Indonesia

Way Curup Irrigation Project

Report Date: March 2001
Field Survey: September 2000

1. Project Profile and Japan's ODA Loan

Location Map of Project Area
(Lampung Province in Sumatra Island)

Trunk Canal of the Project Area

(1) Background

Indonesia's Fifth Five-Year Plan for the irrigation sector (1989 ~ 1993) aimed to make more efficient use of existing facilities in order to achieve the following goals for the agricultural sector.

[1] Greater self-sufficiency in staple foods.
[2] Increased production and improved quality.
[3] Improved incomes and living standards for farmers.
[4] Expanded employment opportunities.

During the period of falling oil prices in the 1980s there had not been sufficient budgets for the maintenance of existing facilities, leading to increasing dilapidation of existing irrigation facilities and a growing need for maintenance and rehabilitation. The Five-Year Plan was heavily weighted towards the maintenance and rehabilitation of existing facilities, which were applied to 8.4 million ha, compared to 500,000 of new development.

This project was included in the elements of the Five-Year Plan for rehabilitation and improvement (Way Curup upper reaches and Way Jepara area) and for new development (Way Curup lower reaches). It combined with the Way Rarem Irrigation Project (IV), which was financed by an ODA loan in 1991, and its early implementation was regarded as necessary to cover future rice demand in Lampung Province, and to maintain rice self-sufficiency in Indonesia as a whole.

(2) Objectives

This project was to build and improve irrigation and drainage facilities in the lower reaches of Way Curup and in the Way Jepara area, and to build drainage canals in the upper reaches of Way Curup, in order to increase production of agricultural produce in the area and improve the lives of its farmers.

(3) Project Scope

The content of this project is as follows:

1) Construction and rehabilitation of irrigation facilities

Building of trunk canals (14.6km), branch canals (22.5km) and terminal waterway networks (3,504ha).

2) Construction and rehabilitation of drainage facilities

Dredging of discharge canals (4km), improvement of trunk drainage canals (29.5km) and building of main branch drainage canals (43.3km).

3) Paving of maintenance access roads (51.7km)

4) Procurement of maintenance equipment

5) Consulting service

Detailed design, bidding assessment/construction supervision assistance, training of maintenance staff etc.

Figure 1 Location Map of Project Area (No-scale)

This project comprised the following three packages

Package 1: Rehabilitation and expansion of the trunk canal between the upper and lower reaches of the Way Curup, and the improvement of irrigation facilities (branch water supply canals and terminal distribution facilities) on the left bank of the lower reaches of the Way Curup.

Package 2 : Improvement of irrigation facilities (branch water supply canals and terminal distribution facilities) on the right bank of the lower reaches of the Way Curup.

Package 3: Improvement of the existing drainage canal network, and additional improvement of terminal distribution facilities in the Way Jepara area.

(4) Borrower/Executing Agency

Republic of Indonesia / Directorate General of Water Resources Development, Ministry of Housing and Infrastructure Development (Former Directorate General of Water Resources Development, Ministry of Public Works)

(5) Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	¥1,422 million / ¥1,400 million
Exchange of Notes/Loan Agreement	September 1991 / September 1991
Terms and Conditions	Interest rate: 2.6%, Repayment period: 30 years (10 years for grace period), General Untied (Partially untied for consulting services)
Final Disbursement Date	October 1998

2. Results and Evaluation

(1) Relevance

This was a high-priority project in line with the objectives of Indonesia's Fifth Five-Year Plan. It remains relevant for the project objectives of supplying the region with rice and improving the country's self-sufficiency in rice.

(2) Efficiency

The executing agency was the Directorate General of Water Resources Development, Ministry of Housing and Infrastructure Development (Former Directorate General of Water Resources Development, Ministry of Public Works), and the project was implemented by the Directorate General's Way Jepara-Way Curup Project Office.

Soil conditions under a section of approximately 2km of the newly constructed trunk canal in the middle reaches of the Way Curup were softer than anticipated, resulting in repeated landslides during construction. The executing agency was forced to make a radical review of the design and construction methods in the affected area, and it reached the conclusion that it would be almost impossible to finish the project within its budget and time constraints. As a result, there is still no supply of water to the lower reaches of the Way Curup. The Indonesian government is rehabilitating the collapsed section using its own funds, and it is scheduled for completion by 2001.

With the exception of the affected section, the overall implementation schedule and total project costs were largely as planned.

(3) Effectiveness

1) Quantitative Effects

Table 1 shows rice productivity at the time of the appraisal, and the level reached at the time of the evaluation. The initial target was 4.0~4.5 tons/ha for each area. The recorded productivity for the upper reaches of the Way Curup in 1999 was 4.0 tons/ha in rainy season and 3.0~3.5 tons/ha in dry season, reaching 70~90% of the target level. Productivity in the Way Jepara area is reported to be mainly around 5.0 tons/ha, exceeding the anticipated level. However, one section of the trunk canals is under repair, preventing water supply to the lower reaches of the Way Curup, and productivity in that area remains at around 2.0 tons/ha, unchanged from before the project. Rehabilitation works now under way on a section of trunk canal will complete the project, allowing realization of its effects in the whole project area.

It was unable to obtain valid recorded data for cultivated area, rice production and other aspects, forcing abandonment of quantitative analysis of project effects.

Table 1 Productivity Indicator

	Before implementation	After completion	
		Target value at the time of appraisal	Actual in 1999
Upper reaches of Way Curup (2,220 ha)	R.S.: 1.0～1.5 ton/ha D.S.: n.a.	R.S.: 4.5 ton/ha D.S.: 4.5 ton/ha	R.S.: 4.0 ton/ha D.S.: 3.0～3.5 ton/ha
Lower reaches of Way Curup (2,566 ha)	R.S.: 2.0 ton/ha D.S.: n.a.		R.S.: 2.0 ton/ha D.S.: n.a.
Way Jepara area (938ha)	R.S.: n.a. D.S.: n.a.	R.S.: 4.5 ton/ha D.S.: 4.0 ton/ha	R.S.: 5.0 ton/ha D.S.: n.a.

R.S.: Rainy season, D.S.: Dry season
※By executing agency

2) Evaluation by local residents

The study conducted a questionnaire survey of 100 households of beneficiary farmers[1]. The average agricultural land area per household was 1~1.5ha, and most farmers grew two rice crops per year. Most had been farming for at least ten years. The questionnaire asked questions on the following points:

- The current state of the irrigation facilities and your evaluation of them.
- Payment of water usage charges.
- Increase in productivity.
- Participation in operation and maintenance activities.
- Overall evaluation and wishes for the future.

The findings of this survey are summarized below as supplementary reference material to gauge the effects of the project.

<Evaluation and the state of the facilities>

After the completion of the facilities, they were transferred to the local government, which is responsible for their maintenance. An overwhelming majority of respondents were satisfied with the management of

[1] The 100 households are a random sample selected with the assistance of the executing agency (the Way Jepara – Way Curup Irrigation Project Office) from the upper reaches of the Way Curup and the Way Jepara area within the project area. The questionnaires were conducted in the form of face to face question and answer sessions.

the facilities by the local government. Over 90% said that they were “satisfied” and less than 10% were “dissatisfied”.

While the state of the facilities is rated good overall, many respondents stated that “embankments are low and prone to overflowing” (Figure 2). Nearly 90% of respondents said that they had suffered damage due to inadequate drainage, and their answers were that “the capacity of drainage canals is inadequate and they are prone to flooding” and “canals overflow in strong rain” (Figure 3).

Figure 2　Current State of the Irrigation Facilities (multiple responses permitted)

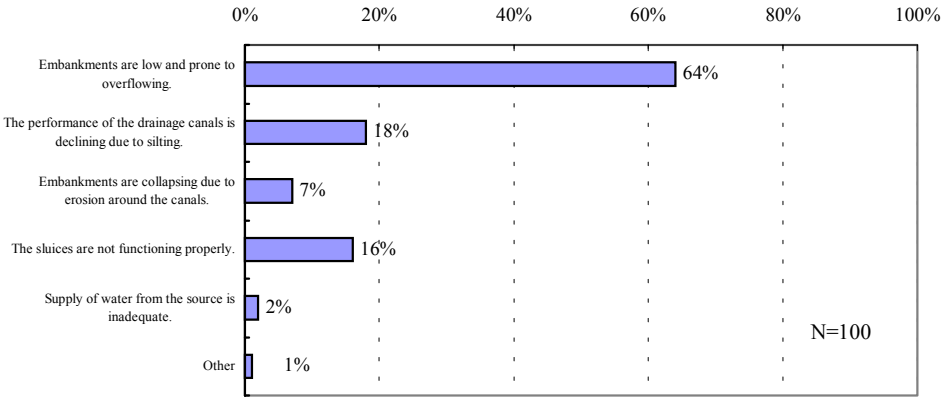
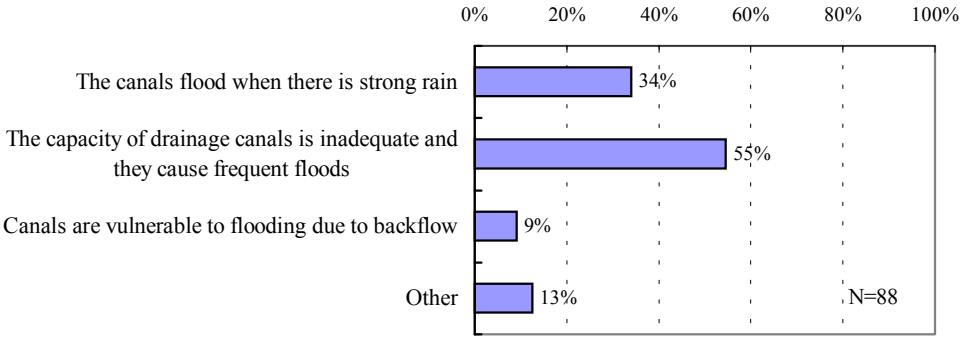


Figure 3　State of Drainage Problems (multiple responses permitted)



Less than 20% of respondents said that there were problems with water supply, but “frequent improper diversion of water” was pointed out in many cases.

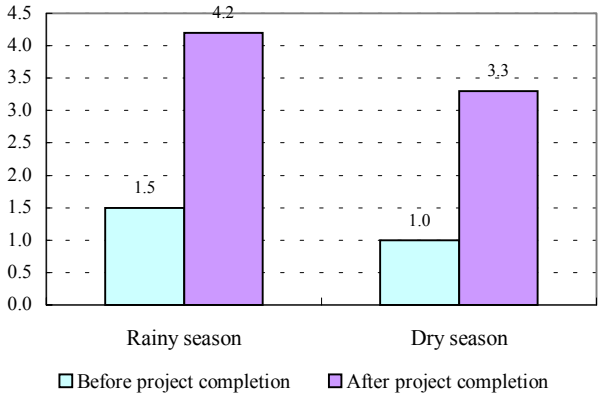
<Payment of water usage charges>

All respondents took the view that water usage charges (paid to the local government) are “a kind of tax”, and all said that they “pay part of the charges”. Despite the fact that all respondents said that the level of charges was “reasonable”, the payment situation is not good.

<Changes in productivity>

Figure 4 shows the responses to the question of how productivity had changed between before and after the project. The figures are averages of the valid responses. Production increased by 180% in rainy season and 230% in dry season, the latter being a particularly large increase.

Figure 4 Rice Productivity Before and After the Completion of the Project (average of responses: tons/ha)



<Overall evaluation and wishes for the future>

When interviewees were asked to rate their satisfaction with the irrigation project as a whole on a four grade scale, an overwhelming majority of 98% were in the satisfied group, comprising 91% who were "very satisfied" and 7% who were "satisfied".

The opinions and wishes listed below were expressed regarding improvements to the facilities. The related problems should be identified (technical problems with the facilities, lack of maintenance by the local government or the water users associations, etc.) and remedial measures examined.

- The embankments are too low and prone to flooding.
- The drainage canals do not have adequate capacity, and they often overflow.
- The access roads should be improved.
- Damaged parts of the facilities need to be repaired.
- The volume of water drawn from the source is inadequate.

The results of the above survey indicate that the residents in the two areas already receiving water supplies are highly satisfied.

3) Recalculation of Economic Internal Rate of Return (EIRR)

The EIRR was not recalculated because quantitative data was not available.

(4) Impact

1) Environmental Impact

The questionnaire survey of beneficiaries, which was introduced above, included a question on whether the project had caused any negative environmental impact. Of the 100 respondents, 98 (98%) replied that there was no such impact.

2) Social Impact

According to the findings of this questionnaire survey, land for the project had been acquired from 62 of the 100 respondents (62%). Of those, six (10%) said they were "satisfied" with the value of compensation

paid, and 54 (90%) said they were either “somewhat satisfied” or thought the compensation was “unsatisfactory but acceptable”. None described themselves as “dissatisfied”. While there were differences of degree, these findings indicate that land was acquired with the acceptance of the residents.

When respondents in the questionnaire survey were asked whether the project had produced a desirable effect on the regional economy, nearly all farmers answered affirmatively because their agricultural incomes had risen.

(5) Sustainability

1) Operation and Maintenance

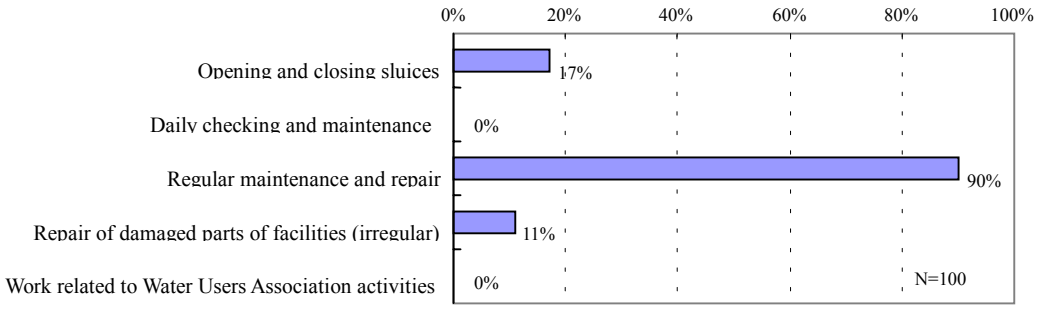
Responsibility for the maintenance of the existing irrigation facilities in the Way Jepara area had already been transferred to the Lampung provincial government and farmers by the time of the appraisal, and the same system is still in operation now. Maintenance of the facilities in the upper and lower reaches of the Way Curup after their completion was transferred, with the Lampung provincial government taking responsibility for the headworks and the trunk and branch canals and the water users associations taking on the terminal distribution facilities. As of September 2000, the terminal distribution facilities had been transferred to the water users associations, but the headworks and main and branch canals had yet to be transferred to the local government. Therefore the Way Jepara – Way Curup Irrigation Project Office still handles maintenance work. According to that Office, the transfer from central to local government is scheduled to be made once rehabilitation works now under way are completed.

In the Way Jepara area, which is the previously irrigated area, 17 water users associations have been set up (as of the end of 2000) to collect water usage charges and the maintenance of terminal distribution facilities. In the Way Curup area, six water users associations have been established in the upper reaches and five in the lower reaches, for a total of 11. However, as mentioned above, water supply has begun in the upper reaches, but not yet in the lower reaches. Therefore only the six associations in the upper reaches are functional, collecting charges and maintaining facilities. The water users associations pay the collected charges to the local government, and they also continue their previous practice of collecting product sharing contributions independently. The associations are functioning effectively as the basic units of maintenance activity. The water usage charge collection system is a new method that was introduced at the direction of the district. The charges collected are used for maintenance and repairs on terminal distribution facilities and branch canals. The procedures from collection to distribution of the water usage charges can be summarized as seen below.

[1] The water users association for each irrigation block collects water usage charges from the farmers after each harvest.
[2] The charges collected in stage [1] are paid to the district revenue office.
[3] The district has a budget coordination committee, chaired by the governor, which coordinates and decides on the uses and allocations of the funds received in [2]. In addition to the governor, the main members represented on the committee are the local irrigation offices, the local development planning agency, the district revenue office and the federation of water users associations.
[4] Having checked the condition of the terminal distribution facilities and the branch canals, the committee described in [3] meets annually to allocate water use charges to the water users associations and local irrigation offices in charge of each part of the facilities, as required for maintenance and repair.

2) Participation in operation and maintenance activities

All respondents (100%) answered that they participated in operation and maintenance activities. Most of them cooperate in the work as members of the water users associations. Figure 5 shows the specific content of their work.



All respondents indicated their intention to continue these activities.

All members receive regular training from the local government in operation and maintenance skills. The training is well regarded as “very useful”, but over 80% stated that they “would like to be trained by experts”.

3) The maintenance condition of the facilities

The area (the upper and lower reaches of the Way Curup) were visited on 20th September 2000 to inspect the condition of the facilities built under this project. The trunk and branch canals on the upper reaches of the Way Curup River were in good condition between the headworks and a section on the trunk canal which was being repaired. The trunk and branch canals downstream from the repair site are not yet functional. The water users associations in the affected area were not operating, and daily maintenance such as grass cutting was not being carried out, but the facilities themselves were usable.

Other than the problem of incomplete repairs to the trunk canal, the area also faces the task of somehow overcoming its poor drainage. A drainage network has been built, but the sides of the canals are not surfaced, leaving them vulnerable to erosion, with resultant sedimentation and declining drainage capacity. As a result, some areas suffer from the constant threat of flooding due to poor drainage. The Indonesian government has asked the Japanese government for additional aid, and measures in that direction are under consideration[2].

4) Sustainability

The rehabilitation works now under way are expected to yield benefits, but without appropriate

[2] A survey of the problems involved in this project, and rehabilitation works, are to be carried out as one of 19 sub-projects covered by the Water Resources Development Sector Loan II, for which the exchange of notes was completed in March 2001.

maintenance there is no prospect of those benefits being sustainable. After the facilities are complete, the responsibility for their maintenance is to be transferred from the central government to the local government, but the local government should secure adequate and stable staffing and budget for maintenance, for the sake of the future sustainability of the facilities. It is also very important that the water users associations in the Way Curup area, which were established as the bodies for maintenance of terminal distribution facilities, should function effectively in maintenance activities, including the collection of charges. Guidance and training from the local government will be important to that end.

3. Lessons Learned

This project was suspended and altered at the construction stage, wasting considerable construction costs. To avoid that kind of problem in cases such as this, where soft ground conditions could be anticipated in the project area, appropriate soil and geological surveys should be carried out in the F/S or detailed design and the results should be used to confirm the suitability of the construction methods chosen.

Comparison of Original and Actual Scope

Item	Plan	Actual
① **Project Scope**		
1. Civil works		
a) Expansion of existing left-side trunk canal	Total: 14.6 km	Total: 12.9 km
- Rehabilitation section	7.3 km	Same as left
- Extension section	7.3 km	5.6 km
b) Branch canal	Total of 9 sections: 22.5 km	Total of 13 sections: 27.2 km
c) Terminal waterway network	3,504 ha	4,292 ha
d) Rehabilitation of discharge canal	(including 938ha of Way Jepara area)	
e) Rehabilitation of trunk drainage canal	4.0km	6.0km
f) Main branch drainage canal	Total of 4 sections: 29.5km	Total of 2 sections: 26.0km
g) Rehabilitation of maintenance access roads	43.3 km	30.5 km
	51.7 km	42.3 km
2. Procurement of maintenance equipment		
a) Bailer for dredging equipment		
b) Bulldozer for marshland		
c) Light truck	For 0.4～0.6 m^3	1 Unit for 0.8 m^3 use
d) Dump car	7-ton	Same as left
e) Four-wheel vehicle	-	3 trucks were added
f) Excavator	6-8 ton	Two 8-ton dump cars
g) Motorcycle	-	One added
h) Other spare parts	For 0.6 m^3	Same as left
i) Amphibian excavator	100cc	10 motorcycles as left
	One unit	Excluded
3. Consulting service	-	One for 0.4 m^3 use
a) Detailed design		
b) Construction supervision assistance	Foreign: 47M/M	Foreign: 50M/M
c) Procuring assistance of maintenance equipment	Local: 108 M/M	Local: 120 M/M
	Total: 155 M/M	Total: 170 M/M
d) Maintenance staff training and preparation of maintenance manuals		
e) Technology transfer to government staff		
② **Implementation Schedule**		
1. Loan Agreement	Sep. 1991	Sep. 1991
2. Consulting service	Jul. 1992 ~ Sep. 1993	Oct. 1992 ~ Dec. 1996
	Apr. 1994 ~ Jul. 1996	
3. Civil works		
a) Expansion of existing left-side trunk canal and improvement of irrigation facilities on the left bank area	Apr. 1994 ~ Mar. 1997	Jun. 1994 ~ Dec. 1996
b) Improvement of irrigation facilities on the right bank area	Jun. 1994 ~ May 1997	Jun. 1994 ~ May 1996
c) Rehabilitation of the existing drainage canal network and improvement of terminal distribution facilities in the Way Jepara area	Aug. 1994 ~ Jul. 1997	Jun. 1994 ~ Dec. 1996
※Rehabilitation of terminal distribution facilities	-	Dec. 1993 ~ Dec. 1994
4. Procurement of maintenance equipment	Sep. 1995 ~ Dec. 1995	Mar. 1995 ~ Jan. 1996
5. Land acquisition	Apr. 1992 ~ Mar. 1994	-
③ **Project Cost**		
Foreign currency	¥940 million	¥208 million
Local currency	¥733 million	¥1,465 million
Total	¥1,673 million	¥1,673 million
ODA loan portion	¥1,422 million	¥1,400 million
Exchange rate	Rp.1＝¥0.068 (Apr. 1991)	Rp.1＝¥0.0465 (Sep. 1996)