Sri Lanka

Ex-Post Evaluation of Japanese ODA Loan
"Walawe Left Bank Irrigation Upgrading and Extension Project (E/S)(I)(II)"

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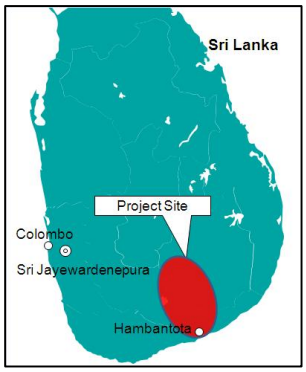
0. Summary

This project aimed to increase agricultural production, promote effective land and water usage as well as settlements in the Walawe left bank by upgrading and extending the irrigation and drainage system, reservoir facilities and social infrastructure, thereby helping improve living standards and boost income and employment opportunities and the regional economy.

The relevance of this project is high, as it is consistent with the priority area of Sri Lanka's development plans and Japan's ODA policy, and it has development needs. The project effectiveness is also high, as developing the irrigation facilities helps farmers obtain sufficient irrigation water efficiently and increase production, not only of paddy but also other food crops (OFC) through crop diversification. Moreover, the impact of the project as mentioned above has also been mostly achieved. The efficiency of the project is fair, as the actual project cost was within budget while the actual project period exceeded the plan. The sustainability of the project is also high as no major problems were observed in terms of institutional aspects, technical capacity, financial status and current O&M conditions.

In the light of the above, this project is evaluated to be highly satisfactory.

1. Project Description



Project Location

Rehabilitated Irrigation Canal

1.1 Background

The Government of Sri Lanka (GOSL) initiated the Uda Walawe Scheme in the early 1960s, targeting irrigation development and settlements in the southern dry zone of the country. The scheme comprised the construction of the Uda Walawe dam on the Walawe river and irrigation systems on

both banks. Subsequently, GOSL self-financed the construction of the Uda Walawe dam and main canals on both banks, which were completed in the 1960s. During the 1970s and 80s, the development of the right bank was prioritized with the support of the Asian Development Bank. Meanwhile, only 4,400 hectares (ha) of 30,000 ha were reclaimed in the northern half of the left bank and the existing irrigation facilities had eroded, collapsed and deteriorated at the time of appraisal, meaning they had to be upgraded and irrigation water management improved. Moreover, the southern half there remains thorny scrub land, where unproductive burn agriculture had been practiced on small patches of land.

Against this background, GOSL decided to complete development of the Walawe left bank, which proceeded for around thirty years to realize the full benefit of past investment and ease the ever-increasing population pressure in the south of the country. Based on a request by GOSL in 1987, JICA, with the collaboration of the executing agency, Mahaweli Authority of Sri Lanka (MASL), implemented a feasibility study from 1991 to 1992 and a detailed design study from 1994 to 1995, whereupon it continued upgrading and extending the irrigation facilities.

1.2 Project Outline

The objective of this project is to increase agricultural production, promote effective land and water usage as well as settlements[1] in the Walawe left bank by upgrading and extending the irrigation and drainage system, reservoir facilities and social infrastructure, thereby boosting living standards, income and employment opportunities and the regional economy.

Loan Approved Amount/ Disbursed Amount	(E/S) 379 million yen / 379 million yen (I) 2,572 million yen / 2,495 million yen (II) 9,393 million yen / 8,711 million yen
Exchange of Notes Date/ Loan Agreement Signing Date	(E/S) June, 1994 / July, 1994 (I) July, 1995 / August, 1995 (II) May, 1996 / October, 1996
Terms and Conditions	(E/S) Interest Rate: 2.6% Repayment Period: 30 years (Grace Period: 10years) ; Conditions for Procurement: General untied (I) Interest Rate:2.6% Repayment Period: 30 years (Grace Period: 10years) ; Conditions for Procurement: Compound untied (II) Interest Rate: 2.3 % Repayment Period: 30 years (Grace Period: 10years) Conditions for Procurement: General untied
Borrower / Executing Agency(ies)	Government of the Democratic Socialist Republic of Sri Lanka/ Mahaweli Authority of Sri Lanka
Final Disbursement Date	(E/S) March, 1997 (I) June, 2003 (II)December, 2008
Main Contractor (Over 1 billion yen)	(I) Korea Heavy Industries & Construction Co., LTD. (Republic of Korea)/Southern Group Civil Constructions (PVT.) LTD.(Sri Lanka)

[1] Promotion of settlement is targeted only in Phase II.

	(II) China National Overseas Engineering Corporation (China)、Sinohydro Corporation (China)
Main Consultant (Over 100 million yen)	(E/S)(I)(II) Nippon Koei Co., Ltd.
Feasibility Studies, etc.	F/S(September,1991–January,1993): Walawe Agricultural Development Planning Survey, Special Assistance for Project Implementation (SAPI)(March 2000) Review on Water Balance in the Uda Walawe Basin and Appropriate Water Use Plan
Related Projects	Project of the Improvement in Rural Infrastructure in the Walawe Left Bank Area (1994-1995): Development of Agricultural Infrastructure (Rural road, bridges, drinking water facilities)

2. Outline of the Evaluation Study

2.1 External Evaluator

Hisae Takahashi, Ernst & Young Sustainability Co., Ltd.

2.2 Duration of Evaluation Study

Duration of the Study: September, 2011 – October, 2012

Duration of the Field Study: January 7 – February 7, 2012 and April 22 – May 7, 2012

2.3 Constraints during the Evaluation Study

Although the Engineering Service (E/S), which was a detailed design study for Phase I, was conducted, information, including details of the output and total actual cost of E/S, was missing, meaning not all the project could be captured.

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance with the Development Plan of Sri Lanka

The Public Investment Plan (PIP)(1990-1994)(1995-1999)[4], which was the development policy of Sri Lanka at the time of appraisal, emphasized "an acceleration in economic growth" and "equal distribution of growth" as its overall goals and cited "investment in infrastructure in rural areas" as the priority for achieving them. In the agricultural sector in particular, 1) improving the self-sufficiency rate of basic food commodities[5], 2) boosting the productivity of tree crops to increase export income, and 3) improving income and employment opportunities in agricultural areas were identified as priority areas. This project was therefore consistent with 1) and 3) among these three areas. The

[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[3] ③: High, ②: Fair, ①: Low

[4] PIP (1990－1994) was the national policy as of E/S and phase I. At the time of appraisal for phase II, PIP (1995-1999) was formulated as national policy. The major purposes of the agricultural sector in PIP (1995－1999) are the same as PIP (1990-1994).

[5] Basic foods include rice, sugar, pulses and milk, etc.

"National Policy Framework (1995)", which was formulated as an agricultural policy, also presented self-sufficiency of basic food commodities as primary means and prioritized 1) increasing rice self-sufficiency, 2) improving the living standards of the poor and 3) balancing farmers' income.

The Mahinda Chintana: Ten Year Plan (2006-2016), which is the present development policy, also targets the development of basic infrastructure, which includes irrigation facilities in rural areas, as well as regional development and easing poverty through community development. To achieve these purposes, this policy emphasizes ensuring food security and boosting the income of small scale farmers as priority areas. Moreover, the Ten Year Development for Agricultural Policy, which was formulated in 2007 in line with Mahinda Chintana, clearly states that growth in the agricultural sector is crucial to achieving food self-sufficiency and income distribution as well as eventually reducing poverty. Accordingly, this policy cited goals of 1) increasing food production, 2) expanding agricultural productivity and 3) improving income for the agricultural community and living standards.

As mentioned above, Sri Lanka's development policy consistently prioritized the development of infrastructure in social service area, which is thought to be of direct benefit in improving the self-sufficiency ratio of food and boosting the income of farmers. The project thus corresponds to the national and other relevant development policy of Sri Lanka at the time of appraisal and ex-post evaluation.

3.1.2 Relevance with the Development Needs of Sri Lanka

During the appraisal, the agricultural sector prioritized the attainment of self-sufficiency in rice, which was 40% in the 1950s, rising to 80-90% in the 1980s. However, it remained rather stagnant in the 1990s due to the production decline. As such, no adequate supply of rice emerged and rice production had to be boosted by providing a stable volume of irrigation water to farmers who relied on rain-fed cultivation. The self-sufficiency ratio of rice achieved 100% in the 2000s, as shown in table 1, while crop diversification, which helps increase OFC production as well as reducing food imports, was promoted at the time of ex-post evaluation. As mentioned above, the project has ensured consistency as a project not only targeting increased rice production but also crop diversification, including an increase in OFC production.

Table 1 Self-sufficiency Ratio of Rice in Sri Lanka

1993	2008	2009	2010
83%	117%	107%	114%

Sources: Appraisal documents, Department of Census and Statistics of Sri Lanka

The Walawe left bank had been considered an area of high potential for agricultural development with abundant water sources for irrigation, land and labor forces. Conversely, the income level there was lower than the national average, and it was less developed compared to the right bank, underlining the substantial need to extend the irrigation land and develop social infrastructure as well as agriculture. As of now, a gap in the income level remains between the target area and the national average, although it has declined, as shown in table 2.

Table 2 Average Monthly Income per Household in Sri Lanka

(Unit: Sri Lanka Rupee (Rs.))

Before Project (1991)					After Project (2010)			
National Average	Urban Area	Rural Area	Target Area		National Average	Urban Area	Rural Area	Target Area
			Irrigated Area	Rain-fed area				
4,940	7,633	4,309	3,740	2,250	7,271	9,463	7,032	6,543

Source: Appraisal documents, documents provided by MASL

Note: Data is shown in real terms. The real term is calculated based on the price of a specific year to eliminate price fluctuation. (The base year was taken as 1982.) In nominal terms, the average monthly income as of the ex-post evaluation is Rs.35,495 for the national average and Rs. 31,490 for the target area.

The majority of people residing in the target area are settlers mainly engaged in the agricultural sector and settlement here is still ongoing. Under these circumstances, irrigation facilities and social infrastructure are cornerstones of their lives and the importance of developing such facilities remains high.

3.1.3 Relevance with Japan's ODA Policy

At the time of appraisal, Japan's ODA policy towards Sri Lanka prioritized five areas, namely 1) improving economic infrastructure, 2) industrial development, 3) developing agriculture, forestry and fishing, 4) human resource development, and 5) improving health and medical services. Among these, 1) clearly described the importance of improving social infrastructure to develop the southern area, while 3) underlined the importance of promoting the improvement in agricultural infrastructure, including rehabilitating existing irrigation facilities[6]. Since the project aims to improve living standards and the economy by rehabilitating existing irrigation facilities, its relevance with Japan's ODA policy for the agricultural sector in Sri Lanka is consistent.

Thus, this project has been highly relevant with the Sri Lanka's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness[7] (Rating: ③)

3.2.1 Quantitative Effects (Operation and Effect Indicators)

(1) Production of Crops in the Target Area

Table 3 shows the planned and actual production volumes of each crop in the target areas.

【Paddy】The actual production of paddy, which is a major crop in the target area, exceeded the planned volume in both phase I and II areas. Thanks to the rehabilitated irrigation facilities, sufficient irrigation water is now available year-round in the target area. Farmers have also been able to shift from a one crop to a dual-crop system, which has significantly boosted paddy production. The paddy yield also peaked at 6.7tons/ ha in the phase I area and 6.6t/ha in the phase II area[8], in 2010. However, a certain number of farmers have shifted their major cultivation from

[6] Based on the policy dialogue between Sri Lanka and Japan, which includes an economic cooperation mission dispatched in 1999 from the Japanese government and policy debate. (Source: ODA white paper, 1999, Vol. 2).

[7] Sub-rating for Effectiveness is to be put with consideration of Impact

[8] Source: Data provided by MASL

OFCs to paddy since the soil of many phase I areas is more suitable for cultivating paddy in relative terms than OFC.

【Bananas and Papayas】At present, the target area is famous for banana production in Sri Lanka[9], where the actual production in the phase I area and phase II area exceeds 2-5 times and 3 times respectively compared to the originally planned volume. Though not as popular as bananas, papaya and dragon fruit have also been richly cultivated in recent years. At the time of appraisal, it was not expected that papayas would be produced in the target area, but training for OFC cultivation, such as water management, was implemented under the project as crop diversification was one of its purposes. This training prompted farmers, who were originally unaware of OFC cultivation or lacked relevant experience, to attempt the cultivation of papayas, bananas, vegetables etc.

【Vegetables and Pulses】Vegetable production achieved only 10 to 20% of the planned amount because more farmers tended to cultivate bananas, which are more profitable and easier to cultivate than vegetables for the following reasons: 1) the price of vegetables is more volatile, 2) it is difficult to prevent damage from insects in vegetables compared to bananas. Since the phase II area in particular is famous for banana and papaya production in Sri Lanka, more farmers have shifted to banana or papaya cultivation instead of vegetables or pulses. Actually at the planning stage, the project stipulated the planned pulse production[10] and while actual production exceeded this amount in 2009, it was slightly below the figure in 2010. At the target area, there was no pulse production before the project and it had just started, meaning a certain period will be needed to establish stable production. Although the production of vegetable and pulses was below the planned amount, producing bananas, which is more stable and profitable for farmers, is an appropriate and rational choice as a means of achieving the impact, namely improving the income of farmers by boosting production.

Table 3 Production of Each Crop in the Target Area

【Phase I Area】 (Unit: 1,000kg)

Crops	Baseline	2005	2006	2007	2008	2009	2010
Paddy	Original plan: 24,420						
Maha[Note 1]	21,884	12,712	13,192	14,169	13,850	19,613	20,201
Yala [Note 1]		12,100	13,383	14,235	14,874	16,967	22,950
Total	21,884	24,812	26,575	28,404	28,724	36,580	43,151
Bananas	Original plan : 6,800						
	750	35,748	35,196	35,100	26,184	19,188	15,900
Papayas	No original plan						
	-	1,440	1,188	2,700	2,124	1,260	1,404
Vegetables	Original plan : 13,000						
	12,400	1,200	1,272	1,440	2,268	3,024	3,192

[9] Bananas are produced mainly for domestic consumption.
[10] In the phase I area, no original plan was set for pulse production.

Pulses	No original plan						
	-	543	495	511	854	805	836

【Phase II】 (Unit : 1,000kg)

Crops	Baseline	2009	2010
Paddy	Original plan : 23,430		
Maha	-	16,720	14,120
Yala		9,810	14,321
Total	-	26,530	28,441
Bananas	Original plan : 10,800		
	-	38,184	35,700
Papayas	No original plan		
	-	13,644	23,220
Vegetables	Original plan : 26,000		
	-	4,788	2,904
Pulses	Original plan: 1,110		
	-	1,153	759

Source: Appraisal documents, documents provided by MASL
Note 1: The cultivation period of the agriculture of Sri Lanka is divided into two terms, namely the Mala period (northeast monsoon in October - March) and the Yala period (southwest monsoon in April - September). Rain is brought only to the southwest in the Yala period and to the entire island in the Maha period.
Note 2: Figures don't match in an average or total because of rounding.

As mentioned above, production for each crop except vegetable has steadily increased. Though farmers used to depend on rain-fed cultivation or traditional Chena (burn) cultivation before the project, now dual cultivation has become available due to the rehabilitated irrigation facilities under the project, which spearheaded the increase in crop production. In addition, thanks to the installation of facilities for efficient water usage such as the dual canal system[11], storage tanks and ensuring adequate water usage, farmers can now cultivate not only paddy but also OFC, including bananas and papayas, which farmers could not water before the project[12].


Dual Canal System: The left canal is for paddy and the right canal is for OFC

3.2.2 Qualitative Effects

A beneficiary survey was conducted in the target area[13] to confirm the qualitative effect. 150 farmers, housewives and merchants etc. responded and the following points were confirmed as

[11] The dual canal system is a water management device which provides two separately designed canals, one exclusively for paddy and the other exclusively for OFC. This is intended to promote the cultivation of OFCs to a high percentage by using water more efficiently.
[12] For reference, the rainfall and production amount were confirmed year by year to determine whether they were related. No significant inter-relation was confirmed.
[13] This project covered four blocks located in the Walawe left bank, namely Kiriibbanwewa and Sooriyawewa blocks in phase I and Maurapura and Tissapura blocks in phase II.

results of this survey:

(1) Optimum usage of irrigation water

According to the beneficiary survey result, farmers can now obtain sufficient irrigation water as the irrigation facilities cover a wider area and water leakage has decreased compared to before the project due to the development of irrigation facilities. More than 50% of respondents replied that adequate irrigation water was not available before the project, but this figure has currently decreased to 2% as shown in Figure 1.

Furthermore, the "dual canal system" and "night storage tanks[14]" were first introduced in Sri Lanka under the project and have functioned as water saving techniques and helped encourage optimum usage of irrigation water in the target areas. In addition, the project took the necessary measures to utilize irrigation water efficiently, for example, repeatedly implementing water management training for farmers. In the beneficiary survey, about 93% of respondents answered that rehabilitation or construction of irrigation facilities boosted the efficient usage of water, especially in the phase II area where dual canal systems were installed, while about 93% answered that the installation of the dual canal system had promoted the efficient use of water.

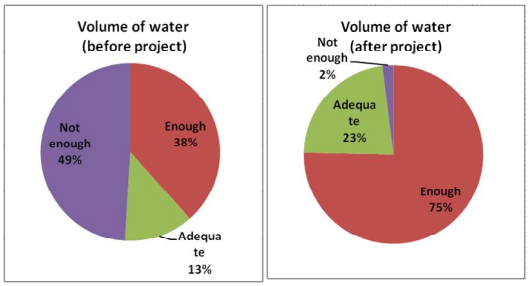


Figure 1 Volume of Irrigation Water before and after the Project

(2) Strengthening FOs' capacity

In the target area, most Farmers Organizations (FOs) were newly organized as most of the farmers in the target area were settlers there. Therefore, at the time of appraisal, there was concern over whether FOs had sufficient capacities to utilize the end irrigation canals appropriately. However, 99% of respondents replied that FOs participated in the operation and maintenance of field canals.

Under the project, the differences caused by currency fluctuations were utilized to implement the Integrated Development Program (IDP). Thanks to the workshops and training implemented as part of IDP, the FO members had opportunities to learn about operating and maintaining field canals, agricultural development, water management, management of FO and income generation methods etc. In other words, the implementation of IDP helped enhance the capacities of FOs. Furthermore, the foundation to utilize the irrigation facilities and maintain their effectiveness was considered to be strengthened through these activities. At the time of ex-post evaluation, a plan including timetables for the water supply to each canal was prepared for all farmers to obtain an adequate volume of irrigation water on a regular basis. As such, it was confirmed that FOs' capacity to utilize the water usage had been enhanced and well established.

[14] The night storage tank is a water storage facility which can store water overnight. Without the night storage tank, water keeps running into canals all night, even if they do not need the water.

3.3 Impact

3.3.1 Intended Impacts

(1) Securing the Stable Food Supply and Saving Foreign Currency

It is difficult to measure the direct relationship between the project and foreign currency saving. However, it was confirmed that rice imports in Sri Lanka at the time of ex-post evaluation decreased by less than half compared to those before the project as shown in table 4[15]. Though the proportion of paddy production in the target area is limited to within 4-5% of the total for Sri Lanka, it is assumed that the increased paddy production in the target area played a certain role in helping reduce rice imports as well as foreign currency saving, albeit to a limited extent.

Table 4 Rice Import in Sri Lanka

(Unit：Thousand ton)

Before project (1993)	After project (2010)
304	126

Source：Data provided by MASL

(2) Improvement in Employment Opportunities and Farmers' Income Level

Table 5 shows the annual average income per person in the Walawe[16] and Mahaweli[17] areas, which has largely increased compared to the pre-project figures. The rate of increase in recent years is even higher for the whole Mahaweli area and the beneficiary survey also shows 98% of respondents stated that their income had increased after the project. The project involved the development of irrigation facilities and various training, including on the usage of irrigation water as well as agricultural development. This support helped boost the income of farmers by increasing production in the target area. Besides, it was assumed that employment opportunities would be boosted by promoting settlers in the phase II covered area by implementing the project. Although no data concerning the employment rate in the target area was available, the number of settlers in the Walawe area increased 1.4 times compared to before the project, as shown in table 6. In this sense, it can be said that the settlement in the target area was promoted by the implementation of the project.

Table 5 Average Income per Person

(Unit：Thousand Rs)

	1996	2008	2009	2010
Walawe	18.3	60.4	58.5	79.0
Mahaweli	15.7[Note]	325.9	304.4	373.7

Note: There is no consistency where the income in Walawe area is lower than that in Mahaweli area. According to the staff of MASL, this is presumably due to simple procedural mistakes.
Sources: MASL, "Mahaweli Handbook"

【Result of the Beneficiary Survey】

Has the household income changed after the project implementation?	Increased	Same	Decreased
	98%	2%	0%

Table 6 Number of Settlers in the Walawe area

Before project (1995)	After project (2010)
30,262	47,512

Source: MASL, "Mahaweli Handbook"

[15] According to the staff of MASL, imported rice is quality rice for hotels or certain special occasions.
[16] The Walawe area includes both the right and left bank areas along the Walawe river.
[17] In Sri Lanka, irrigation facilities are basically under the jurisdiction of the Department of Irrigation. However, the area situated along the Mahaweli river, the longest in Sri Lanka, is under the jurisdiction of MASL. In this report, this area is indicated as the Mahaweli area.

(3) Improvement in Regional Economic Development

The value of agricultural production has continued to rise in both Walawe and Mahaweli areas, as shown in table 7. Since the main industry in these areas is agriculture, the increase in the value of agricultural production is considered to have boosted regional economic development in the target area. Although macro data on a regional level, such as the Gross Regional Domestic Product at a district level was not available in Sri Lanka, 98% of respondents replied that the regional economy had improved due to the project in the beneficiary survey. Furthermore, all respondents answered that the project had promoted agricultural activities in the target area.

Table 7 Value of Agricultural Production (Paddy + OFCs) in the Walawe area

(Unit: Million Rs.)

	1996	2008	2009	2010
Walawe	2,319	11,160	11,021	15,184
Mahaweli	7,359	39,198	33,634	48,028

Source: Planning & Monitoring Unit, MASL, "Mahaweli Handbook"

[Result of the Beneficiary Survey]

Has the regional economy been stimulated by implementing the project?	Yes	No
	98%	2%

Has the project helped promote agricultural activities?	Yes	No
	100%	0%

(4) Poverty Alleviation

Through increased income and the value of agricultural production as explained above, the project helped improve living standards and alleviate poverty. Since the poverty rate of the target area was unobtainable, the executing agency advised that the Hambantota district should be used as a reference for poverty, since it covered a large portion of the target area. The poverty rate in the Hambantota district greatly improved from 31% at the time of appraisal to 6.9% after the project as shown in table 8. However, a number of development projects were implemented in the Hambantota area, including the development of Hambantota port, making it difficult to confirm the direct relationship in data between the project and poverty alleviation.

Table 8 Poverty Rate

	Before project (1995/96)	After project (2009/10)
Hambantota district	31.0%	6.9%
Sri Lanka	28.8%	8.9%

Source: Department of Census & Statistics, "Poverty Indicators"

(5) Improvement in the Living Environment

Farmers in the target area used to make a living by rain-fed cultivation or burned agriculture, meaning their lives were dictated by the weather and thus insecure, given the inability to cultivate crops in dry seasons due to the lack of water. According to interviews with farmers, their life has significantly improved since adequate volumes of water have now become available in a planned

manner, which has allowed them to engage in dual cropping thanks to the irrigation facilities developed under the project. The beneficiary survey also shows results showing that 99% of respondents are satisfied with their living standards after the project.

3.3.2 Other Impacts

(1) Impacts on the natural environment

Under the project, there was consideration of the natural environment, for example an "elephant management and conservation program", including relocating dangerous lone elephants to national parks, installing electric fences, establishing a "tree planting program", "water quality test", "soil conservation" etc. based on an Environmental Impact Assessment". In Sri Lanka, the human-elephant conflict is a serious issue as wild elephants harm houses and crops. Since the population of wild elephants is relatively high in the target area, the "elephant management and conservation program" has eased the problem for farmers and residents in the target area. Though the human-elephant conflict remains an issue in part of the target area, there are no other negative impacts on the natural environment.

(2) Land Acquisition and Resettlement

At the beginning of the project implementation, extended negotiation was required to convince individuals encroaching on the project area to resettle. This was because some resisted leaving the place or others lacked an understanding of the project and thus refused to resettle. Thanks to support from the MASL staff and continued dialogue among them, land acquisition and resettlement was completed amicably, although the smooth implementation of the project was affected. Resettlement was implemented in line with the appropriate process and a certain amount of land was allocated to resettled residents. Most are now engaged in the agricultural sector and cultivate paddy or OFCs in the project area[18].

(3) Unintended Positive Impact (Success as a banana production area)

The phase II area of the project, where agricultural activities had to rely on rain-fed or burn cultivation, is now becoming famous for banana production, which accounts for 15% of total production in Sri Lanka. In the process, the project helped increase banana production and explore the distribution route via diversified support, including not only the development of irrigation facilities but also training in agricultural development and water management, the development of a market and organizing food exhibitions (Refer to Box 1 for more information).

As mentioned above, this project has largely achieved its objectives, therefore its effectiveness is high.

[18] Based on interviews with the executing agency and a site survey.

Box 1: Development and Significance of Banana Distribution in the Walawe Area

【Efforts to Increase Banana Production】

The project phase II area was thorny scrub land and cultivation was not possible in the dry season before the project. Now, however, crops can be produced in this area year-round due to efficient water usage by the developing of a dual canal system, hence this area is now known for its banana production. In the course of the project, project consultants advised farmers that bananas were profitable crops which used less water, and conducted training to transfer the necessary skills for banana production. These activities helped increase banana production, the volume of which is now more than double the originally planned level in the target area.

【Market Route Exploitation】

This project also supported efforts to explore the market route of bananas, for example holding the Walawe Food Exhibition in Colombo, developing a market (Pola) to link producers and buyers, approaching the supermarket (Keells) and offering land and building collecting centers in Keells as part of IDP. Thanks to these efforts, buyers and Keells expanded their business to the Walawe area and bananas produced in the project area are now transported to major cities in Sri Lanka, including Colombo, via various market routes.

【Current Situation of Market Routes】

Bananas produced in the project area are shipped to major cities via major five distribution routes, namely 1) Pola (traditional market), 2) Economic Center (more or less the same as Pola but farmers can find intermediaries between farmers and buyers), 3) Collecting points operated by individuals, 4) Collecting centers of supermarket chains and exporters, 5) Collectors at farm gates.

Pola

Collecting centres of Keells

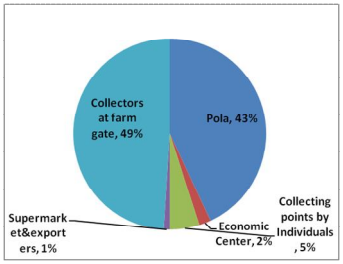


Figure: Proportion of each market route

According to the simplified beneficiary survey and interview surveys, the popular market routes are Pola, which is the traditional and accessible market route and collectors reaching the farm gate, as shown in the figure above. This is because of the reduced burden of transportation costs on farmers. Conversely, collecting centers buy bananas at approximately double the price compared to Pola or other market routes though the proportion is limited to just 1% as shown in the figure. This collecting center was built with the support of the project by offering land and building, thanks to the efforts of MASL and project consultants, whereupon the business in the project area of shipping bananas all over Sri Lanka got underway. Since Keells imposes quality requirements on farmers in terms of shapes and sizes, only member farmers who can satisfy these requirements can sell bananas to this collecting center. In addition, to date only one collecting center for Keells has been established in the project area and member farmers must incur transportation costs, therefore the number of members is limited to 200. However, Keels is now planning to expand the collecting center to increase the volume of bananas since a stable volume of bananas can now be collected year-round in this area.

Table: Price of bananas

Keells collecting centre	Pola, Collecting center, collectors at farm gate
Rs. 35 / kg	Rs. 15–25 / kg

Source: Interview Survey

【Future Prospects】

The volume of banana production in the target area accounts for 15% in Sri Lanka. According to the regional office of MASL, Pola and collecting at the farm gate will remain major marketing routes for farmers who do not prioritize quality when producing bananas or who do not want to pay transportation costs. However, the market route of the Keells collecting center also has the potential to expand business in the target area. Cargils, which is the largest supermarket, has already decided to open a collecting center and plans to ship a larger volume of bananas than Keells. Furthermore, three kinds of bananas are produced in Sri Lanka and farmers in the target area are currently producing the

cheapest kind called Embul since it is the easiest for production. Accordingly, efforts to increase farmers' income e.g. by producing different types of bananas will be made in future.
From the perspective of agricultural development in the Walawe area, if farmers' awareness of factors such as "quality bananas are profitable" "taking more time and effort to produce bananas will increase income" increases as they can see transactions with Keells, this might encourage new settlers or the poor in this area and is expected to help build capacity. In the Walawe area, this can now be seen to emerge.

3.4 Efficiency (Rating: ②)

3.4.1 Project Outputs

The project consists of the following: Engineering Service (E/S), which is a detailed design for phases I, in which irrigation facilities and appurtenant structures were developed for irrigated areas, and phase II, in which developed irrigation facilities and appurtenant structures were developed for a new irrigation area. Table 9 shows the planned and actual outputs of the project.

Table 9: Project Output (Planned/Actual)[19]

【Phase I 】

Item	Planned	Actual
Upgrading and Rehabilitation of irrigation facilities		
・Beneficial Area	・2,900ha	・2,960ha
・Main and Branch Canals	・24.2 Km	・49.8 Km
・Distribution and Field Canals[20]	・162.4 Km	・251.7 Km
Construction of irrigation and drainage system		
・Beneficial Area	・1,040 ha	・1,047 ha
・Main and Branch Canals	・ 9.7 Km	・3.5 Km
・Distribution and Field Canals	・73.1 Km	・121.4 Km
・Drainage System	・15.0 Km	・88.4 Km
Provision of development center and agricultural facilities		
・Agricultural education center	・1 no.	・As planned
・Collecting and shipping center	・2 nos.	・0
・Pola (Market)	・1 no.	・2 nos. (Rehabilitation)
Provision of equipment		
・Heavy machines for facility maintenance	・N/A	・5 machines
・Vehicles for maintenance & communication facilities		・4cars , 8 motorbikes
・Vehicles and tools for working maintenance		・PC, Projector, etc.
Environmental Monitoring and Measures		
・Afforestation	・220 ha	・56.5 ha
・Soil preservation	・1set	・As planned
・Collecting data and monitoring	・1set	・As planned
Consulting Service	・F/S review ・Construction management ・Planning of training 36M/M(Man/Month)	・As Planned 48 MM

【Phase II】

Item	Planned	Actual
Irrigation and drainage extension works		

[19] Details of E/S were not obtained from either consulting firms or the executing agency.
[20] Distribution and Field Canals indicates end irrigation waterways. Each FO member is a farmer in this distribution waterway downstream. Field canals indicate the waterway where the distribution canals exists further in the downstream.

・Beneficial area ・Main and branch canal ・Distribution and Field canal ・Drainage canal ・Storage tank	・5,152 ha ・43.0 Km ・473.0 Km ・407.0 Km ・65 nos.	・4,706 ha ・42.0 Km ・450.0 Km ・601.0 Km ・63 nos.
Provision of Social Infrastructure ・Covered area (Education facilities, health and medical centers and etc.)	・1,454 ha	・1,391 ha
Reservoir rehabilitation ・Upstream riprap and surface preparation ・Toe road ・Renovation of electric system for spillways gate ・Renovation of mechanical system for spillways gate ・Repairs gates, cleaning, painting and provision of water seals	・59,000 m^2 ・3.5 Km ・5 nos. ・1 no. ・5 nos.	・44,816 m^2 ・3.5 Km ・5 nos. ・1 no. ・5 nos.
Operation and maintenance equipment	・1set	・1set
Environment measures ・Fuel wood plantation ・Wild elephant program (Construction of power fence and establishment of jungle corridor) ・Soil Conservation ・Data collecting and monitoring	・1,319 ha ・ 292 ha ・1 set ・1 set	・377 ha ・669 ha ・1 set ・1 set
Consulting Service	・F/S review ・Construction management ・Planning of training 96M/M	・As planned 132 M/M
Integrated Development Program	-	Trainings for water management, agricultural development, strengthening of FO, income generation activities, supporting to installation of collecting centers, etc.

The planned output at the time of appraisal was modified based on the local conditions, and the consequent major modifications were as follows:

【E/S】Analysis for E/S was not possible as data was not available.

【Phase I】

1) Construction of distribution and field canal: During the initial project implementation, the local conditions were re-confirmed, and the depth and length of the canals were modified based on the lifestyles of the farmers and discussion with them. This did not impact on the project but influenced the smooth implementation of civil works.

2) Extension of the drainage system: At the time of appraisal, the scope of drainage systems was formulated referring to the map. However, small canals and farmland, which were not on the map, were confirmed, so the necessary modification, including extension and construction of the drainage system, was made.

3) Construction of a collecting and shipping center: It was cancelled as the functions of the collecting and shipping centers were integrated into Pola.

4) Area for afforestation: The settlement program under the government, which was supposed to be completed before the project, remained ongoing when the project started. Since some people were still living in some of the areas scheduled for afforestation, the project progressed within the areas possible.

5) Consulting services: Based on the extension of the project, the assignment period of the consulting service was also extended. Since consultants played an indispensable role in the course of the project implementation, the increase in the M/M of the consulting services with the extension of the project was considered reasonable and appropriate. Other than this extension, the consulting services were executed as planned without any problems.

【Phase II】

1) Reduction of the beneficiary area: GOSL started a project to develop the Hambantota sea port as a priority task and requested MASL to release a certain land area from the proposed development area of this project. Accordingly MASL decided to release part of the project area for the Hambantota Sea Port Development Project, which resulted in a reduction in the beneficiary area.

2) Extension of the drainage system: Same reason as Phase I

3) Reduction of the afforestation area: Same reason as Phase I

4) Wild elephant program (construction of a power fence and establishment of a jungle corridor): The Walawe area is known for wild elephants and there were many cases of conflict between humans and elephants, including ruined crops in the cultivating area. Accordingly, the area for the power fence and corridor was extended to minimize this damage based on the local circumstances.

5) Addition of IDP: IDP was implemented by utilizing the saving caused by currency fluctuation. It was recommended by the Special Assistance for Project Implementation (SAPI) conducted in 2000, which suggested that as well as appropriate irrigation and social infrastructure, the necessary assistance and training to farmers to improve their incomes and living standards should be supported. Taking account of this recommendation, MASL took the initiative and implemented various activities under IDP, including training farmers in water management, agricultural development and extension, the institutional development of FOs, income generation, etc., by utilizing 445 million Rp. of savings.

6) Consulting services: Same reason as Phase I. In phase II, a consultancy contract was also extended accordingly as a result of the implementation of IDP, particularly in support of training of water management, agricultural development, etc.

3.4.2 Project Inputs

3.4.2.1 Project Cost[21]

The planned project cost was 14,076 million yen (of which the Japanese ODA loan accounted for 11,965 million yen), and the actual total project cost was 13,628 million yen (of which the Japanese ODA loan accounted for 11,206 million yen), which was 3% lower than planned. The reasons why the actual cost was lower than the planned cost, despite the increased scope, was due to the substantial savings in the loan due to the appreciation of the Japanese Yen against Sri Lanka Rupees over the project period. Accordingly, IDP was implemented by utilizing part of these savings (445 million yen) in phase II.

3.4.2.2 Project Period[22]

While the planned project period, including E/S, was 165 months, the actual project period was 243 months, 47% longer than planned[23]. The major reason for this extension was the need to modify part of the construction works based on local circumstances and farmers' requests. In addition, when the project started, considerable time was required for dialogue with people who were illegally occupying the resettlement area, which delayed the project implementation. The commencement of the Hambantota Sea Port Development Project, which was initiated by GOSL, also affected the smooth implementation of this project in phase II. Since the project had to be suspended until the exact land requirement for sea port development had been identified, this delayed the completion of the project works by an additional 3 years or so. However, this delay was unavoidable because MASL needed to comply with the Hambantota Sea Port Development Project, which was initiated by the government as priority work. In addition, the tsunami of 2004 also affected project progress, since it hampered efforts to obtain materials and human resources. The unique issue of the irrigation project was also raised as one of the reasons, since it would ordinarily be necessary to dam canals to construct and rehabilitate irrigation facilities, meaning this work could not be carried out during the cultivation season.

[21] The project cost for E/S was not included in the analysis as the information was not available.
[22] The project period is defined as the period from the signing of L/A to the completion of all work included in the project.
[23] The project period of each phase is as follows. For E/S, the project period was to last from April 1994 to March 1996 (24 months), but the actual project period was from April 1995 to September 1996 (18 months), which was within the planned schedule (75%). Conversely, the project period of phase I was to last from August 1995 to June 2006 (59 months), but the actual project period was from August 1995 to March (80%) which was 30% longer than planned. For phase II, the project period was to last from October 1996 to July 2003 (82 months) but the actual project period was from October 1996 to October 2008, which was considerably longer than planned (177%).

3.4.3 Results of Calculation of Internal Rates of Return (IRR)

The Economic IRR (EIRR) was calculated at the time of appraisal. At the time of ex-post evaluation, when the actual figures were calculated via the same preconditions, the results exceeded the planned values as shown in table 10[24].

Table 10: EIRR

	Original	Plan	Actual
EIRR	15%	19%	21%

Note: Cost = Investment cost, Replacement cost, Maintenance cost, Benefit = Production, Price, Gross income, Production cost, Net Income

As mentioned above, although the project cost was within the plan, the project period was exceeded, therefore efficiency of the project is fair.

3.5 Sustainability (Rating: ③)

3.5.1 Structural Aspects of Operation and Maintenance

The operation and maintenance (O&M) of major irrigation facilities such as main canals, reservoirs etc., is to be overseen by MASL. The O&M for drainage systems and end irrigation facilities are under the responsibilities of each FO[25], while each of the line ministries has responsibilities for O&M for equipment and social infrastructure. Although there were concerns over the lack of institutional capacity of FOs as they lacked experience in O&M of irrigation facilities at the time of appraisal, a system of unit offices and block offices to support FO in the event of any damage or maintenance has been well established. The support system in the block office also functions well, since each block office includes technical staff, including technical officers, engineering assistants and water masters. In addition, coordination among FOs, unit offices, block offices and regional offices proceeds smoothly and there is no problem in the O&M structure.

3.5.2 Technical Aspects of Operation and Maintenance

MASL, the executing agency and also the responsible entity for O&M of major irrigation facilities, has the technical capacity for the necessary O&M by training technical staff, although this depends on the budget each year[26]. According to the site survey, interview survey and beneficiary survey, no issues of water shortages were confirmed, even at the lower part of the area, since water masters who staffed each block office and FO controlled the water volume based on the plan. It should be noted that project consultants visited the farmers more than 1,000 times as part of the IDP and kept advising on the importance of water management and O&M of the irrigation facilities carefully and eagerly. As such, most FO members were well aware of the importance of water management, maintenance of facilities, bookkeeping, etc. and experienced them by participating in training or workshops under the guidance of the consultants. Therefore, no problems on the technical capacity of FOs were observed.

[24] Only the EIRR for phase II was calculated, since documents showing the precondition of the EIRR calculation for Phase I were not available.

[25] The Walare left bank area is divided into four blocks, which are grouped together as a unit, ultimately forming an FO along each of the end irrigation canals.

[26] It is normally planned once a year.

3.5.3 Financial Aspects of Operation and Maintenance

According to the appraisal documents, the total annual O&M cost needed for the project facilities was estimated at 15 million Rs.[27]. As shown in table 11, the budget of O&M in the Resident Project Manager (RPM) Walawe office for these years has shown an upward trend. According to MASL staff, the O&M budget before 2009 was insufficient but has been increased since 2010 because of growing awareness of the importance of O&M of irrigation facilities in MASL. Under present circumstances, maintenance or rehabilitation work, which is considerably costly, has not been performed for either major irrigation facilities or end irrigation facilities. The cost of O&M or end irrigation canals is covered by the maintenance fund collected as fees from FO members[28].

3.5.4 Current Status of Operation and Maintenance

Both irrigation and other facilities are now fully utilized and no cases of water shortages in the lower area or damage to facilities were confirmed in the observation survey. The irrigation facilities are usually maintained twice a year before the cultivation periods start, and the necessary maintenance for reservoirs and cutting of grass as well as cleaning around facilities is conducted by FO on a voluntary basis. Basically, since the farmers are beneficiaries and understand the importance of facilities and the change in their living standards after the project, their involvement in the maintenance activities is significant, hence the maintenance is appropriately made.

One concern for the future is O&M for power fences for elephants, since maintaining a long fence is very costly and there are some cases which FO cannot afford. Therefore follow up from MASL on a regular basis will be expected. In addition, the number of farmers cultivating paddy has shown a tendency to increase recently, possibly resulting in a shortage of irrigation water in future, since paddy cultivation requires a relatively larger volume of water compared to OFC. Hence, it is necessary to observe the situation carefully, though no serious cases have yet been confirmed.

No major problems have been observed in the operation and maintenance system, therefore sustainability of the project effect is high.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project aimed to increase agricultural production, promote effective land and water usage as well as settlements in the Walawe left bank by upgrading and extending the irrigation and drainage system, reservoir facilities and social infrastructure, thereby helping improve living standards and boost income and employment opportunities and the regional economy.

The relevance of this project is high, as it is consistent with the priority area of Sri Lanka's development plans and Japan's ODA policy, and it has development needs. The project effectiveness is also high, as developing the irrigation facilities helps farmers obtain sufficient irrigation water

[27] Source: Appraisal documents
[28] Price of the collection fee differs from FO to FO within the range 200 to 620Rs per cultivation season.

efficiently and increase production, not only of paddy but also bananas, through crop diversification. Moreover, the impact of the project as mentioned above has also been mostly achieved. The efficiency of the project is fair, as the actual project cost was within budget while the actual project period exceeded the plan. The sustainability of the project is also high as no major problems were observed in terms of institutional aspects, technical capacity, financial status and current O&M conditions.

In the light of the above, this project is evaluated to be highly satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

- Facilities supported by the project are well-maintained and effectively utilized under the appropriate management of farmers. However, maintaining the power fence is very costly and there are some power fences which FO cannot afford. Wild elephants are liable to harm humans as well as disrupt agricultural activities without a power fence in the target area, hence MASL is expected to monitor and support the O&M of the power fence on a regular basis.
- The effect will be reduced if knowledge of the proper use of irrigation facilities as well as the capacity to conduct proper maintenance are not at an appropriate level. Therefore, IDP was implemented in addition to the training originally planned under this project. Moreover, training or workshops under IDP, such as water management, institutional management and agricultural development, etc., were repeatedly conducted with the eager and polite support of consultants. This was highly effective in ensuring sustainability because farmers first understood the meaning or importance of maintenance and then acquired knowledge and experience through such training or workshops. In the phase II area, it is recommended that FOs and MASL actively take initiatives to share knowledge and experience on the importance of maintenance and efficient usage of irrigation facilities with new settlers.
- In this evaluation, no record of detailed information such as the project cost of E/S was available in either Japan or Sri Lanka. Such a record must be maintained, however, since E/S was conducted as a detailed design for phase I and E/S. For future projects, an improved and sound project management system is expected as well as operating and information management of the same.
- Irrigation facilities are fully utilized in the project area and sustainability has also been ensured with sufficient water reaching the lower area. This was partly thanks to the patient work of consultants and MASL to encourage farmers to understand the importance of agricultural development, water management and skills in producing crops such as bananas, etc. Although these activities were additionally implemented as part of IDP, which was not included in the original plan, they supported efforts to ensure good practice, whereby training with the ceaseless and careful support of consultants and executing agencies will help ensure effectiveness and sustainability. These activities and components are also expected to continue in the target area and be included in the project plan for future similar projects.

4.3 Lessons Learned

・This project started civil work on the one hand, and also involved dialogue with farmers. It turned out some modification was needed based on the lifestyle of farmers having delayed the project implementation. Furthermore, discussion with those who illegally occupied the project land took a long time and also delayed the project. Taking time to discuss with local people and ensuring mutual understanding is critical for the project implementation. Accordingly, a process which reflects the needs of beneficiaries, for example holding a briefing session or workshop, must be taken at the planning stage, to avoid such problems.

・This project is evaluated as highly satisfactory in terms of full effectiveness. Key to this result was the installation of irrigation facilities, which optimally exploit a water saving approach. Sufficient water has been provided to the target area, which was originally barren, due to the installation of new facilities which meet the needs of beneficiaries, e.g. a dual canal system targeting both increased paddy and OFC, storage tanks, etc. Thus, it is effective to install facilities which are designed to meet local needs and circumstances in order to retain sustainability.

Comparison of the Original and Actual Scope of the Project

Item	Original	Actual
1.Project Outputs 【Phase I】	Upgrading and Rehabilitation of irrigation facilities	
	・Beneficial Area : 2,900 ha	2,960 ha
	・Main and Branch Canals : 24.2 Km	49.8Km
	・Distribution and Field Canals : 162.4Km	251.7Km
	Construction of irrigation and drainage system	
	・Beneficial Area : 1,040 ha	1,047 ha
	・Main and Branch Canals: 9.7 Km	3.5 Km
	・Distribution and Field Canals: 73.1 Km	121.4 Km
	・Drainage System: 15.0 Km	88.4 Km
	Provision of development center and agricultural facilities	
	・Agricultural education center: 1 no.	As planned
	・Collecting and shipping center: 2 nos.	0
	・Pola (Market): 1no	2 nos(rehabilitation)
	Provision of equipment N/A	
	・Heavy machines for facility maintenance	5 machines
	・Vehicles for maintenance & communication facilities	4 cars, 8 motorbikes
	・Vehicles and tools for working maintenance	PC, Projector, etc.
	Environmental Monitoring and Measures	
	・Afforestation: 220 ha	56.5 ha
	・Soil conservation	As planned
	・Collecting data and monitoring: 1 set	As planned
	Consulting Service 36M/M (Man/Month)	48 MM
	・F/S Reviews	As planned
	・Construction management	As planned
	・Planning of training	As planned
【Phase II】	Irrigation and drainage extension works	
	・Beneficial area: 5,152 ha	4,706 ha
	・Main and branch canal: 43.0 Km	42.0 Km
	・Distribution and Field canal: 473.0 Kn	450.0 Km
	・Drainage canal: 407.0 Km	601.0 Km
	・Storage tank: 65 nos.	63 nos.
	Provision of Social Infrastructure	
	・Covered area (Education facilities, health and medical centers and etc.): 1,454 ha	1,391 ha
	Reservoir rehabilitation	
	・Upstream riprap and surface preparation: 59,000m^2	44,816 m^2
	・Toe road: 3.5 Km	As planned
	・Renovation of electric system for spillways gate: 5nos.	As planned
	・Renovation of mechanical system for spillways gate: 1 no.	As planned
	・Repairs gates, cleaning, painting and provision of water seals: 5 nos.	As planned
	Operation and maintenance equipment: 1 set	As planned
	Environment measures	
	・Fuel wood plantation: 1,393 ha	377 ha
	・Wild elephant program (Construction of power fence and establishment of jungle corridor): 292.2 ha	669.0 ha
	・Soil Conservation: 1 set	As planned
	・Data collecting and monitoring: 1 set	As planned
	Consulting Service: 93M/M	132 M/M
	Integrated Development Program : N/A	Trainings, income generation activities, installation of collecting center, etc.

2.Project Period 【E/S】	April 1994 – March 1996 (24 months)	April 1995-September 1996 (18 months)
【Phase I】	August 1995 – June 2000 (59 months)	August 1995 – March 2002 (80 months)
【Phase II】	October 1996 – July 2003 (82 months)	October 1996 – October 2008 (145 months)
3.Project Cost 【E/S】 Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 306million yen 157 million yen (71 million Rs) 463 million yen 379 million yen 1Rs = 2.22 yen (N/A)	 No information
【Phase I】 Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 1,435 million yen 1,591 million yen (784 million Rs.) 3,026 million yen 2,572 million yen 1Rs = 1.93 yen (N/A)	 1,818 million yen 1,205 million yen (971 million Es.) 3,023 million yen 2,495 million yen 1Rs = 1.06 yen (Average between August, 1995 and June 2003)
【Phase II】 Amount paid in Foreign currency Amount paid in Local currency Total Japanese ODA loan portion Exchange rate	 6,253 million yen 4,797 million yen (2,485 million Rs.) 11,050 million yen 9,393 million yen 1Rs. = 1.93 yen (N/A)	 5,098 million yen 5,507 million yen (5,195 million Rs.) 10,605 million yen 8,711 million yen 1Rs. = 1.06 yen (Average between October, 1996 and December, 2008)