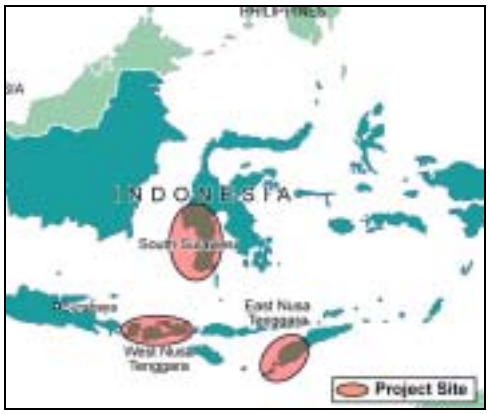
The Small Scale Irrigation Management Project

Report Date：October, 2002
Field Survey：August, 2001

1. Project Profile and Japan's ODA Loan



Location Map of the Project

Surface Irrigation in NTB (West Nusa Tenggara)

1.1 Background

The Republic of Indonesia accomplished self-sufficiency in rice in 1984. Production of food crops, including rice, soybeans, peanuts and corn, remained, however, one of the most important priorities in its development policies. The Government also emphasized land clearing and farm development projects on islands other than Java, mainly because of the lack of land for agriculture in Java and because a social and economic gap existed between Java and other regions of the country. In this context, Small Scale Irrigation Management Project (SSIMP) commenced in Eastern Indonesia in 1985.

SSIMP was originally launched with assistance of USAID (U.S. Agency for International Development) in 1985 to study the needs and feasibility of developing small-scale irrigation systems in Eastern Indonesia, where social and economic development lagged behind Java. SSIMP was to be financed by the Indonesian Government and USAID. However, the Indonesia Government could not allocate the necessary budget for SSIMP because of the financial difficulties, and requested the Japanese Government for financial assistance for SSIMP. Co-financing between USAID and JBIC (Japan Bank for International Cooperation) was agreed to in 1989, and Japan's ODA was provided to finance two subprojects of SSIMP which consisted of 15 subprojects in total.

1.2 Objectives

1) To diversify cropping patterns by introducing secondary crops (soy beans, peanuts, etc.), especially in dry seasons, and 2) to increase agricultural production and farmers' living standards in target areas by implementing studies on and constructing small-scale irrigation systems in South Sulawesi (SulSel), West Nusa Tenggara (NTB) and East Nusa Tenggara (NTT). SSIMP also aimed to increase the management and operation capacity of the executing agency and of farmers groups so as to enhance project sustainability.

1.3 Project Scope

The project scope of SSIMP consists of the activities listed below:

Surface-water Irrigation System

- Development of total irrigation area of 19,530 ha in South Sulawesi, West Nusa Tenggara, of which Japan's ODA loan covers construction of the Tiu Kulit dam and irrigation systems in NTB to serve a command area of some 1,700 ha.

Groundwater Irrigation System

- Development of total irrigation area of 5,240 ha in South Sulawesi, West Nusa Tenggara and East Nusa Tenggara, of which Japan's ODA loan covers Oesao irrigation systems in Nusa Tenggara to serve an estimated area of 600 ha with approximately 50 medium or deep wells.

Consulting Services:

- Project management and assistance;
  - To conduct on-site studies, such as project justification studies and plan review
  - To conduct detailed design studies and preparation of tender document
  - To formulate farmers' group with participatory approach
  - To conduct O&M and farming guidance, and
  - To implement construction works
- Special studies on water resource management and development methods, and
- Training service for local engineers and O&M staff in NTB

1.4 Borrower / Executing Agency

The Government of the Republic of Indonesia / Directorate General of Water Resources Development (DGWRD), Ministry of Public Works (Currently the Ministry of Settlement and Regional Infrastructure)

※ Actual implementation unit at each sub project level under the supervision of the executing agency is follows.

・ Surface water irrigation system in NTB: Project office was established in Provincial department of public works

Groundwater irrigation system in NTT: Ground water development project office was established in NTT by the executing agency.

1.5 Outline of Loan Agreement

Loan Amount Loan Disbursed Amount	1,896 million yen 1,893 million yen
Exchange of Notes / Loan Agreement	December, 1989 December, 1989
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.5% p.a. 30 years (10 years) Partially Untied
Final Disbursement Date	December, 1996

2. Results and Evaluation[1]

2.1 Relevance

At the time of project appraisal, the project objectives and its approach, i.e., changing water resources development manner from large-scale development to small-scale sustainable development was in line with the new-stream concept in agricultural development supported under the 5th Five Year National Development Plan (REPLITA V), which is summarized as follows:

1) To link social and economic development with the protection of the natural ecosystem and to link land and water use across the whole catchment area or ground water aquifer,
2) To introduce participatory approaches that involve farmers, planners and policy makers at every level of the project,
3) To recognize water resources as an economic commodity, in order to achieve efficient and equitable use, and
4) To empower women to participate in water resource development programs, including decision-making and implementation.

At present, the project's objectives and its concept are still relevant under current national policy, which prioritizes Eastern Indonesia development and the reduction of the economic gap between Java and other regions of the country.

2.2 Efficiency

2.2.1 Project Scope

Construction of Pamasar Embung irrigation system was added in the Surface-water Irrigation component during the implementation stage in response to a strong request from the local community. Consequently, total irrigation area for the Surface-water Irrigation component increased to 2,500 ha, from original plan of 1,700ha. The remaining scope was implemented as planned.

[1] This section, except for "*Relevance*", reviews only portions financed by Japan's ODA due to data availability. "The Project" refers to Japan's ODA portion of SSIMP.

2.2.2 Implementation Schedule

Though work was added to the original scope of project, as stated above, the Project was realized on schedule.

Oesao Groundwater Irrigation Systems were completed in December 1993, almost two years earlier than originally scheduled. After successful test well drilling at 16 locations with the Hand-Rotary Drilling Method and its evaluation, it was decided to adopt shallow tubewells with this method for all projects wells (248 tubewells, 2.5ha per well), instead of the deeper tubewells (50 tubewells, 12ha per well) originally planned by USAID. The implementation schedule shortened as a result. Hand-Rotary drilling was chosen because it is quicker-yielding, more cost effective and more acceptable to farmers because of its simple technology. Accordingly, all the sub-projects were completed efficiently and earlier than scheduled.

2.2.3 Project Cost

The local portion was almost 4 times bigger than the original estimated cost, mainly due to the expanded project scope. On the other hand, the foreign portion was considerably cost under-run, because of exchange rate. Accordingly, the total actual cost for the Project was almost same as planned.

2.3 Effectiveness

2.3.1 Quantitative Effect ---Agricultural Produce---

1) Surface-water Irrigation

Table 1 shows the actual agricultural performance of the Tiu Kulit Irrigation Area in NTB. In 1998, four years after project completion, performance exceeded the original target and is considered sufficient. Though monitoring data after 1998 were not available at the time of this evaluation, it can be assumed that the project has maintained this level of agricultural performance, since most farmers interviewed in a field survey reported that they raise two paddy crops a year in the tail reaches area and some have three in the upstream area.

Table 1 : Agricultural Performance of Tiu Kulit Irrigation (1,700 ha)

	Original Target	1994 Completion Year	1998 4 Years after Completion
Cropping Area (ha)			
(wet season)			
Paddy	1,700	1,800	1,887
(dry season)			
Paddy	0	0	570
Mungbean	340	340	325
Ground nuts	680	0	0
Soy bean	680	680	1,300
Crop. Intensity	200 %	166 %	240 %
Unit Yield (ton/ha)			
Paddy (wet season)	4.50	4.45	4.63
Paddy (dry season)	-	4.52	4.63
Mungbean	1.00	0.70	0.80
Ground nuts	-	-	-
Soy bean	1.20	1.00	1.10

source : Regional Irrigation Office in NTB

Pamasar Embung Irrigation is another surface-water irrigation scheme added to the scope of the Project. Unfortunately, no baseline data nor appropriate monitoring data after completion of the Project were available for this irrigation scheme. Thus, agricultural performance of Pamasar Embung Irrigation cannot be evaluated in this report.

Figure 1 : Beneficiary area of Surface water Irrigation in NTB

2) Groundwater Irrigation

Table 2 summarizes the distribution of pumps (wells) by sub-area in Oesao. 55% of the original pumps procured under the Project had already deteriorated and been replaced by the executing agency in 1999/2000, in response to the farmers' strong demand. The pumps installed under SSIMP were planned to be replaced by the farmers themselves

without financial support from the Government. However, farmers could not prepare sufficient fund for the replacement, and the Government decided to assist the farmers in the replacement. In Oesao-fan, the replacement ratio is near 80%. Project Officials think it will be necessary to replace most of the remaining pumps since their economic life is expected to be over in the near future.

Table 2 : Distribution of Pumps by Sub-Area

Sub-Area	Oesao-fan	Lili-fan	Naibesi-fan	Parili-fan	Total *
No. of Wells and Pumps	68	33	43	103	247
No. of Pumps Replaced	52 (76%)	25 (76%)	17 (40%)	41 (40%)	135 (55%)
No. of Pumps after Economic Life	16	8	26	62	112

Source: Groundwater Irrigation Sub-Project Office in NTT

Note: 1 sub-project was not identified in the data source.

Table 3 shows actual agricultural performance in the Oesao Groundwater Irrigation area. Before the Project, the cropping area in Oesao covered only 275 ha per annum, which means less than 50% in Land Utilization.. After project completion, it increased to 465 ha or 77% of Land Utilization in 1994 and improved to more than 100% after 1995. While the rice production in 1998 marked 3,180 tons, which is around 20 times of that in 1991. It seems other crops became stabilized as dry season crops. Accordingly the Oesao area drastically improved in terms of rice production and crop diversification was realized mostly as expected.

Table 3 : Agricultural Performance of Oesao Groundwater Irrigation (602.5 ha)

	1991 Before Project	1994 Completion Year	1995 1 year after completion	1998 4 year after completion
Cropping Area (ha)				
Paddy (wet season)	75	291	405	390
Paddy (dry season)	-	25	27	14
Mungbean	-	32	16	16
Soy bean	-	14	4	3
Maize	200	78	140	163
Vegetable	-	25	42	25
Total Cropping Area	275	465	632	611
Land Utilization	46%	77 %	105%	101%
Production (ton)				
Paddy (wet season)	167	1,157	1,620	1,580
Paddy (dry season)	-	101	1,600	1,600
Mungbean	-	38	19	23.
Soy bean	-	18	5	5
Maize	386	211	507	652
Vegetable [*1]	-	200	420	300.

source : Official data provided by Oesao Groundwater Irrigation Sub-project office.

[*1] Vegetables include tomatoes, longbeans, mustard greens, eggplants, cucumbers and chilies.

No official data after 1998 were available, so current performance cannot be measured objectively. However, during the present field survey for this evaluation, it was observed that performance has been maintained at a relatively high level, though, there is expected to be some disparity among sub-project areas due to varying social and economical conditions (details are discussed in *2.5 Sustainability 2) Current Status of Project Facilities*).

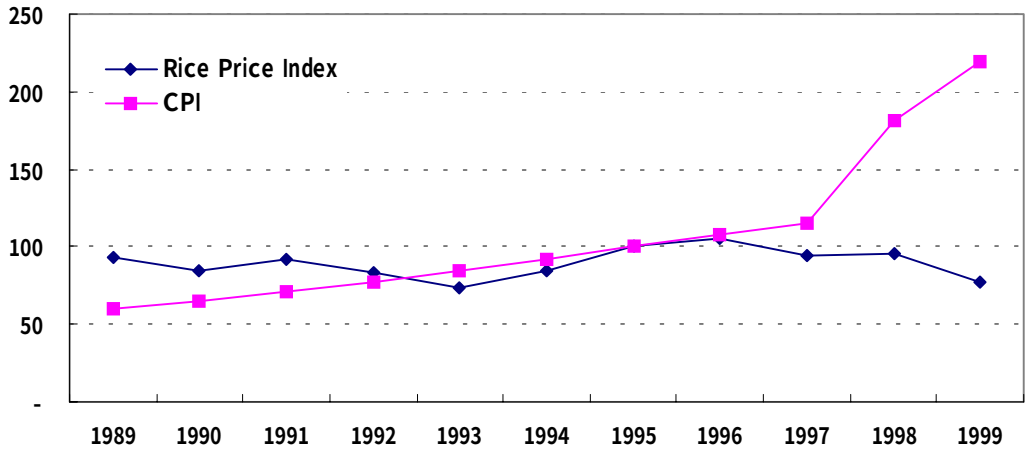
Figure 2 : Beneficiary area of Groundwater Irrigation in Oesao

2.3.2 Recalculation of EIRR (Economic Internal Rate of Return)

EIRR for the Project was re-calculated, using most of the same assumptions as at the time of project appraisal. The annual expenditure outflow was estimated, based on data in the project completion report, while additional agricultural output of the irrigation areas constructed under the Project of the Surface-water and the Groundwater Irrigation were regarded as benefit.

The recalculated EIRR was 5.9 %, while the projection at appraisal was 13.4 %. This discrepancy might be caused by the low rice prices in the 1990's while the general price index, i.e. CPI, increased and jumped up in the late 1990's. When the original EIRR was calculated in 1989, the CPI was lower than the Rice Price Index, but the Rice Price Index became relatively lower than the CPI, so that the current EIRR was re-evaluated as a smaller value than the original as a result of a change of balance in cost-and-benefit.

Figure 3 : Rice Price Index and General Price index



International Financial Statistics book 2001 (IMF)

Note: Value of 1995 =100

Rice Price Index is nominal term

2.4 Impact

2.4.1 Impacts on Farmers' Income and Regional Economy

<Surface-water Irrigation>

Table 4 summarizes data on average farming household income and expenditures (annual), collected in the Interview Survey of Beneficiaries[2] for this evaluation. The data for 1992 and 2000 were compared using 2000 as the substantial basis[3]. "Income from

[2] One hundred interviewees (beneficiaries) were selected in the project areas of Tiu Kulit and Pamasar Embung, basically by means of a random sampling method, with the cooperation of the Project Office. The questionnaire included a question on "Farmers' Economy" to obtain insight into changes in farmers' living standards.

[3] Using CPI in International Financial Statistics Book 2000. The CPI in the year of 2000 is not yet available at the time of evaluation, thus, the data in 1999 was applied for calculation instead of that in 2000, assuming no big discrepancy between 1999 and 2000.

Agriculture" increased at rate of 132%, while "Expenses for Agriculture" increased at 153%, resulting in an increase of "Net Income from Agriculture" at a rate of 124%. "Other Income" and "Total Income" increased at around 120%, but "Cost for Living" remained at the same level as before. Consequently, "Possible Savings" increased at around 170%. In conclusion, it can be said that the project has substantially contributed to increasing farmers' income in spite of increases in direct agricultural expenses, and certainly to improving their living standards. This is verified by survey results; to the question, "Do you think this project supports economic activity?", 98 of 100 respondents replied, "Yes, I do," specifying such reasons as "Increase in farmers income" and "Increased job opportunity".

Table 4 : Summary of Farmers' Economy (comparison in 2000 real basis)[4]

	①. Before Project Completion 1992	②. Recent (After Completion) 2000	②/①
Number of Family Members	4.9 nos.	5.4 nos.	112%
Income from Agriculture	6,737,303 Rp.	8,890,000 Rp.	132%
Expense for Agriculture	1,928,201 Rp.	2,950,000 Rp.	153%
Net Income from Agriculture	4,809,102 Rp.	5,940,000 Rp.	124%
Other Income	2,972,414 Rp.	3,240,385 Rp.	119%
Total Income	7,781,516 Rp.	9,180,385 Rp.	118%
Cost for Living	5,559,738 Rp.	5,417,500 Rp.	97%
Possible Savings	2,221,778 Rp.	3,762,885 Rp.	169%
Possible Savings per one family member	453,424 Rp.	696,831 Rp.	154%

source : Interview Survey to the Beneficiaries

<Groundwater Irrigation>

An example of an indirect, positive impact of groundwater irrigation on the regional economy -- revitalization of the local market place in Oesao -- was observed during the field survey in March 2002.

In Oesao, the local market had been held once a week before project completion, but became a morning-to-night, weekday market after project completion. According to the Sub-Project Manager of Groundwater Irrigation in NTT, the increase in and diversification of agricultural production in the project area enabled farmers to hold the market daily. People come to the market not only from the surrounding area but also from as far away as Kupang city to purchase fresh vegetables and daily commodities. Hence, positive impacts, not only on farmers' income but also on the regional economy, have been observed.

[4] Data on incomes and expenses in 1992 were converted into a substantial price in 2000, applying CPI (Consumer Price Index) quoting from International Financial Statistic Books 2000 (IMF).

Figure 4 : A View of Local Market in Oesao

2.4.2 Impacts on Technique/Knowledge

The approach illustrated below was adopted for Groundwater Irrigation Development in Oesao. It emphasized the participation of farmers and local Project Officers, and trial and error and feedback processes as keys to assuring project sustainability.

<SSIMP Approach in Groundwater Irrigation Development>

Step 1 : Project Justification Study

Consultants carry out field investigations, including test well drilling, to measure the potential of natural and human resources and to determine the appropriate development approach.

Step 2 : Farmer Group Formulation

A series of site meetings are arranged to discuss development possibilities of irrigation systems with farmers and to encourage them to formulate a Water User Group and participate in the project.

Step 3 : Site Selection

After farmer groups have been formed and registered, group leaders make an official development request to the project office. The project office confirms the technical feasibility of the project before selecting an appropriate site.

Step 4 : Mapping and Design

Topographic maps with farm lot boundaries are prepared and land ownership is clarified with farmers. Detailed designs are made by the consultant; the consultation process with farmers continues on the canal routes and distribution box locations.

Step 5 : Construction Works

The contractor encourages the farmers to provide labor for the construction. Farmers' participation in the construction is considered to generate a sense of ownership.

Step 6 : Participative O&M Guidance

The consultant prepares an O&M manual and holds a series of guidance sessions with farmers.

Step 7 : Intensive On-Farm Guidance

Demonstration farms are established within the project area for extension of new farming techniques, so as to encourage farmers to try new dry season crops. Extension workers stay in the villages to give farm guidance intensively through daily visits. The consultant's agronomist provides the necessary back-up and support.

According to the Sub-Project Manager in NTT, the above participatory approach was practiced by project officials, consultants and farmers, and necessary know-how and knowledge were transferred from the consultants to local people. In light of its positive effects on efficient/effective project implementation and sustainability, this experience should be considered for other, similar projects.

2.4.3 Environmental Impacts

At the time of project appraisal, some concerns regarding surface-water irrigation were stated in the appraisal documents: 1) Possible negative impact on fishery/aquaculture in the lower reaches of the rivers due to the quantity of river flows decreasing, and 2) Potential damage to forestry resources as a result of dam construction[5]. However, no serious problem has arisen so far reported by the Regional Irrigation Office.

To confirm the extent of environmental impact, a result of the aforementioned Interview Survey should be quoted here. When 100 people were asked whether or not they had observed any negative impact on the environment as a result of the project, 19% of respondents said "Yes", giving as an example the forest cutting implemented during dam construction. However, the anticipated negative impacts of the dam construction on the environment were considered minimal, since the construction scale was small enough, and no remarkable negative impact was observed during the field survey in August 2001 by the evaluation team. Needless to say, environmental elements should be monitored further to maintain project sustainability.

As for groundwater irrigation, each sub-project unit is too small to generate any negative environmental impact. Furthermore, the Project adopted pumps designed to limit the amount of water being pumped up, thereby preventing negative impacts on groundwater resources.

2.4.4 Social Impacts ---Land Acquisition---

There was no large land acquisition under the Project for either surface-water or groundwater irrigation. 84% of Interview Survey respondents (84 households) were not subject to land acquisition, while 16% were. Only 3% of the respondents were required to relocate. All respondents subject to land acquisition and resettlement accepted the government's offer of compensation without any serious resistance.

[5] Tiu Kulit Dam: Dam Embankment Volume 580,00 m^3, Effective Storage Capacity 10,000,000 m^3.

2.5 Sustainability

2.5.1 Operation and Maintenance

1) O&M Organization and Technical Capacity

<Surfacewater Irrigation>

Key facilities such as the dam and main / secondary canals in the Tiu Kulit Irrigation and Pamasar Embung Irrigation projects in NTB are currently operated and managed by Cabang Dinas Pengairan Sumbawa (branch office of provincial water resources departament at Sumbawa District). The tertiary canals are managed by farmers.

The major O&M activities of Cabang Dinas Pengairan Sumbawa are: 1) Grass cutting (twice a year), 2) Lubrication of gate hoists (once a year), and 3) Maintenance of the inspection road (at least once a year, depending on actual conditions), carried out with reference to the O&M manual prepared by the consultants.

<Groundwater Irrigation>

Oesao Groundwater Irrigation in NTT has been managed by farmers since being transferred from the Project.

As for the beneficiaries' (farmers) technical capacity, although no data that systematically measure this aspect were available at the time of evaluation, information collected during the field survey and in interviews conducted for this evaluation indicates that their knowledge and technical capacity are sufficient.

Especially for the groundwater irrigation project, as mentioned previously, beneficiary participation was required in the course of the project implementation. In addition, during the first two dry seasons after completion of irrigation facilities, farmers were provided technical and financial support, such as fuel supply for pumps from the Project, so that, through first-hand experience, they could acquire knowledge and skills for maintenance and operation of the systems. This support also increased farmers' cultivation of new secondary crops in the dry season, to which they were not accustomed before the Project. Since groundwater irrigation is totally new for most of the farmers, it is assumed that this two-year experience played a crucial role in determining subsequent farmers' behavior, and hence, project sustainability.

2.5.2 Current Status of Project Facilities

The Mission for this Evaluation visited Tiu Kulit Irrigation and Pamasar Embung Irrigation, both in NTB, in July 2001, and Oesao Groundwater Irrigation, in NTT, in March 2002, to inspect the current status of the project facilities. Major observations made during the site inspections are as follows (listed by sub-project):

<Surface-water Irrigation>

Tiu Kulit Irrigation

There was no defect in Tiu Kulit dam and appurtenances, while some defects were on the irrigation system to be properly rehabilitated. For instance, in the lower reach of Brankolong secondary canal, some structures had broken, probably due to soil conditions and the frequent passage of animals. There has been no serious damage to water conveying functions, but the canal should be properly rehabilitated.

Pamasar Embung Irrigation

There had been defects in the spill way (slope protection had been broken) adjacent to the dam structure, but they had already been repaired in 2000 with assistance from IBRD. In the lower reach of secondary canal, some parts of the canal lining were broken, as a result of buffaloes walking across the canal, and left as is.

Though there are some minor facility defects in both of the sub-projects at the time of evaluation they were still in good condition as a whole, with no serious constraints in view of project sustainability.

<Groundwater Irrigation>

There are four major sub-areas, namely Oesao-fan, Lili-fan, Naibesi-fan and Pariti-fan, comprising around 600 ha in total, in the Oesao Groundwater Irrigation area. The Mission visited Oesao-fan only (making interview to two farmers groups), since the conditions on the access roads to the other sub-areas did not permit access at the time of the field survey, which was conducted at the end of the wet season.

Oesao-fan Irrigation

The Mission interviewed only those farmers whose pumps were replaced by the executing agency in 1999/2000. However, based on interviews with farmers, it can be assumed that those farmers groups have established users fee collecting systems and do not have problems repairing minor defects (e.g. procurement of spare parts). Problems do arise when farmers need to replace original equipment, for example, when its economic life comes to an end.

Pariti-fan Irrigation

According to Officials and consultants interviewed in this field survey, the project facilities in Pariti-fan are not maintained as well as those in Oesao-fan: Project Officials reported that farmers in Pariti-fan, in general, are not as motivated to operate and maintain the irrigation systems as those in Oesao-fan, for the following reasons:

- Because of the low accessibility to market (distance, bad road conditions), they have fewer opportunities to generate cash income through irrigated farming, than Oseano Irrigation which is located close to the market,

- Traditionally they make their living from livestock, rather than from farming, and

- Agricultural crops are eaten by cattle. Farmers have been advised to install fences to separate cattle and crops. However, the farmers cannot afford adequate fencing.

2.5.3 Toward Sustainability

While the technical capacity of farmers is considered sufficient, appropriate monitoring and supporting activity by the government is necessary to sustain the project. In addition, organizations for O&M should be established in a form of WUA (Water Users Association). A WUA is formed by bringing several farmers' groups together under the coordination of the local government. In the case of Oesao Groundwater Irrigation, though the office assisted farmers groups in formulating WUAs, 37 Water Users Associations were established (registered to the second level Local Government: Kabupaten) as of 2001, while 67 WUAs are scheduled to be established. According to the Head of Water Resources and Irrigation, Provincial Office, in NTT, a current challenge in project sustainability is the strengthening of WUAs.

3. Lessons Learned

It is useful for Medium- and small-scale water resources development projects to incorporate the following components in project design:

1) a sufficient on-site technical review of plan and design during the pre-construction stage.
2) assistance, with a participatory approach, to formulate farmers' groups and establish self-funding system for the facilities.
3) follow-on activities, such as intensive guidance after project completion, to support the learning process for O&M techniques.
4) consideration of an area-wise development approach, binding such related infrastructures as feeder roads, markets, etc., to maximize the effect/impact of the project.

4. Recommendations

(For Groundwater Irrigation)

Most of the original facilities/equipment installed under the Project are facing the end of their economic life, so it is essential to assist farmers in preparing for their replacement.

Prior to extend any further assistance, however, the Regional Irrigation Office would need to check and verify farmers' actual financial ability/affordability for the future overall replacement.

Based on the results of such survey, Government bodies and farmers groups can identify appropriate measures for those who need it. Without such a process, it is impossible to make rational decisions regarding further assistance.

Comparison of Original and Actual Scope

Item	Plan	Actual
(1) Project Scope		
1.Surface Water Irrigation	- Construction of dams and irrigation system in NTB, Tiu Kulit dam irrigation (approx. 1,700 ha)	- Construction of Tiu Kulit dam irrigation sub-project, NTB (1,800 ha) - Construction of Pamasar Embung irrigation sub-project, NTB (700 ha)
2.Groundwater Irrigation	- Construction of irrigation system in Oesao plain, NTT (approx. 600 ha)	- as planned
3.Consulting Services <Scope of Works>	- Overall project management	- as planned
	- Review on detailed design and construction supervision of surface water sub-project	- as planned
	- Project justification study, detailed design, making tender documents, construction supervision, etc. of groundwater sub-project	- as planned
	- Execution of special study a) Water management study b) Agricultural study c) Formulation of future SSIMP	- Execution of special study a) Formulation of following SSIMP-II - Additional investigation and review on detailed design and preparation of tender documents for the following dams/weir to be implemented under SSIMP-II a) Gapit dam b) Sumi dam c) Salomekko dam d) Palara weir - Execution of Sumbawa Water Resources Development Study (master plan)
<Man-Month>		
	Professional (A) : 83 M/M	- as planned
	professional (B) : 322 M/M	- as planned

(2) Implementation Schedule		
1.Loan Agreement	Sep. 1989	Dec. 1989
2.Selection of consultant	Jul. 1989 – Jun. 1990	Oct. 1989 – Jun. 1990
3.Surface-water		
a) Construction work	May 1991 – Aug. 1994	Dec. 1991 – Apr. 1994
b) Consulting Services	Jul. 1990 – Aug. 1994	Dec. 1990 – Jul. 1994
4.Groundwater		
a) Construction work	Sep. 1991 – Oct. 1995	Sep. 1991 – Dec. 1993
b) Consulting Services	Jul. 1990 – Aug. 1994	Dec. 1990 – Jul. 1994
5.Additional Works		
a) Construction work	---	May 1994 – Nov. 1995
b) Consulting Services	---	Oct. 1994 – Aug. 1995
(3) Project Cost		
Foreign currency	1,358 million yen	201 million yen
Local currency	873 million yen (11,956 million Rp)	2,029 million yen (40,580 million Rp)
Total	2,231 million yen	2,230 million yen
ODA loan portion	1,896 million yen	1,893 million yen
Exchange Rate	1Rp. = 0.073 yen (Apr. 1989)	1Rp. = 0.05 yen (Weighted average during project implementation)

Independent Evaluator's Opinion on the
Small Scale Irrigation Management Project

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The project objectives to improve agricultural performance of the area by means of developing surface water and groundwater irrigation in parts of the eastern region of Indonesia is still significantly relevant with the national development priority of the country.

Time performance of the project conduct contributed significantly to the efficiency of the project. In addition to keeping the activity be conducted on schedule, selection of a more appropriate and acceptable method during the project was proven to be very helpful in meeting project efficiency.

Significant improvement in agricultural performance strongly proved that this project was very effective in actualizing the ultimate objectives of the project. However, we have to be wise in tolerating the fact that the project EIRR was much lower that that targeted by the appraisal due to ever-decreasing level of agricultural terms of trade.

Positive impacts have been reported as very significant with a meaningless level of negative impact of the project. However, protecting hydrological condition of the system through upstream conservation is advisable to have the irrigation system environmentally sustainable.

Technical and institutional sustainability of the project relied on farmers participation could be considered very appropriate assurance of system sustainability. This participative management is satisfying the emerging model of national irrigation policy reform. However, such sustainability needs to be supported with a more conducive system to make agriculture more profitable. Otherwise, social capital has been developed might be eroded after a few years.

Promoting favorable condition for agriculture is, therefore, recommended to make any agricultural and irrigation development in the Republic be more feasible in providing better prosperity to both the people and the nation.