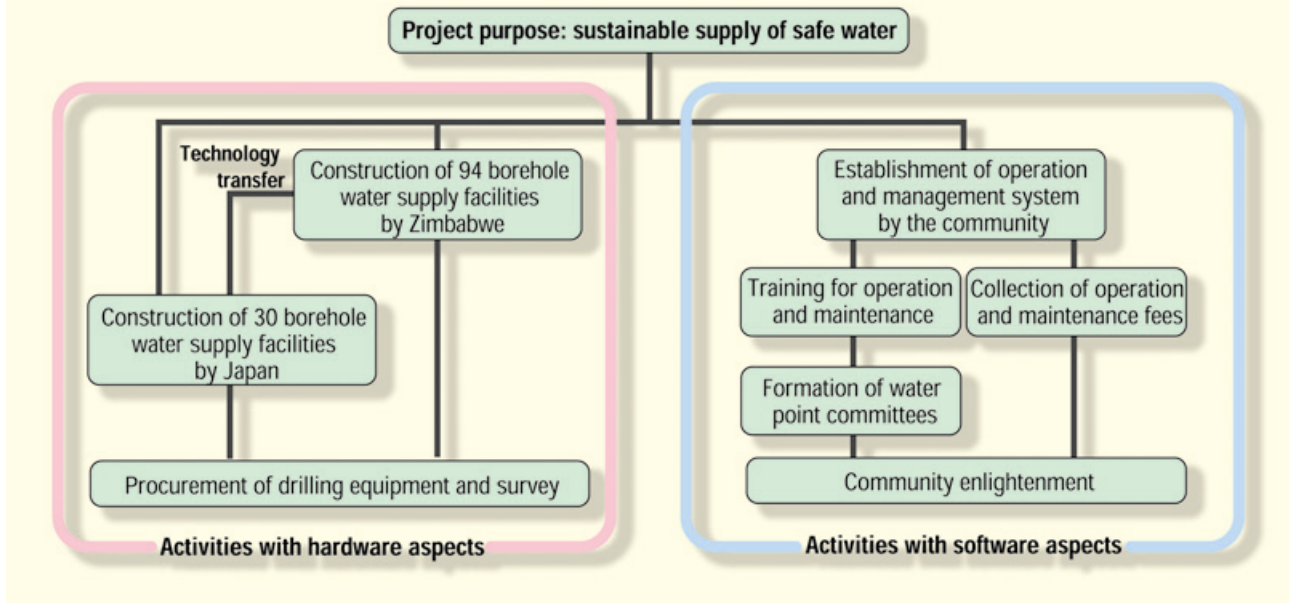


**4-3 Evaluation Results by Country**

**(1) Zimbabwe**

**1) Cooperation Outline**

Development in the water sector in Zimbabwe has proceeded under a decentralization policy. The Ministry of Local Government and National Housing and the Ministry of Local Resources and Water Development have promoted sanitation education and water supply in rural areas for over 10 years. The Integrated Rural Water Supply and Sanitation Program (IRWWSP) has been implemented since 1987, and

**Figure 3-6** Relation between the Purpose and Major Activities in the Project for Rural Water Supply in Binga District

in 2002, the water coverage rate in rural areas increased from an initial 25% to 80%. However, it is expected that the coverage rate may have decreased recently due to an increase in the number of areas in need of water supply facilities under the resettlement program. Under these circumstances, by carrying out environmental conservation, including water supply and sanitary environment, as the priority field for aid, Japan has provided support to secure water resources in the rural and urban areas.

The Project for Rural Water Supply in Binga District is the only project that Japan has implemented in the water supply sector since 1996. The project purpose was a sustainable supply of safe drinking water in the target communities. The target group was 84,000 villagers living in 12 of the Binga District's 21 wards who needed urgent assistance.

This project included awareness campaigns for community members and the formation of water point committees for operation and maintenance of water facilities (software activities) that were carried out in parallel with the procurement of necessary equipment and materials, as well as the construction of borehole water supply facilities using hand pumps (hardware activities) (Figure 3-6). These software activities were sub-contracted to Save the Children Fund (SCF), a British NGO with experience in the field of water supply in Binga District, and they implemented their tasks for about 40 communities, including those for whom water supply facilities were constructed using Japan's aid. The study team decided to evaluate this project as an integrated approach in the water sector that combines hardware activities represented by the construction of water supply facilities with software activities represented by community enlightenment and organiza-

tion building.

## 2) Impact on Poverty Reduction and Sustainability in the Water Supply Project (Impact and Sustainability)

In terms of impact on poverty reduction, the biggest contribution of the project was an increase in the number of villagers with access to safe water through the construction of borehole water supply facilities. According to the results of a questionnaire survey, the percentage of borehole users increased sharply from 10.6% to 73.8% over five years in the sample villages where boreholes were constructed.

The respondents who used a borehole as a water source were compared with those who used other water sources. As shown in Table 3-23, the percentages of respondents who stated that diarrhea, eye disease, and skin disease had decreased over five years were 72.8%, 65.6%, and 84%, respectively, among borehole users, whereas they were 29.3%, 41.3%, and 56% among non-borehole users; the percentages of borehole users were higher than those of non-borehole users as a whole (Figure 3-23). In particular, a significant difference in the incidence of diarrhea was observed. It may be concluded that the incidence of water-borne dis-

**Table 3-23** Incidence of Water-borne Diseases (Comparison with 5 years ago)

Disease	Borehole users (n=125)		Non-borehole users (n=75)	
	Decreased		Decreased	
	No. of people	%	No. of people	%
<b>Diarrhea</b>	91	72.8	22	29.3
<b>Eye disease</b>	82	65.6	31	41.3
<b>Skin disease</b>	105	84.0	42	56.0

JICA Study Team (November 2002)





A borehole water supply system using a hand pump, which was constructed under the project (Project for Rural Water Supply in Binga District in Zimbabwe)

eases decreased among borehole users.

Although sanitation practices improved over the five years, including encouraged hand washing and improved ways of water storage, no significant difference was observed between villages with borehole construction and those without it; it hasn't been determined if the project contributed to this difference. Fetching water is normally a task for women and girls in Binga. Although the number of borehole users increased from 18 to 125 over five years, only 52 respondents, which comprised one third of the borehole users, noted a reduction in time spent fetching water. Construction of boreholes does not necessarily reduce the time needed for fetching water as it depends on the location of the water source from the house, and some may prefer going to borehole, even when the distance is far, in order to draw safe water.

In summary, it was confirmed that access to safe water improved in the villages where boreholes were constructed in the project and the incidence of water-borne diseases decreased among borehole users. However, other impacts on the living conditions in the target communities were not identified in this study.

On the other hand, in terms of sustainability of the water supply project, some borehole water supply facilities were not in use due to a breakdown at the time of the evaluation study. During the construction of a borehole, the water point committee was advised to collect maintenance fees from users in preparation for future breakdowns. Many committees subject to the field survey did collect some fees and saved them in fund for a period of time; however, at present none of the water point committees collect fees from users. This is due to serious economic conditions brought on by the severe drought in the area and the high inflation rate, which has exceeded 170% annually.

During the implementation stage, activities such as community enlightenment and formation of water point committees for operation and maintenance of the facilities were sub-

contracted to SCF, an NGO that had many years of experience in the water sector in the area. Out of 10 borehole water supply facilities visited by the study team, eight had water point committees. In summary, it is said that although a water point committee was formed at each facility, operation and maintenance systems capable of coping with possible future breakdowns have yet to be established. The reasons may be attributed to: (1) the fact that the members were not fully trained in operation and maintenance due to time constraints; (2) no follow-up was provided by SCF or the Rural District Council; (3) many residents did not fully understand the practice of community-based operation and maintenance; and (4) the Rural District Council did not have an appropriate system to support the community.

## (2) Zambia

### 1) Cooperation Outline

Zambia's urbanization rate of 43.6% is higher than other Sub-Saharan African countries. Areas demonstrating rapid population increase are unplanned settlements where infrastructure remains undeveloped. There are 33 unplanned settlements in Lusaka, whose population accounts for more than 60% of the city's total population. In these unplanned compounds, access to public services was limited, resulting in poor sanitary conditions.

Under these circumstances, the government of Japan specified cost-effective health and medical services as a priority issue for assistance in Zambia. Accordingly, several projects in the water supply sector were implemented in the peri-urban areas of Lusaka, where the population consists mainly of low-income people.

A synergy effect was sought from three projects that were implemented in George Compound surrounding Lusaka by coordinating activities throughout the process of planning and implementation; namely, the Water Supply Project in the Satellite Area of Lusaka, the George Community Empowerment Program, and the Lusaka District Primary Health Care Project. In other words, the PHC pilot project and the George Community Empowerment Program were implemented for the purpose of sustaining the benefits provided by the construction of water supply facilities with grant aid. These three projects can be grouped together as an integrated approach for safe water supply called the Program for Improvement of Living Conditions.

Under the Program for Improvement of Living Conditions, grant aid (construction of facilities), the George Community Empowerment Program, and part of PHC project were all provided to achieve safe water use in the George Compound. Improvement of health and hygiene conditions was the goal in combination with the rest of the activities in the PHC project, such as improving the living environment and improving health and hygiene services (Figure 3-7).

The main activities of these three projects are as follows.

a. Water Supply Project in the Satellite Area of Lusaka (Water Supply Project)

The project purpose was to achieve a stable supply of safe water for the residents in the target communities. Specifically, in order to supply safe water in a stable way in George Compound, where residents suffer from many water-borne diseases such as cholera, the project divided George Compound into eight service areas and constructed a piped water supply system with a borehole as a water source in each area. In parallel, operation and maintenance systems were established by setting up the George Main Division as a management body and facilitating participatory operation and maintenance by user communities at the public tap level. Also training in hygiene education was conducted to improve awareness of users. The main activities included: (1) assistance and guidance to the Lusaka Water and Sewage Company (LWSC) for improving the operation and maintenance system; (2) planning for the organizational management of the George Main Division that provides water supply services along with LWSC; and (3) advice and training for staff in the office. In addition, the project conducted socio-economic surveys at the household level and promoted enlightenment activities together with the staff members of the Lusaka City Council (LCC), who were loaned to the George

Main Division.

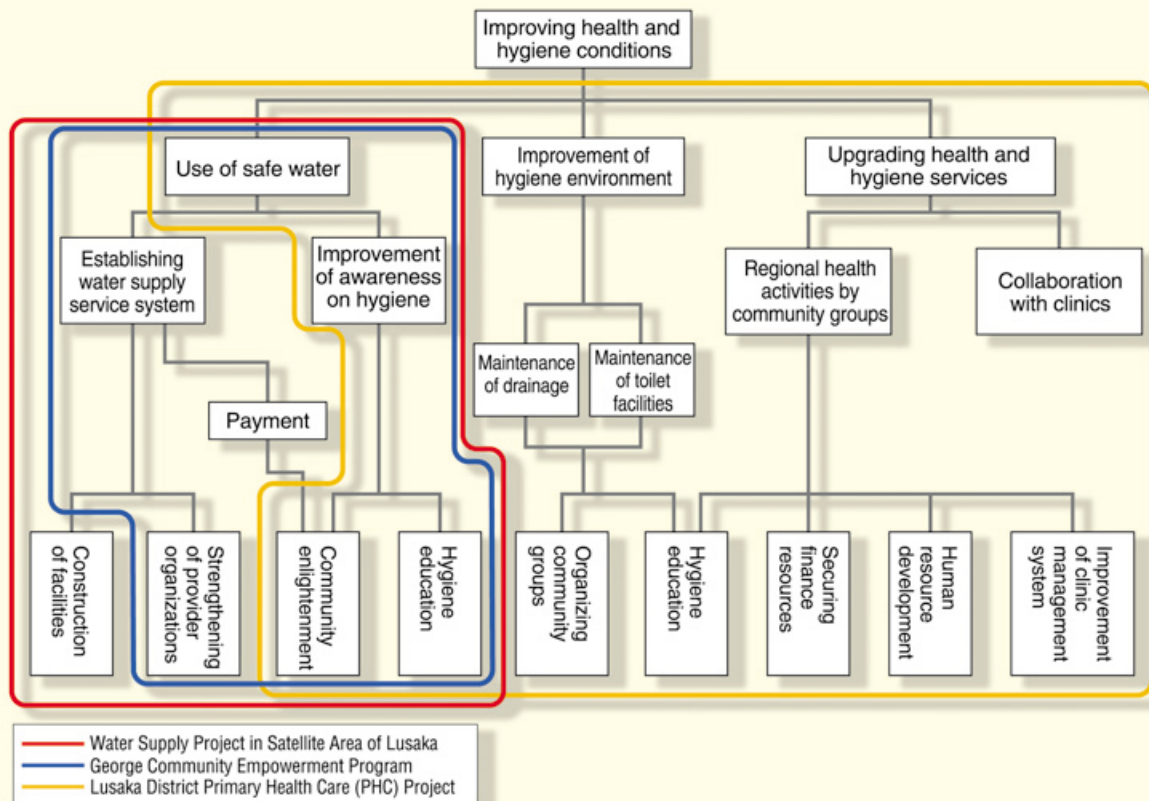
Activities for building an operation and maintenance system for water supply services were carried out in collaboration with CARE, an NGO that was financially supported by DfID.

b. Lusaka District Primary Health Care Project (PHC Project)

In order to improve the PHC management system of the Lusaka Regional Health Care Control Team, a pilot project for improving community-based PHC services as well as activities for strengthening the referral system (introduction of an appropriate medical institution according to level and nature of the sickness or injury) and promoting school health were carried out in collaboration with a Japanese NGO (AMDA). The project purpose was to improve the PHC management system in Lusaka District in line with Zambia's health care reform policy and strategy.

In addition, as a water supply facility was constructed with grant aid, the promotion of safe water use and sanitation education was expected to bring about a synergy effect in improving health and hygiene. Accordingly, the pilot project for improving community-based PHC activities was implemented in George Compound. This pilot project involved a community organization in promoting proper use of safe water and improving the hygiene environment. It incorporated PHC activities with regard to child growth.

Figure 3-7 Goal and Activities of the Integrated Approach for Safe Water Use in George Compound, Lusaka





Public water taps in the George Compound (The Program for Improvement of Living Conditions in Zambia)

### c. George Community Empowerment Program (GCEP)

The purpose of this project was to improve the management of water supply services and its usage based on a partnership among the LCC, LWSC, and area-based organizations (ABO). Prior to the project, activities for building an operation and maintenance system was carried out in collaboration with the NGO as part of the aforementioned Water Supply Project. This project started three months before the completion of the grant aid project in succession of the activities. Specifically, with the aim of continuously operating and utilizing the water facilities constructed in the grant aid project under the partnership among LCC, LWSC and ABO, activities for strengthening related organizations and capacity building, as well as improving the management system for water supply services, were undertaken.

Planning of the project involved primarily LWSC, as well as LCC, consultants, and CARE, which took charge of activities in the scheme of the Community Empowerment Program. An approach to sanitation education was applied after it was coordinated with the above-mentioned PHC pilot project.

## 2) Impact on Poverty Reduction and Sustainability in the Water Supply Project (Impact and Sustainability)

As the construction of water supply facilities in the entire George Compound was completed, illegal connections to the old pipes decreased and the use of public water taps significantly increased. Most of the residents in the target communities have used the installed water taps as their main water source and have acknowledged the improved quality of the water. Consequently, it can be concluded that steady outcomes have emerged toward the improvement of safe water usage conditions. In terms of the overall goal of the program, namely, improvement of health and hygiene conditions, through enhanced understanding of adequate hygiene practices and utilization of water from a public tap, the program achieved some impact, as demonstrated by a decrease in the incidence of water-borne diseases. Specifically, awareness of sanitation has improved among residents as shown by

increased hand washing practices using soap, and many residents observed the decrease in the incidence of diarrhea and cholera. The incidence of cholera, especially, decreased drastically from 70 cases per 10,000 in 1994 to one case per 10,000 in 2000.

On the other hand, as far as sustainability of the water supply project is concerned, user fees covered the operation and maintenance expenses for water supply services, including labor costs, running costs for the facilities, and maintenance costs such as pipe repairs, and the independent financial management of the George Main Division of LWSC was maintained. The rate of user fee payment has been slowly rising since commencement of the GCEP in every service area. While it was 55% at the outset, it has stayed around 70% on average since 2001. A sustainable operation has become financially possible.

The service management is based on a partnership agreement between the George Main Division of LWSC and the George Water Committee, which represent the community. A collaboration relationship has been formed between the service provider and the community group. The George Main Division is responsible for customer services, including user registration and complaint procedures, as well as the financial and technical management of the entire scheme. On the other hand, the George Water Committee supervises tap leaders selected from the communities to take care of public taps in terms of opening and closing taps, and also promotes community enlightenment. Both parties hold discussions on issues in water usage and operation and maintenance of water supply services, if necessary.

## 4-4 Evaluation Results

Based on the above analysis by country, the evaluation results are summarized below from the standpoints of the sub-questions explained in 4-2 (1).

### 1) Sub-question a.

#### What kinds of approaches are effective in efficiently and effectively providing sustainable and safe water supply for the poverty group in the Sub-Saharan Africa?

If a project requires advanced skills that cannot be easily acquired at the local technical level, introduces a high maintenance facility that requires time and money, and proposes water management organizations that impose a large load on the community, sustainability cannot be secured. To begin with, water issues in the target area, structure of the poverty, and the relation between the community and water should be understood. It is important to discuss thoroughly with the community in advance what kind of water problems they have; what kind of water supply facility is needed to solve those problems; what kind of system is needed to operate



and maintain the facility; and what improvements should be expected from a water supply project so that a plan can be made in line with local situations and needs. Based on the cases in Zimbabwe and Zambia, it is believed that activities for organizing the community groups, such as community enlightenment, and technical guidance on operation and maintenance, are all indispensable to bring about a sustainable project.

In order to establish a sustainable water supply system using limited locally available resources among the poor in Africa, an integrated approach comprised of basic activities and input with a focus on the establishment of a water supply system should be effective. Such an integrated approach is expected to include the following activities.

- A preliminary study to identify not only engineering aspects but also software aspects such as the socioeconomic context, water problems, and the relation between water and poverty in the target communities
- Sensitization and planning workshops with community members to understand the community background and water problems, as well as to plan water supply projects suitable for the communities
- Formulation of plans that include facility construction, procurement, system for operation and maintenance, and water control organization by the community, which are agreed by residents
- Community enlightenment, capacity building, institutional strengthening, operation and maintenance skills training
- Construction of facilities and procurement of equipment necessary for operation and maintenance
- Monitoring and evaluation of the above activities and follow-up if necessary

The second to fourth activities listed above are expected to take much time. However, the community organizations based on their understanding and agreement will lead to better outcomes with small input in the context of project sustainability, and will contribute to project efficiency. The second, fourth, and sixth activities are considered effective in collaboration with NGOs and have great potential to be carried out by the partner government independently.

## 2) Sub-question b.

**What kinds of approaches, with the establishment of the water supply sector and sustainable management system as the entry point for community development, are effective in increasing not only the direct impact of safe water supply but also impacts that eventually leads to the achievement of overall goals, such as improvements in living conditions for the poverty group and poverty reduction?**

For resident-led community development, which started

with water supply as its entry point, to develop independent activities beyond the water sector and to expand impact, community awareness of problems, problem analysis, planning, fund raising, human resources development, and strengthening the community organizations are all essential. These activities are expected to enhance the capacity of self-governing of the community. In order to promote improved living conditions initiated by the community, it is important to define the central and local governments' responsibilities for community activities and support the community by providing technical information and training.

If each community activity is separately conducted, a synergy effect cannot be expected. It is more efficient to build a mechanism in which the activities of the poverty group in both urban and rural areas can influence each other effectively through opportunities for information exchange, the introduction of successful cases in other areas, or the presentation of role models to women's groups.

Poor urban areas are sometimes illegal settlements, to which the partner country's government has difficulty in rendering support. Therefore, establishment of a long-term support system, from enlightenment activities to organizational building in collaboration with local NGOs, is important if community development activities are to expand from water supply issues to improvement of living conditions and poverty alleviation in poor urban areas. In poor rural areas, the priority is to establish a sustainable water supply system by setting up an operation and maintenance system for the water supply facility in the community. This requires continuous support in community enlightenment and organization building. Achievement of a single goal can foster confidence, trust, and initiative in the community and therefore it builds unity in the community development.

## 3) Sub-question c.

**What social and economic conditions are required from the government of a partner country and community for an integrated approach to be effective for the poverty group in African countries?**

If the planning and implementing unit of development projects is devolved to the local administration from the central administration under the decentralization policy, it may be effective to conduct integrated approaches with local governments as the implementing unit. It is desirable to start the integrated approach with the local governments who have already have experiences in human development and organization strengthening with the support of international organizations and donors and who have the basis of financial and human resources capable of coordinating activities in respective sectors.

Integrated approaches can be introduced to those communities that have traditional leaders who are respected and



trusted by the community and where a certain consensus building mechanism is established based on some community organizations interested in solving issues in regional development. In other words, it is important to have a unity of community and the presence of human resources who can lead various activities by means of an integrated approach.

Development activities can be disturbed by the interference of politicians who cause inequitable distribution of benefits to certain groups in the community and induce confrontation and trouble within the community. On the other hand, local politicians can act as a bridge between the community and the administration to promote development projects. It is therefore necessary to recognize politicians as a part of social capital in the community and formulate a program where politicians can demonstrate their leadership in community development.

Based on the above, it can be concluded that the integrated approach of the water sector that combines hardware and software activities is effective in implementing projects for sustainable safe water supply that targets the poverty group. Compared to engineering-oriented projects that only support facility construction and procurement of equipment and materials, projects that integrate software activities such as operation and maintenance, community enlightenment, organizational building, and sanitation education allow for positive participation of the community and improvement of ownership, thus increasing project sustainability and impact.

## 4-5 Lessons Learned

To implement an integrated sector approach more appropriately, the following strategies are important at all stages of the project, including planning, implementation, and follow-up: (1) understanding water-related problems and poverty structure in the target communities; (2) establishing an operation and maintenance system constituting the community

organizations as the core; (3) strengthening the supporting system that involves the central and local governments or NGOs. In short, there are two important issues for future development projects in the water supply sector. First of all, preliminary studies and the planning stage should be expanded and improved. Second, it is desirable to expand and reinforce the capacity building regarding the community planning and implementation capacity and the support system of central and local governments.

Using the integrated approach that combines capacity building for both beneficiary and government sides with construction of water supply facilities and establishment of an operation and maintenance system through community participation, the community can actually feel the benefits. By nurturing beneficiaries' confidence, trust, and a sense of responsibility, developing a sustainable development system in the water supply sector is considered the first step toward solving "water and poverty in Africa." In the integrated approach in the water supply sector, it is also important to reduce the incidence of infectious diseases borne by water, which is another development issue surrounding water; improve nutrition, living environments, and maternal and child health; and improve the entire community health situation by enhancing community enlightenment and sanitation education.

When community organizations and the government's community support system are formed through water sector development, an integrated approach addressing basic human needs, such as primary education, health, sanitation, and income generation, can enhance the community's willingness and initiative towards community development with synergy effects among different activities. It is expected that continuous implementation of community-based activities will generate an effective and sustainable impact on poverty reduction, and that Japan's cooperation will further contribute to addressing issues of water and poverty in Africa.