Indonesia

Small Scale Irrigation Management Project (2)

Report Date: January 2003

Field Survey: December 2002

1. Project Profile and Japan's ODA Loan

Project area location map

Secondary and tertiary canals in the Salomekko irrigation area

1.1 Background

The Eastern region of Indonesia has been economically behind compared with other parts of the country. The Indonesian government has allocated a large amount of public funds to irrigation development projects targeting development of this region. In three Eastern Region provinces of South Sulawesi, West Nusa Tenggara and East Nusa Tenggara, agriculture occupies a large part of the local economy, accounting for over 50% of the economy of West Nusa Tenggara and East Nusa Tenggara, in particular. However, this region is the driest part of the country with a dry season lasting for 8 months or longer. Some areas have an annual precipitation less than 1,000mm. This environment makes it extremely difficult to cultivate crops without irrigation water in this region (except for several areas) and inhibits increase of agricultural production. Under these circumstances, a special study for continuance of the Small Scale Irrigation Management Project I (SSIMP-I) was conducted and sub-projects of high priority were selected.

It was considered highly important to actively support irrigation development in Eastern Indonesia through the implementation of the second phase of the project.

1.2 Objectives

To carry out small scale irrigation development projects in three provinces of West Nusa Tenggara, East Nusa Tenggara and South Sulawesi in Eastern Indonesia for the purpose of increasing production of rice and other agricultural products, thus contributing to income enhancement and poverty reduction of farmers.

1.3 Project Scope

(1) Irrigation development

Irrigation development by surface water irrigation sub-projects in which dams and headworks are to be constructed and groundwater irrigation sub-projects undertaken as listed below, covering the total irrigation area of 14,000ha.

Project scope of irrigation development (initial plan)

Province and region	Sub-project	Irrigation system
West Nusa Tenggara		
Sumbawa Island	Bringin Sila	Headworks
	Pelala	Headworks
	Gapit	Dams
	Sumi	Dams
	Sumbawa	Groundwater
East Nusa Tenggara		
Flores Island	Wae Mantar II	Headworks
Sumba Island	Wae Wagha	Spring
	Kahale	Headworks
Timor Island	Oesao	Groundwater
South Sulawesi	Awo	Headworks
	Salomekko	Dams

(2) Procurement of equipment for maintenance

(3) Consulting services

Review on detailed designs for the construction work described above, supplementary measurement survey, preparation of bidding documents, supervision of the construction work, and training services (training for the staff and farmers' groups to efficiently maintain project facilities, and support to farmer's groups to promote organized activities)

1.4 Borrower/Executing Agency

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

1.5 Outline of Loan Agreement

Loan Amount Loan Disbursed Amount	8,135 million yen 8,076 million yen
Exchange of Notes Loan Agreement	November 1994 November 1994
Terms and Conditions -Interest Rate -Repayment Period (Grace Period) -Procurement	 2.6% 30 years (10 years) General Untied (Partially Untied for Consulting Service)
Final Disbursement Date	December 2000

2. Results and Evaluation

2.1 Relevance

Development of Eastern Indonesia was listed as an important issue in the national development plan REPELITA IV set out under the government policy of eliminating economic gaps between regions and easing poverty. In this sense, too, the objective of the project, which was "to carry out small scale irrigation development projects in three eastern provinces (West Nusa Tenggara, East Nusa Tenggara and South Sulawesi) for the purpose of increasing production of rice and other agricultural products, thus contributing to income enhancement and poverty reduction of farmers" was relevant. This is evidenced by the economic level in each region during the project period (see the table below) (the economic level of Eastern Indonesia including three provinces covered by the project is relatively low).

Table 1: Comparison of economic level among region/province of Indonesia (values in 1997)

Region/Province	Regional income (1,000 Rp.)	Percentage against income in Jakarta	Population below the poverty line (%, 1996)
West Indonesia	**2,992**	**30.5**	**10.6**
Sumatra	2,959	30.2	9.8
Java	2,994	30.5	11.5
(Jakarta)	9,808	100.0	2.5
East Indonesia	**2,641**	**26.9**	**15.4**
Bali	3,347	34.1	4.3
West Nusa Tenggara	**1,208**	**12.3**	**17.6**
East Nusa Tenggara	**1,864**	**19.0**	**20.6**
East Timor	1,011	10.3	31.2
Maluku	1,864	19.0	19.5
Irian Jaya	4,392	44.8	21.2
South Sulawesi	**1,742**	**17.8**	**8.0**
Kalimantan	4,752	48.5	14.2
Entire Indonesia	**3,130**	**31.9**	**11.3**

Source: "Statistical Yearbook" 1998 by Central Bureau of Statistics

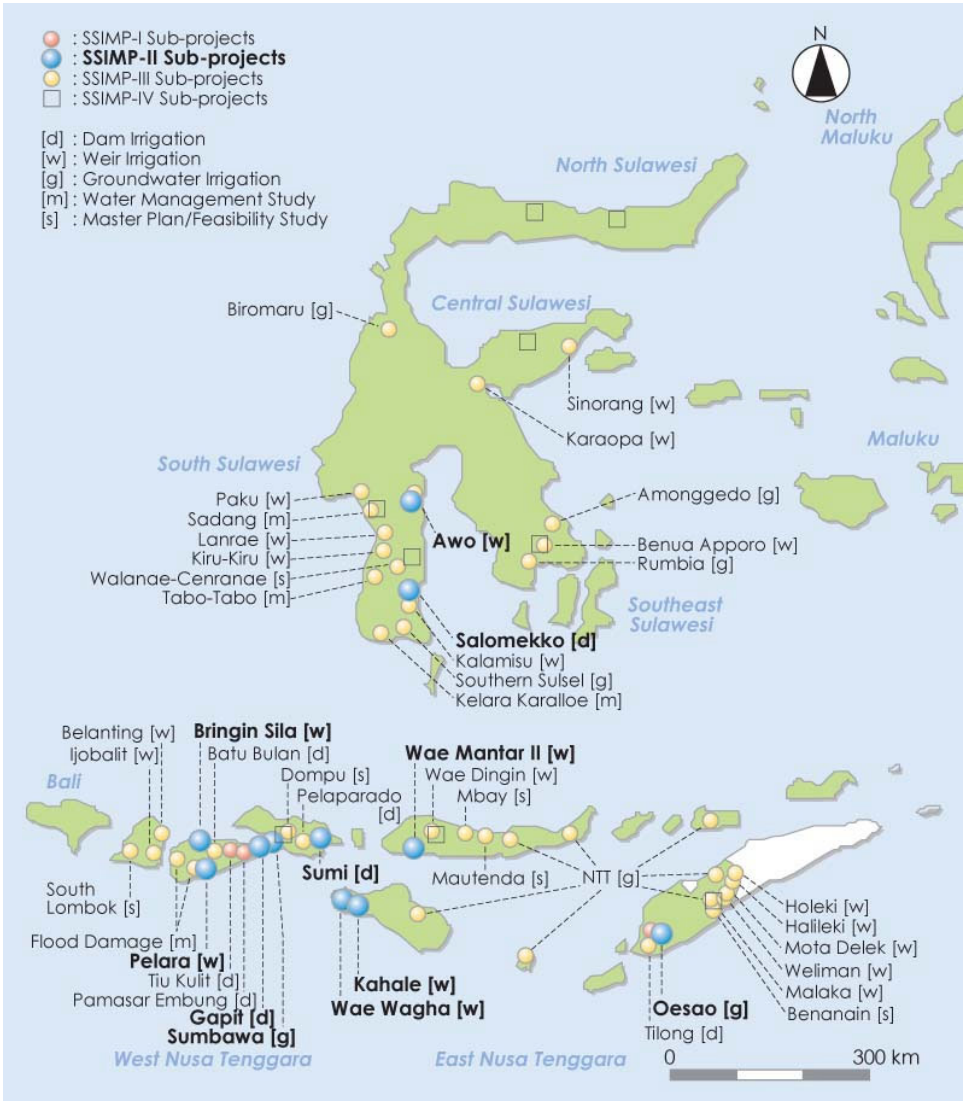
Note: The poverty line varies by province and differs between cities and farming villages. For example, the national average in 1996 for farming areas was 27,413Rp whereas that for urban areas was 38,246Rp.

The basic development concept for SSIMP was (1) to ease poverty in the Eastern region and reduce economic gaps between regions, (2) to create tangible effects and benefit from development quickly through the implementation of economically efficient and effective development projects, and (3) to enable sustainable irrigation agriculture. These points remain important for the promotion of independent development of each region even after the decentralization (Otonomi-Daerah) in 2001, and the project has maintained its relevance to the present. Under this background, SSIMP-III is currently underway aiming at completion in 2003. In addition, the Loan Agreement for DISIP (decentralized Irrigation System Improvement Project), which is equivalent to SSIMP-IV, was signed in October 2002.

Table 2: Outline of Small Scale Irrigation Management Development Project

	SSIMP-I	SSIMP-II evaluated this time	SSIMP-III to be completed 2003	DISIP L/A signed in October 2002
Implementation period	1990-1994	1995-1998	1998-2003	2002-2008
Number of target provinces	2	3	6	8
Number of sub-projects	3	11	40	27
Irrigation area (ha)	3,100	15,786	45,000	99,250
Number of beneficiaries of water supply	-	10,000	240,000	n.a
Water source facilities				
Dam (number)	1	3	3	n.a
Reservoir (number)	1	0	0	n.a
Headworks (number)	0	6	12	n.a
Well (number)	248	192	310	n.a

Figure 1: Distribution of sub-project locations



Source: Prepared based on materials provided by the executing agency. As for SSIMP-IV (DISIP), only locations of major sub-projects are shown.

2.2 Efficiency

2.2.1 Project Scope

[South Sulawesi Province]

In South Sulawesi, two sub-projects to establish surface water irrigation system were implemented; Awo Weir Irrigation Extension Sub-project and Salomekko Dam Irrigation Sub-project. Both sub-projects have been completed almost according to the planned scope, with a little change in the design and volume of construction works.

[West Nusa Tenggara Province]

In West Nusa Tenggara, the four surface water irrigation sub-projects of Bringin Sila Weir Irrigation, Pelala Weir Irrigation, Gapit Dam Irrigation and Sumi Dam Irrigation, and Sumbawa groundwater irrigation development, were implemented. In each of the surface water irrigation sub-projects, the project scope was expanded under the policy of expanding the beneficiary area as far as possible within the limit of the budget available. On the other hand, the scope of Sumbawa Groundwater Irrigation Sub-project was reduced to cover an area of 200ha (17pumps installed) compared with the original plan which was to construct 600 tubewells covering an area of 1,400ha. The reason for this reduction is as follows:

> *A detailed survey following the signing of Loan Agreement revealed that deep wells were needed in many of the planned locations and, therefore, the economic cost (estimate) increased. As a result, construction of many wells was considered unfeasible and these were excluded from the scope of SSIMP-II. It was decided to construct these wells in stages using other budgets such as the national budget (APBN). Eventually a policy was set that groundwater irrigation systems should be developed in areas other than the surface water irrigation areas (including the surrounding areas) and thus the area covered by the groundwater irrigation system has been reduced.*

Although the scope of Sumbawa Groundwater Irrigation Sub-project has been reduced, the irrigation system has come to provide water to areas of 640ha in total (as of FY2001) thanks to subsequent construction projects financed by the national budget and the succeeding SSIMP-III.

[East Nusa Tenggara Province]

In East Nusa Tenggara, the three surface water irrigation sub-projects of Wae Mantar II Weir Irrigation, Wae Wagha Spring Irrigation and Kahale Weir Irrigation, and Oesao Groundwater Irrigation Extension Sub-project were implemented. The scopes of Wae Mantar II and Kahale were expanded under the policy of expanding the beneficiary area as far as possible, while the scope of Wae Wagha Sub-project was reduced to adjust for the expansion of those two projects. The Oesao Groundwater Irrigation Extension Sub-Project has been completed as planned.

2.2.2 Implementation Schedule

Among four sub-projects to establish surface water irrigation systems implemented through the

international competitive bidding (ICB), three sub-projects have been completed several months to one year earlier than initially planned. Early completion is preferable in that tangible effects are generated quickly. On the other hand, most of those implemented through local competitive bidding (LCB) have been completed a little behind the schedule.

2.2.3 Project Cost

The cost of Sumbawa Sub-project has been reduced due to the reduction in the project scope mentioned above (according to the Executing Agency). The reduced amount was reallocated for the expansion of other sub-projects. In addition, increase and decrease of the projects costs have occurred within other sub-projects with the expansion and reduction of the project scope. In total, the project cost exceeded the amount estimated at the planning stage by around 0.6%, and the exceeded portion was financed by the government fund. The loan disbursed amount was 8,076 million yen, less than the loan limit of 8,135 million yen.

2.2.4 Continuity from SSIMP-I

SSIMP-II, which is the succeeding project of SSIMP-I, has been carried out to provide technical cooperation in each phase of the project cycle including study and planning, designing and implementation, and operation and maintenance (O&M) after completion. These circumstances are considered to have contributed to the smooth progress of the project and realization of a satisfactory effect and impact after completion. To be specific, the project is characterized by the following:

(1) The preparatory study and planning (including review on the design) was carried out as part of SSIMP-I under the title of "Special Study for Formulation of Future SSIMP" by a consulting team comprising the same members as that of this project. This resulted in the smooth progress and completion of the project.

(2) With regard to ground water irrigation, a participatory approach to the formation and completion of the project established through the implementation of SSIMP-I, which is called "SSIMP approach to Groundwater Irrigation Development[1]", was practiced and functioned effectively.

(3) The local consultants who participated in SSIMP-I also participated in the project. Their know-how and knowledge were utilized to further enhance the project capability.

2.2.5 Effectiveness of the Participatory Approach

Unlike the large scale irrigation project for immigrants which has been promoted in Sumatra and other areas, this is a small scale irrigation project basically for local residents who have been living there for a long time. The participatory approach encouraging involvement by beneficiaries worked because it was introduced in the areas where the residents have a strong sense of solidarity. This

[1] An approach which emphasizes the participation of farmers and local project officers, and the feedback process. In SSIMP-I, this approach contributed to efficient and effective implementation of the project and realization of sustainable and independent development.

approach helped establish the ownership of Water Users' Associations (WUAs).

2.2.6 Participation by NGO

As for the two sub-projects in South Sulawesi, a local based NGO called LEPPSEM (Lembaga Pengembangan dan Pembinaan Sosial Ekonomi Masyarakat: Construction Association for Socio-Economic Development of Village Communities) has been participating in the project as the coordinator between the administration and farmers from the implementation stage through to today. Specifically, they have acted as a mediator in the designing of tertiary canals, formation of WUAs and socialization in connection with the cultivation planning. The NGO's participation helped maintain good communications between the two sides and contributed to efficient implementation of the participatory development projects.

2.2.7 Environmental Impact Assessment

Prior to the dam construction required for the establishment of a surface water irrigation system, an environmental impact assessment (EIA) was conducted according to the government regulations. The result indicated that no substantial change was required in the plan or design. Thus, construction of facilities including dams has been carried out and completed almost as planned.

2.3 Effectiveness

2.3.1 Agricultural Production Performance

The table below gives a comparison between the original targets and actual cultivation area (ha) achieved in each sub-project area. According to the data obtained from this survey, the total rice cultivation area is 10% larger than the original target and the total area for cultivation of other grains is only 3% smaller than the target. The overall performance of the project is satisfactory.

Table 3: Achievement of the target cultivation area
(actual cultivation area of rice and other grains, 2001[note])

Sub-project	Cultivation of Rice			Cultivation of Other Grains		
	Plan (ha)	Actual (ha)	Achieve-ment Rate	Plan (ha)	Actual (ha)	Achieve-ment Rate
South Sulawesi						
Awo Weir Irrigation Extension	4,180	3,516	84%	--	--	--
Salomekko Dam Irrigation	1,900	2,725	143%	1,900	127	7%
West Nusa Tenggara						
Bringin Sila Weir Irrigation	1,675	2,010	120%	918	3,156	344%
Pelala Weir Irrigation	3,890	3,590	92%	1,942	3,150	162%
Gapit Dam Irrigation	1,300	2,154	166%	1,625	1,253	77%
Sumi Dam Irrigation	1,290	n.a	n.a	1,290	n.a	n.a
Sumbawa Groundwater Irrigation	1,400	705	50%	2,000	997	50%
East Nusa Tenggara						
Wae Mantar II Weir Irrigation	1,900	4,216	222%	--	--	--
Wae Wagha Spring Irrigation	612	197	32%	490	--	0%
Kahale Weir Irrigation	468	341	73%	122	--	0%
Oesao Groundwater Irrigation Extension	600	177	30%	900	873	97%
Total	**17,925**	**19,631**	**110%**	**9,897**	**9,556**	**97%**

Source: Data provided by the executing agency

Note: The figures for Oesao Groundwater Irrigation Extension are as of 1998. The totals do not include the data on Sumi Dam Irrigation.

The performance of Sumbawa Groundwater Irrigation Sub-project cannot be evaluated in comparison with the original target because of the decrease in the project scope mentioned in the section on efficiency. Among sub-projects in East Nusa Tenggara, in contrast to the remarkably high achievement level of Wae Mantar II Weir Irrigation Sub-project, the performance of the other three sub-projects has been poor. In the Wae Mantar II Weir Irrigation area, farmers can raise two to three rice crops a year thanks to water supply by irrigation and rainfall. On the other hand, various problems have been pointed out regarding the Wae Wagha Spring Irrigation Sub-project, Kahale Weir Irrigation Sub-project and Oesao Groundwater Irrigation Extension Sub-project, according to the executing agency, including farmland development being behind schedule, insufficient

functioning of WUA, lack of guidance for farmers engaging in agriculture and high production costs in these extremely remote regions.

Although complete data on unit yield (tons/ha) and production (tons) is not available, in the cases of the Salomekko Dam Irrigation and Sumbawa Groundwater Irrigation areas, which we visited in this survey, the unit yield has increased with the introduction of double cropping to 4.5-6.5 t/ha as compared to 2.5-3.0 t/ha before the completion of the project, when only one paddy crop was grown in rain-fed paddy fields during the rainy season. Particularly in West Nusa Tenggara, where weather-dependent agriculture had been practiced and little was harvested in unfavorable years, productivity has increased at least fourfold. Miscellaneous non-staple crops including grains also seem to be widely grown during the dry season, indicating that crop diversification has been realized.

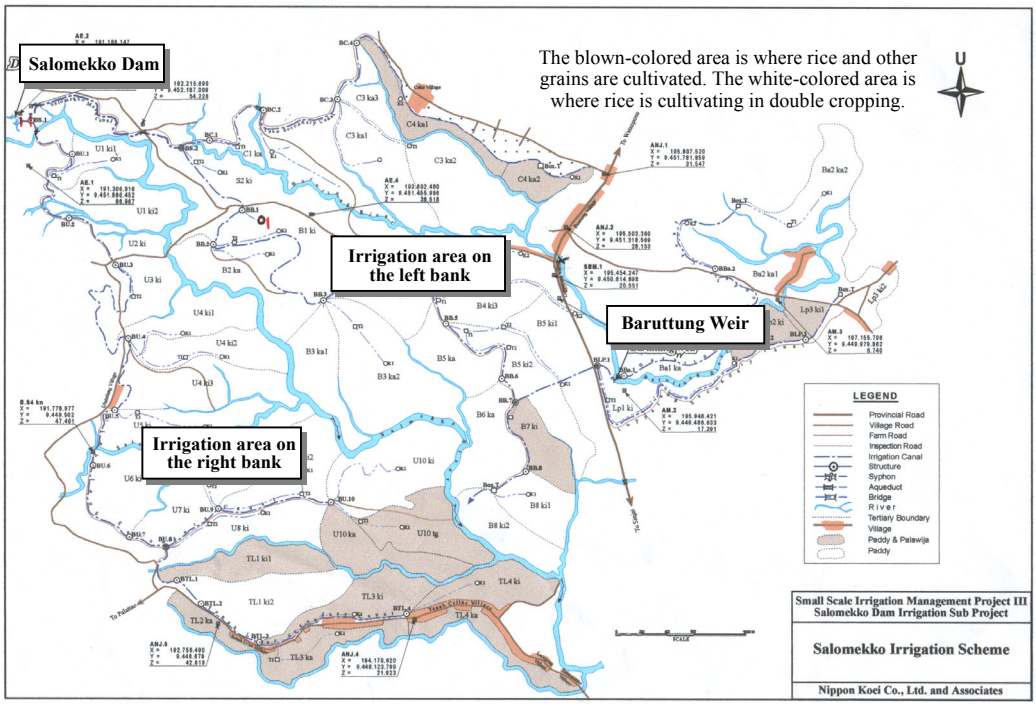
2.3.2 Case Study

The following is a specific report on how the effects of the project have developed in the two sub-project areas visited during this survey.

[Salomekko Dam Irrigation, South Sulawesi Province]

In this irrigation area, the crop pattern of two rice crops/year is widely practiced (in some parts of the lower drainage area, one rice crop/year plus one combination crop of rice (75%) and other grains (25%)/year) are grown. This pattern is different from the planned pattern, which is one rice crop/year plus one crop of other grains/year.

Figure 2: Current state of cultivation



Source: Materials provided by Provincial Water Resource Management Office of South Sulawesi

The rice price, which remains controlled by the government, is generally stable, with small fluctuations each year. Under this market environment, farmers prefer rice farming. Before the project had been completed, one crop of 3t/ha was harvested per year in rain-fed paddies. Now, after the completion of the project, the local farmers can grow two crops of 6-7t/ha a year, realizing a fourfold increase at least. In spite of the downward tendency of the rice price, which declined from 1,400Rp/kg in the time before the project to the present 800Rp/kg, total income from rice farming has more than doubled.

Figure 3: Beneficiary areas

Other crops such as mung beans and groundnuts are also grown. Under the floating rate system of the market where these crops are traded, the relatively high price during the growing period (where demand outweighs supply) declines drastically at harvest time (where demand is then outweighed by supply). For example, the price of maize drops sharply from 500Rp/kg in the growing period to 150Rp/kg at the harvest time, and this forces the farmers to keep the crop for their own consumption. Even in the case of chilies, which are a high-yield crop, prices that stand at 3,000-9,000Rp/kg during the growing period may drop to 500Rp/kg at harvest time. Moreover, chilies are difficult to preserve, and therefore it is not easy to sell off an entire crop at the market. At present, it is difficult for local farmers to engage in the type of agricultural management that follows market price movements and ships the appropriate crops in a timely manner. As a result, they tend to prefer growing rice throughout the year.

[Sumbawa Groundwater Irrigation, West Nusa Tenggara]

We visited two WUAs to conduct interview surveys. According to one WUA, local farmers raise three non-rice crops (groundnuts, mung beans, and a second crop of groundnuts) per year. Bananas are also grown. The market prices of crops such as groundnuts tend to be stable. Before the completion of the groundwater irrigation system, the farmers merely harvested one such crop from rainwater-dependent fields. According to the other WUA, the local farmers raise three crops a year, with one crop of rice followed by two other grains or two crops of rice followed by one other grain. Before the completion of the groundwater pump irrigation system, they merely harvested one crop of rice from rainwater-dependent paddy fields. Since the unit paddy yield has increased from 2.5 t/ha to 4.5-5.0 t/ha, annual paddy production has increased twofold at least and eightfold at most. The cropping area per one farming household is about 1 ha. Although cropping conditions vary between the two cases described above, productivity has improved remarkably in both cases.

Figure 4: Beneficiary areas

(A pump shelter on the right)

2.3.3 Recalculation of Economic Internal Rate of Return (EIRR)

EIRR for the project recalculated based on the data obtained from this survey was 11.6%[2], a little lower than the projection at appraisal, which was 13.6%. This figure reflects the fact that the performance level of several sub-projects such as Wae Wagha Spring Irrigation and Kahale Weir Irrigation is low (for the reasons discussed above), while Gapit Dam Irrigation and Wae Mantar II Weir Irrigation Sub-projects have achieved higher levels of performance than planned at appraisal. Still, EIRR for the overall project is within the range of 8-20%, which is the target level for agriculture-based sector projects[3]. Thus, the economic efficiency of the project can be regarded as adequate.

[2] The project cost represents the economic cost including actually incurred construction costs, materials and machinery costs, construction supervision costs and contingency expenses. The benefit is the appraised amount stated in the value as of FY2001 and adjusted based on the performance of each sub-project confirmed by this survey.

[3] Appraisal Manual (agriculture-based sector), Overseas Economic Cooperation Fund

2.4 Impact

2.4.1 Economic Impacts

Two case studies of Salomekko Dam Irrigation and Sumbawa Groundwater Irrigation confirmed that the increase in agricultural production stated above has led to improvement in the farmers' living standards. Details are as follows:

(1) **Purchase of agricultural machines**: in the case of the Salomekko Dam Irrigation area, where the rice production has increased more than fourfold, an increased number of farmers purchased hand tractors (albeit secondhand). At present, at least 30% of farming households own hand tractors. The fact that a hand tractor costs 15 to 20 million Rp (200,000 to 300,000 yen) indicates that their income levels have increased remarkably. As for TV sets and motorcycle, almost 100% of the farming households now own them.

(2) **Improvement of education of children**: before the project started, many children had been forced to withdraw from elementary school because their families could not afford educational expenses due to financial difficulties. Today, however, almost all children are able to attend junior high school. Some of them proceed to high school and even to university.

(3) **Acquisition and holding of land**: in the Sumbawa Groundwater Irrigation area, some farmers have come to be able to hold their own land and houses thanks to the increased incomes that have resulted from the increase in harvests.

In connection with the sustainability of the project (see "5. Sustainability" for details), the financial situation of these areas has improved to such level that the farmers can afford to share the expenses of maintaining and repairing irrigation facilities (canals, groundwater pumps, etc.) to some extent.

2.4.2 Environmental Impacts

The groundwater irrigation sub-projects are small in scale and cause only small impacts on environment. According to the executing agency, no environmental problem has been reported in connection with the project.

2.4.3 Social Impacts

According to the executing agency, there is no problem concerning land acquisition and relocation of residences. At the time of appraisal, 15 families were expected to be required to relocate because of the construction of the Pelala Weir Irrigation in West Nusa Tenggara. However, at the time of evaluation, no information or data on this issue has been obtained.

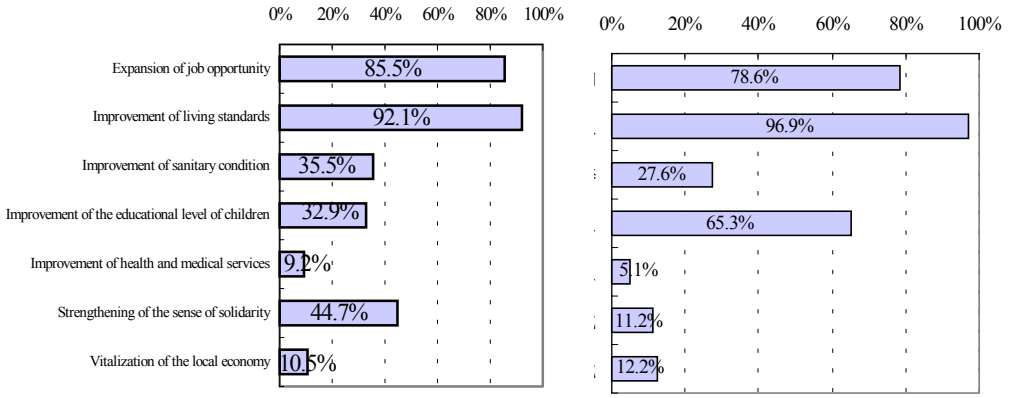
[Study on the impact of the project based on the results of an interview survey to beneficiaries]

An interview survey targeting beneficiaries (about 100 persons) in the Salomekko Dam Irrigation area (SD) and the Sumbawa Groundwater Irrigation area (SB) was conducted concerning the effect/impact brought about by the sub-projects and O&M. In both areas, the beneficiary satisfaction level with regard to the sub-projects is high (95% of beneficiaries of SD and 100% of those of SB are satisfied with the sub-projects in general), and beneficiaries think their living standards have improved compared to the time before the project started (SD: 93%, SB: 100%). This is a survey-based study on what the beneficiaries think of the impact and O&M of the sub-projects.

- **Major impact**

When asked to select up to three elements of the impact of the project, most respondents in both areas selected "improvement of living standards" and "expansion of job opportunities". Particularly in Sumbawa, "improvement of the education level of children" was also selected by many respondents. In both areas, nearly 100% of the children finish elementary school. 60 to 70% of the children graduated from elementary school in Salomekko and more than 70% of those in Sumbawa proceed to junior high school. Moreover, it is estimated that 60 to 70% of junior high school graduates in Salomekko and 90% of those in Sumbawa proceed to high school.

<Major impact of the project>

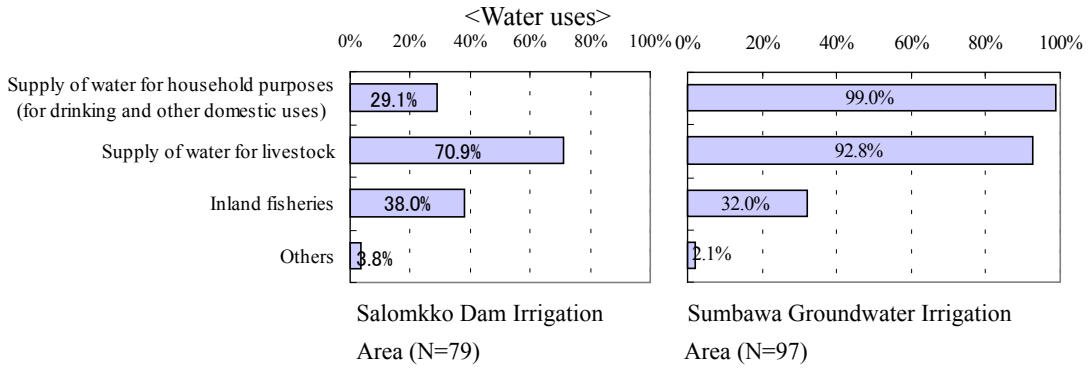


Salomkko Dam Irrigation Area (N=76) Sumbawa Groundwater Irrigation Area (N=98)

In addition, since it has become easier to obtain water than before, the impact related to the aspect of WID (Women in Development) has been considerable. It was pointed out that women's labor in drawing water has been reduced (more than 90% of the respondents in SB) and that the burden of farm labor on women has been reduced due to the improvement of productivity (30 to 40% of the respondents in both areas).

- **Water uses**

Water, which has become easier to obtain since completion of the project, is used not only for irrigation but also for other aspects including household purposes and livestock. In a comparison between the two areas, the percentage of the respondents who use water for household purposes is higher in Sumbawa, standing at 99%, reflecting the previous situation in this area where it was difficult to obtain water for household purposes (this has led to the reduction of women's labor in drawing water, as stated above).



- **Beneficiaries' view on the operation and maintenance of the facilities**

In order to grasp the farmers' views on the operation and maintenance of facilities, two options were presented: "O&M of key facilities such as dams and main and secondary canals should be conducted by the government on condition that adequate user fees are collected", or "O&M of the facilities, including secondary canals in addition to tertiary canals, should be conducted by WUAs (without paying expensive water use fees to the government). In both areas, more than 90% (100% in Sumbawa) of the farmers selected the latter, or "self autonomy by WUAs". The former option, which is a system of entrusting facility maintenance to the government by paying water use fees, did not gain much support from the farmers. This indicates the farmers' strong awareness about self autonomy or low reliance on and expectations of the government.

2.5 Sustainability

2.5.1 Operation and Maintenance

Among surface water irrigation facilities, key facilities such as dams, weirs, and main and secondary canals are operated and managed by the local (district) government, and farmers' groups take charge of the operation and maintenance of peripheral facilities such as tertiary or lower canals (in some cases, such as that of Salomkko Dam irrigation, farmers' groups actively take part in the maintenance of the secondary canals). Following the decentralization (Otonomi-Daerah) in 2001, the law stipulates that district governments are the main entity responsible for administrative services in all areas ranging from finance to personnel. In reality, however, now is the transitional period when there is no active involvement by district governments in the operation and maintenance of irrigation facilities. On the other hand, facility operation and maintenance of groundwater irrigation is directly carried out by farmers' groups.

The following describes the present operation and maintenance systems in two sub-project areas which we visited on this occasion.

[Salomekko Dam Irrigation, South Sulawesi Province]

The irrigation area extends over two counties of Salomekko and Tonra. Dams and main canals (1.6 km) are maintained by a Ranting (branch office) which functions as a local agency of the district government and takes charge of the maintenance of these facilities. Meanwhile, main, secondary and tertiary canals are maintained by farmers, i.e. WUAs. According to the regulations of the district

government, WUAs are required to maintain the tertiary canals only. However, they also carry out maintenance (including partial repair) of the secondary canals on their own initiative with their own funds.

[Sumbawa Groundwater Irrigation, West Nusa Tenggara Province]

Completed groundwater pumps and other facilities are all maintained by WUAs (P3A). The WUA and WUAs Confederation (Gabungan P3A) are generally well-organized and well-operated. The WUA collects WUA fees (water use fee, maintenance and repair fee, etc.) in addition to operating and maintaining irrigation facilities in its home district, and also engages in joint purchase of agricultural inputs such as fuel and fertilizer through the confederation. One of WUAs in Sumbawa won the first prize in the national WUAs contest in the previous year, evidencing a high level of WUA activities in the region.

2.5.2 Water Users' Association

This section will look into the current state of WUAs as an activity base for farmers.

WUAs have been established almost as planned (registered with the district government), partly owing to the efforts of NGOs at the project implementation stage. Generally they are active in operation and maintenance of irrigation facilities.

Table 4: Establishment of WUAs and collection of water use fee (actual result in 2001)

Sub-project	Establishment of WUAs			Collection of water use fee		
	Plan	Actual	Achieve-ment rate %	Plan '000Rp	Actual '000Rp	Achieve-ment rate %
South Sulawesi						
Awo Weir Irrigation Extension	22	22	100	89,764	56,035	63
Salomekko Dam Irrigation	16	16	100	18,830	4,203	22
West Nusa Tenggara						
Bringin Sila Weir Irrigation	5	5	100	n.a	n.a	n.a
Pelala Weir Irrigation	7	7	100	n.a	n.a	n.a
Gapit Dam Irrigation	12	10	83	n.a	n.a	n.a
Sumi Dam Irrigation	23	23	100	n.a	n.a	n.a
Sumbawa Groundwater Irrigation	32	30	94	n.a	n.a	n.a
East Nusa Tenggara						
Wae Mantar II Weir Irrigation	16	16	100	n.a	n.a	n.a
Wae Wagha Spring Irrigation	2	2	100	n.a	n.a	n.a
Kahale Weir Irrigation	3	3	100	n.a	n.a	n.a
Oesao Groundwater Irrigation Extension	38	54	Note)	n.a	n.a	n.a

Source: Data provided by the executing agency

Note: The number of WUAs established in Oesao Groundwater Irrigation Extension Sub-project exceeds the planned number because, at the implementation stage, a larger number of shallow wells than planned, which cover a small irrigation area, have been constructed.

In the sub-project sites which we visited for case study purposes, 16 WUAs have been established under Salomekko Dam Irrigation Sub-project in South Sulawesi. These cover 53 blocks of the tertiary canals (as planned), and 30 out of planned 32 WUAs have been established under the Sumbawa Groundwater Irrigation Sub-project in West Nusa Tenggara.

2.5.3 Technical Capacity

[Government staff]

Government staff are responsible for operation and maintenance of key facilities such as dams, weirs (water storage facility) and main and secondary canals. Their duties include gate operation and routine works such as sediment removal, mowing and other cleaning activities which require no high degree of knowledge or skill. Probably because of this, the government agency evaluated the staff as "having an adequate level of skills" in its self-evaluation (problems lie in the financial aspect as stated below).

[Farmers]

In the case of Salomekko Dam Irrigation, operation and maintenance of irrigation facilities are carried out almost properly through periodic service activities. On the other hand, the condition of agricultural roads (soil roads) in the irrigation area is poor. Steeply sloped sections are especially bumpy, making it extremely difficult to drive automobiles during the rainy season. It is difficult for the farmers and WUAs to repair these roads with the technology, materials and machines currently available to them, and they are asking for help from the local government.

In the case of Sumbawa Groundwater Irrigation, they do not have adequate knowledge and skills necessary for the maintenance of pump machines. Training of mechanics is required.

2.5.4 Financial Status

As data on all sub-projects has not been collected, the following statements are limited to data concerning two sub-projects we surveyed on this occasion.

(1) Government budget

[Salomekko Dam Irrigation, South Sulawesi Province]

According to the district government, although a budget for the operation of irrigation facilities has been allocated since the project was completed in 1999, the budget for maintenance is not enough (virtually none). In the examples from immediate preceding years, about 8,600 million Rp and 128 million Rp were allocated in 2002 and 2001, respectively. The branch office of the district government (Ranting Dinas) is staffed by 20 officials consisting of a clerical official (branch manager), 5 dam operation staff and 14 gate operation staff. Therefore, 360,000 Rp/month was allocated per one official in 2002 and 530,000 Rp/month in 2001. These amounts are not enough to pay salaries to the staff and cover office costs. Given this situation, appropriate maintenance of key facilities cannot be expected. The maintenance of secondary and tertiary canals is covered by the

WUA fee.

[Sumbawa Groundwater Irrigation, West Nusa Tenggara Province]

The maintenance of groundwater irrigation facilities is carried out by WUAs organized by farmers, and the WUA fee provides the revenue source for the maintenance cost.

(2) WUA fee

In both cases, the revenue source for the maintenance of irrigation facilities is provided by the WUA fee. The followings are observations on the situation concerning the collection of the WUA fees.

[Salomekko Dam Irrigation, South Sulawesi Province]

According to the replies to a questionnaire from the executing agency, the collection rate of the WUA fee (irrigation service fee: ISF) of the Salomekko Dam Irrigation is 22% (as of 2001, 4,200 thousand Rp against the expected 18,800 thousand Rp). This performance cannot be considered satisfactory. However, there is a gap between this figure and the result of the interview survey we conducted when we visited there. In the interview, the farmers (WUA members) in both irrigation areas said, "The WUA fee is determined by mutual consent of the members and properly collected." This gap may be explained by the situation described below.

In the case of Salomeeko Dam Irrigation, the amount of WUA fees was determined at 30,000 Rp/ha for the dry season and 15,000 Rp/ha for the rainy season after consultation at the WUA Confederation (GP3A, upper organization of WUA). The collected fees are divided into the irrigation service fee (ISF), which covers the WUA operation cost as stipulated by the government regulations, and the reserve fund for maintenance and repair of the irrigation facilities. It is presumed that the several million Rp stated on the reply from the executing agency is the amount of the former only, or the WUA operation cost. Given that the WUA have repaired four broken drop structures on the secondary canals from 2000 to 2001 with its reserve fund for repairs (the repair cost was 500,000 to 1,000,000 Rp per repair), it would be reasonable to assume that an amount larger than that written on the questionnaire reply has been collected and expended. In the questionnaire survey to beneficiaries conducted on this occasion, 75% of the respondents answered "I am paying irrigation service fee (ISF)" and 100% answered "I am sharing the cost for facility maintenance and repairs in addition to ISF". Judging from these factors, even though the ISF has not been fully collected, WUAs' financial capability and contributions to O&M are considered sufficient taking into account the maintenance and repair costs they have shouldered.

[Sumbawa Groundwater Irrigation, West Nusa Tenggara Province]

In the case of Sumbawa Groundwater Irrigation, no reply (data) was submitted by the executing agency concerning the collection of ISF. However, the following facts were found from the result of the interview survey conducted when we visited there. WUAs of the groundwater irrigation collect three types of fees from their members: Iwran Air (irrigation service fee), Iwran Wajib (member fee)

and Iwran Khusus (special fee). Iwran Air is the fund for purchasing fuel for the operation of pumps, which is currently set at 3,500 Rp/hour. Iwran Wajib is collected at the rate of 5,000 Rp/period or 500 Rp/month, for example, in accordance with the agreement made for each year by each WUA. These are ordinary fees collected for the operation of WUAs. The payment of Iwran Khusus is left to the free will of each member. It is paid not in cash but in the form of a contribution of crops (example: 10-20kg/harvest). Although no data is available concerning the collection situation (rate), considering that the purchase of fuel for the maintenance of pumps and replacement of spare parts (machine parts) and batteries have been done as necessary, it would be reasonable to assume that the WUA fee including ISF has been collected and used to an adequate extent[4]. However, there is a concern over their financial ability, which has yet to reach a capacity where they are able to purchase replacement pumps (which will be necessary in the future). The farmers intend to prepare for the future by reserving funds or otherwise in advance, but this may not be easy to accomplish.

In both cases, the farmers, who are also members of WUAs, engage in cleaning and mowing around irrigation canals and drainage canals on a regular basis as a voluntary service in the spirit of mutual aid (Gotong-Royong), in addition to their contribution in the form of the payment of WUA fees. Thanks to these activities, irrigation facilities are kept in good condition.

2.4.5 Current Status of Project Facilities after Completion

At the present stage after project completion, each facility is in good condition. Here are details of the current status of project facilities of the two sub-projects we surveyed on this occasion.

[Salomekko Dam Irrigation, South Sulawesi Province]

There has been no major problem with the irrigation facilities, including the dam, during the four years since completion up to the present day. Around the dam lake, a park was constructed under the successor project SSIMP-III. The idea of this park originally arose as a safety measure because many people visited this place immediately after the appearance of the dam lake, although there were no tourist facilities, and some of them entered the lake or came near the spillway. The purpose was to reduce dangerous behavior by providing a tourist facility, and this seems to work well. The main canals are also in good condition (aside from some cracks and sediment accumulation). However, cleaning activities such as mowing and sediment removal are not enough. Increases in the budget and follow-up activities by the district government are desired.

[4] Still, they do not have enough funds for pump replacement, which is sure to become necessary in the future. In the case of the WUA which won the first prize in the district contest and which we interviewed, the cash balance in the immediate preceding year was 2.5 milion Rp. Considering that the current market price of a pump is over 100 million Rp, pump replacement with their own funds would be difficult without collecting further contributions.

Figure 5: Current maintenance status of canals

The secondary canal maintained by WUA (right) is better cleaned than the main canal maintained by the government (left)

The secondary and tertiary canals are also kept in good condition with no problems. The drop structure on the BP8-BP10 section of the secondary canal in the right bank district was broken around the year 2000, and the WUAs Confederation procured construction materials and repaired the broken point with their own funds.

Figure 6: Drop structure on the secondary canal repaired by WUA

The internal structure of the Baruttung Weir (covering 108 ha of the lower drainage area) is broken for some reason and water is leaking. As water is leaking through the internal structure, more serious damage might be caused unless preventive measures are taken immediately. With regard to this problem, the WUAs Confederation expressed its intention to shoulder costs for repairs and is now asking the government for technical examination and advice.

Figure 7: Baruttung Weir

Although the cultivation of one crop of rice followed by one crop of other grains was planned, double cropping of rice is being practiced. Because of the difference in water demand between rice and other grains (rice requires four times more water than other grains), it is difficult to meet the total water demand with water supplied from the dam only. Still, double cropping of rice has been possible both in the upper and lower drainage areas (except for some districts) during the four years since project completion in 1998, because they have had some rainfall even during the dry season. However, sporadic rainfall during the dry season cannot always be expected. Moreover, it is feared that economic gaps may arise between districts due to uneven water consumption between the upper and lower drainage areas in the dry season. When we asked the farmers in the lower drainage area their opinion about the issue of uneven water consumption between the upper and lower drainage areas, they said "Everyone wants water. We cannot blame only the farmers in the upper area," or, "If I lived in the upper area, I would try to take as much water as possible."

[Sumbawa Groundwater Irrigation, West Nusa Tenggara Province]

There are 4 villages in Empang County, where the largest number of groundwater irrigation facilities have been constructed in this sub-project. Under SSIMP-II, 10 new wells were dug and 15 pumps were brought in and installed. In these villages, three types of pumps by different manufactures were installed. They are made in Germany, Japan and the U.S. The Germany-made pump (Turbine type) has a large pumping capacity and is suitable for deep wells, but the spare parts (special gears) are difficult to obtain. Usually the villagers have to wait for three months before receiving the parts after placing an order at an agent in Surabaya. As they cannot wait for three months, they use replaceable automobile parts (gears) instead (the local price is 600,000 Rp). The Japanese- and U.S.-made pumps (centrifugal type) can be ordered at agents in Sumbawa Besar, but they are inferior to the German pump in power. Fuel consumption is 2 liters/hour for the German pump and 1 liter/hour for the Japanese and U.S. pumps.

There are about 1,700 farming households in Bantu Lanteh Village, one of these four villages. Among them, about 1,000 households are supplied with irrigation water pumped up from underground, while the remaining 700 households do not have wells (an additional 11 wells are needed). This kind of gap exists even in the same village depending on whether they have wells or not. However, there is no serious problem likely to develop into a social conflict[5].

[5] The farmers in the neighboring district outside the irrigation area also attended the interview meeting to listen to the discussion, and expressed a strong desire for the construction and installation of wells and pumps in their own district. The government side responded that they needed to determine if this was feasible or not, taking the costs and benefits into consideration, and that they could not decide whether or not to proceed with a project only on the strength of a request. It shows that the procedure of conducting a justification study including an economic feasibility study prior to the implementation of such projects has been established.

Figure 8: Pumps installed in the project and water springing from the distribution box

2.4.6 Towards Sustainable and Independent Development

As stated above, the performance of the project as a whole is satisfactory and the current status of project facilities maintained by WUA is considered good in general. In order to ensure the sustainability of the project, several problems need to be recognized and addressed. This section will summarize specific problems (the points which should preferably be improved) in the two sub-projects we surveyed on this occasion.

[Salomekko Dam Irrigation, South Sulawesi Province]

Following the completion of the project, productivity has increased and the living standards of the local farmers have improved. In this sense, the objective of the project has been fully achieved in this area. In this irrigation area, the farmers' awareness about the maintenance of irrigation facilities is high and the WUA is actively operating. The secondary and tertiary canals are maintained by the farmers (the WUA). The Indonesian Government, which has been promoting reform of the facility maintenance system of the irrigation sector, is currently instituting a legal system which enables transfer of authority to maintain trunk canals and lower irrigation facilities under the President Order No.3 issued in 1999. In this sub-project, the secondary canals are maintained by the voluntary service and funds of the WUAs. However, these activities are carried out on a voluntary basis without any official agreement with the district government. Therefore, the executing agency (the government side) considers it is necessary to clearly define the authority and responsibility of the government and WUAs concerning the maintenance of irrigation facilities in accordance with the government regulation (PP77/2001) which came into operation throughout the nation in FY2001.

Another cause of concern is the financial condition of the district government offices in charge of the maintenance of the trunk facilities. As it is not long since the trunk facilities were completed, they are presently in good condition. It is desired that the maintenance system of the main canals be

improved, combined with the expansion of local finance. Meanwhile, the NGOs deserve some appreciation for their role as the coordinator between the government and the farmers. Still, in light of the presently practiced cropping pattern, there is room for further strengthening their activities through guidance and education for the farmers on the limited water resources.

[Sumbawa Groundwater Irrigation, West Nusa Tenggara Province]

Following completion of the project, productivity has increased and the living standards of the local farmers have improved. In this sense, the objective of the project has been fully achieved in this irrigation area. When it comes to the question of sustainability, the ideal is that the farmers will be able to afford to replace the pump facilities with new ones from their own fund. As a matter of fact, however, considering the additional value of the products, it seems unreasonable to expect this in reality. If the WUA we visited is one of the best performing WUAs in the district, it would be appropriate in terms of sustainability to have other WUAs use the performance of the said WUA as a target benchmark.

According to those who are involved in this sub-project, improvement of the organization and capability of the farmers and WUAs is the key to the success of the project. In particular, how to strengthen the field of marketing is an important question. Amid the changing economic factors affecting the farmers, such as liberalization of the rice market and reduction of government subsidies, their survival depends on establishing their position effectively in the market; and this remains a difficult challenge.

3. Feedback

[Lessons Learned]

Further steps necessary for upgrading farmers' organizations through cooperation with NGOs

The formation and progress of the project went all the more smoothly because the NGOs' abilities had been utilized from the planning stage. As a result, the performance level (degree of voluntary contribution) of WUAs, namely the beneficiary farmers, is high with respect to the maintenance of project facilities after completion. The result of this field survey shows that the NGOs functioned effectively because the following three necessary conditions had been met and, therefore, good communication between the government and farmers was maintained: (1) the NGOs conducted local community-oriented activities; (2) they participated in the project from the early stage; and (3) they took a neutral position without sympathizing with either the government or the farmers. Needless to say, maintaining good communications is not enough. It is essential for all the participants to have the same recognition of and intention to reach a specific goal, such as the improvement of agricultural productivity or the improvement of living standards.

[Recommendations]

The next challenge is guidance on agricultural management and marketing, and putting it into

practice

Thanks to the project, agricultural production (cultivation and unit yield) has increased and the living standards of the beneficiary farmers have improved in general. However, in light of the current situation, where the farmers prefer to grow rice instead of other grains (for which market prices are unstable) and the rice pricing system is shifting to a market rate system, it is considered important to promote guidance (or training) for the beneficiary farmers and WUAs on agricultural management/marketing. In the case of the Salomekko Dam Irrigation area which we visited in this survey, double cropping of rice is widely practiced, although the planned cropping pattern was one crop of rice and one crop of another grain, and it is feared that water shortages will result. Improvement of the farmers' capability in agricultural management/marketing is expected to help solve this kind of facility-related problem.

The purpose of marketing is to gain and secure the farmers' position in the market by providing crops which can meet demand, or crops which can exploit new demand and thus realize more favorable profit levels. The direction of marketing may relate not only to the aspect of profit but also environmental conservation and energy use. When discussing this issue, addressing the question of sustainable marketing is necessary, as opposed to focusing only on trends in the crop market.

Active involvement by the local government and expansion of local finance is necessary

Following the decentralization and the enforcement of the government regulation (PP77) concerning facility maintenance by WUAs, it is stipulated that the responsibility for the maintenance of irrigation facilities basically lies at the district or lower level of local governments. As far as the two sub-projects which we surveyed on this occasion are concerned, the recognition and sense of responsibility among WUAs, as well as their financial capacity, exceed the basic level. In some cases, they assume the role of the local government. However, it is impossible for WUAs to maintain all the irrigation facilities under present conditions. Active involvement by the local government in the technical aspects, as well as adequate and stable fund sources to support such involvement, are necessary in particular.

Comparison of Original and Actual Scope

Item	Plan	Actual
1. Project Scope		
Civil engineering	Surface water: 12,227ha, Groundwater: 2,000ha Total 14,227ha	Surface water: 14,986ha, Groundwater: 800ha Total 15,786ha
(1) South Sulawesi		
- Awo Weir Irrigation Extension	2,090ha Main and secondary canals = 38km	2,200ha Main and secondary canals = 39km Drainage canals = 14km
- Salomekko Dam Irrigation	1,900ha Dam V=410,000m^3, H=28m, L=350m Main and secondary canals =30km	1,722ha Dam V=500,000m^3, H=30m, L=300m (Water storage: 8.2 million m^3) Main and secondary canals 26km
(2) West Nusa Tenggara		
- Bringin Sila Weir Irrigation	1,675ha Irrigation weir H=25m, L=40m Main and secondary canals =21km	2,400ha Irrigation weir H=20 m, L=47m Main and secondary canals =34.6km
- Pelala Weir Irrigation	1,942ha Irrigation weir H=4.4m, L=108m Dam V=330,000m^3, H=19m, L=900m	2,292ha Irrigation weir H=6.5m, L=90m No dam
- Gapit Dam Irrigation	1,300ha Dam V=330,000m^3, H=29m, L=292m Main and secondary canals =20km	As left Dam V=370,000m^3, H=29m, L=293m Main and secondary canals =20.55km
- Sumi Dam Irrigation	1,290ha Dam V=690,000m^3, H=42m, L=282m Main and secondary canals =30km	2,542ha
- Sumbawa Groundwater Irrigation	1,400ha Tubewell=600	200ha
(3) East Nusa Tenggara		
- Wae Mantar II Weir Irrigation	950ha Irrigation weir H=4.5m, L=45m Main and secondary canals =14km	1,436ha
- Wae Wagha Spring Irrigation	612ha Capture Ring Intake=3 Main and secondary canals =10km	474ha
- Kahale Weir Irrigation	468ha Irrigation weir H=1.5m, L=10m Main and secondary canals =5km	620ha
- Oesao Groundwater Irrigation Extension	600ha Tubewell=300	As left
Procurement of materials and machines (pump)	300 units	No data available
Consulting services	Foreign 162M/M Local 802M/M	Foreign 150M/M Local 728M/M

2. Implementation Schedule		
(1) L/A	Nov. 1994	Nov. 1994
(2) Consultant selection	Jul 1994 – Jun. 1995	Jan.1995 – Oct. 1995
(3) Consulting services	Jul. 1995 – Aug. 1999◎	Oct. 1995 – Nov. 1999
(4) Implementation (* indicates ICB)		
- Awo Weir Irrigation Extension	Jun. 1996 – Dec. 1997	Mar. 1996 – Dec. 1998
- Salomekko Dam Irrigation*	Jun. 1997 – Mar. 1999	Jan. 1996 – Feb. 1998
- Bringin Sila Weir Irrigation	Jun. 1996 – Oct. 1997	Jan. 1996 – Sep. 1997
- Pelala Weir Irrigation*	Aug. 1996 – Aug. 1999	Mar. 1996 – Dec. 1998
- Gapit Dam Irrigation*	Jul. 1996 – Nov. 1998	Sep. 1995 – Jul. 1997
- Sumi Dam Irrigation*	Aug. 1996 – Oct. 1998	Mar. 1996 – Jan. 1999
- Sumbawa Groundwater Irrigation	Jul. 1996 - Aug. 1996	Jun. 1996 - Jan. 1997
- Wae Mantar II Weir Irrigation	Jun. 1996 - Aug. 1996	Apr. 1996 – Jan. 1998
- Wae Wagha Spring Irrigation	Aug. 1996 – Oct. 1997	Nov. 1995 – Dec. 1996
- Kahale Weir Irrigation	Apr. 1996 – Dec. 1996	Nov. 1995 – Dec. 1996
- Oesao Groundwater Irrigation Extension	Jan. 1997 – Jan. 1998	May. 1996 – Aug. 1997
(5) Procurement of materials and machines for O&M	Apr. 1997 – Mar. 1999	No data available
3. Project Cost		
Foreign currency	5,012 million yen	1,346 million yen
Local currency	4,613 million yen	8,333 million yen
Total	9,625 million yen	9,679 million yen
ODA loan portion	8,135 million yen	8,076 million yen
Exchange rate	1 rupiah = 0.050 yen (as of 1994)	1 rupiah = 0.045 yen (as of Apr. 1994)

Third Party Evaluator's Opinion on
Small Scale Irrigation Management Project (SSIMP) II

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Relevance

As development of eastern region of Indonesia was a highly important program during PELITA IV and afterwards, Evaluator agrees that the project objective met the National Development Plan, in the extent that it promoted agriculture sector development as well as contributed to eliminate economic disparities among regions by providing a comprehensive irrigation infrastructure for the lagged, eastern region of Indonesia (KTI). Considering that government would maintain its rice self-sufficiency program since 1984 and that rice producers were shrinking in the western part of Indonesia, it was a strategic approach to expand the rice agriculture to eastern part of Indonesia (KTI), as well as to intensify the agriculture economic productivity in those areas. Moreover, agriculture would remain as main economic activity for people in those areas, so that Evaluator agrees that the small-scale irrigation management project should justify its relevance not only to the government development plan but also to the people's hope.

The project responded appropriately to the farmers needs in improving the village economics, productivity and standard of living. According to the report, there were improvements in productivity of local agriculture product and that the project's contribution to such improvements was significant. There were farmers' income increase, more job opportunities, more government tax as more crop output was produced, as well as more income increase for society as a whole since more crop product reduced import dependency on rice demands.

Taking into account survey results that indicated that there were double to quadruple increasing of output and productivity in crop harvesting, and that, on the other hand, product market price remained stable during that period, the economic valuation of the project should show a positive benefit to the economy as a whole. The project was classified as efficient during its implementation period and effective in achieving its intended goals.

Impact

The Evaluator concludes that, in general, the overall goal of the project has been achieved to the extent that it did not only increase agriculture field extensively but also raised crops output productively as well as improved farmers' welfare intensively. Although those achievements were not solely contributed by the project, the irrigation system was obviously a dispensable contributor in achieving such improvements. Evaluator agrees with the report that the project brought about positive impacts on women betterment, education, poverty alleviation and other positive sosio-economic improvement. The project also gave positive benefit to society in general, as it increased national capacity in agriculture sector.

Evaluator agrees that the agriculture management is a strategic approach to maintain the project sustainability and that the government should escalate this issue into national attention since many similar projects face the same problem. Doing so, not only does the farmer wealth is increased intensively, but also many projects' economic valuation remains high as well as the environment could be conserved wisely. According to the report, there were no environmental problems occurred so far, as the scale of both project and its environmental impact was small. However, Evaluator suggests that periodic environmental evaluation should be performed carefully in order to monitor any unwanted, accumulated impacts that may become serious problem as early as possible.

Evaluator agrees with the report that necessary steps should be addressed to manage routine operational responsibilities as well as to maintain a fair and competent resource management system for the sake of as many beneficiaries as possible. The key success factors are technical capability, farmers' participation and solidarity, as well as local government initiative. Evaluator also praises the NGO role in the project that made the project run efficient and effective. Such

participation should be a model for other NGOs involved in similar projects in the future.