

# Indonesia

## Upland Plantation and Land Development Project at Citarik Sub-watershed

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Field survey: November and December 2008

### 1. Project Profile and Japan's ODA loan



Location of the project site



Tributary of the Citarik River

#### 1.1 Background

Indonesia has been faced with the problems of frequent occurrence of large floods and subsequent lowered soil fertility induced by sediment runoff in many catchment basins. In particular, the basin of the Citarik River, which is the target area of this project, has been struck with a series of vast sediment runoff and since 1990 there have been floods every year. The flood of 1994, for instance, took the lives of six persons and inflicted damage on an area of 3,124 ha. At the same time, the farm productivity lessened by sediment runoff has come to a serious issue.

#### 1.2 Objective

The objective is to alleviate sediment runoff and enhance farm productivity by conserving farm/forest land and also stabilizing torrents and their banks in the catchment basin (33,388 ha) of the Citarik River that flows through Bandung and Sumedang Prefectures in West Java Province, thereby contributing to river basin conservation and economic development.

### 1.3 Borrower/Executing Agency

Republic of Indonesia/Directorate General of Regional Development, Ministry of Home Affairs

### 1.4 Outline of Loan Agreement

Loan Amount/Loan Disbursed Amount	¥4,128 million / ¥3,960 million
Exchange of Net signed/Loan agreement signed	December 1995 / December 1995
Terms and Conditions	Interest Rate 2.3%, Repayment Period: 30 years (including a Grace Period of 10 years) General-untied
Final Disbursement Data	December 2006
Main Contractors	Village Development Committee (LKMD), Farmers groups, and etc.
Consultant Services	PT. BHAWANA PRASASTA (Indonesia), PT. TRITUNGGAL P. KO (Indonesia), PT.KOGAS DRIYAP CONS (Indonesia), and Pacific Consultants International (Japan) (JV)
Feasibility Study(F/S), etc.	1993: Feasibility Study (F/S) by JICA 1994: Special Assistance for Project Formulation (SAPROF) by JBIC

## 2. Evaluation Result

### 2.1 Relevance (Rating: a)

We will make an analysis on the relevance of the project below in the light of (1) National Five-year Development Plan, (2) regional development plan, and (3) the needs of the project at the time when the loan agreement was signed (1995) and at the time of ex-post evaluation (2008).

#### 2.1.1 National Five-year Development Plan

The Indonesian Government attaches high priority to measures to conserve catchment basins for alleviating sediment runoff in its Sixth National Five-year Development Plan (REPELITA VI: 1995~1999). The basin of the Citarik River, which is the target area of this project, was located in the uppermost-stream area of the Citarum River that was one of the eleven river basins in the nation that needed urgent measures. The issue of river basin conservation measures (natural resources management and flood control) still remains a high priority sector in the current

Medium-term National Development Plan (RPJMN: 2004~2009) as well. That is, the issue is stressed under the sections of “environmental improvement” and “infrastructure development” that are two of the five targets established under “people’s prosperity,” i.e. one of the three agendas which can be compared to the basic policies of the Plan. These facts obviously indicate that a high priority has been consistently placed on the issue of river basin conservation measures in the National Five-year Development Plan.

### 2.1.2 Regional Development Plan

The Regional Development Plans of both Bandung (1994~1998) and Sumedang (1993~1997) Prefectures assigned high priority to conserving farm/forest land and stabilizing torrents and their banks in the target area of this project, which is located in the hinterland, with the ultimate aims of stabilizing the livelihood of the people living and promoting agriculture in the basins of Bandung and Sumedang Prefectures. At the same time, in the current Regional Development Plans of both Bandung (2005~2010) and of Sumedang (2003~2008) Prefectures, high priority is still given to the issues of conserving farm/forest land and stabilizing torrents and their banks in the target area of this project located in the hinterland. We can thus acknowledge that these regional governments have consistently attached high priority to the conservation of farm/forest land and the stabilization of torrents and their banks.

### 2.1.3 Needs of the Project

Prior to the implementation of this project, vast sediment runoff was a frequent occurrence in the basin of the Citarik River. That is, since 1990 the basin has been struck with floods every year. For instance, the flood of 1994 took the lives of six persons and inflicted damage on an area of 3,124 ha. Likewise, the issue of lowered farm productivity caused by the sediment runoff loomed large before the project had been implemented. Hence, it was reasonably concluded that the importance and needs of this project would have been high because it would take measures to conserve farm/forest land and stabilize torrents and their banks in an area of 33,388 ha with the aims of reducing sediment runoff and increasing farm productivity. After the implementation of this project, sediment runoff has been on the decrease in the basin of the Citarik River. Nonetheless, now the area is subject to the risk of new floods that may be caused by torrential rain due to global warming. In this area approximately 25% of the working population is engaged in farming, and agriculture still remains a major economic activity. It is judged that the project, which is implemented in order to conserve farm/forest land and stabilize torrents and their banks with the purposes of

preventing sediment runoff and increasing farm productivity, persistently has its high importance and needs. Therefore, we can acknowledge the needs of this project at present as well even after the project's implementation as prior to its implementation.

Based on the above grounds, the project is highly relevant with the development needs and national policies at the times of both appraisal and ex-post evaluation.

## 2.2 Efficiency (Rating: b)

### 2.2.1 Outputs

The following figure 1 indicates an outline of the facilities which have been developed under this project. The plans at the time of appraisal and actual output of each plan are shown in Table 1 below. There are some discrepancies between the plans at the time of appraisal and actual outputs at the time of ex-post evaluation. These differences stem from the fact that the project was implemented in accordance with actual needs based on the detail design (1997) carried out during the duration of the project.

Figure 1: Outline of outputs

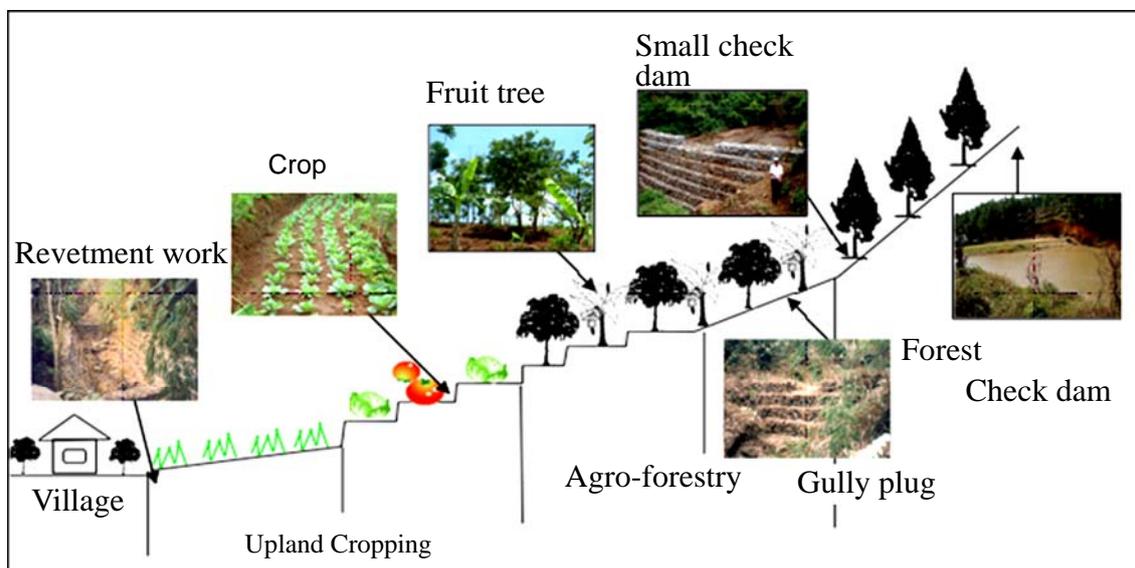


Table 1: Details of outputs

Plan (At the time of appraisal)	Actual (at the time of ex-post evaluation)	Differences between the plan and actual outputs
Farm/forest land conservation (To control sediment runoff by developing tiered terraces, afforestation, and improving farmlands and dry fields in the way to conserve the soil)		
(1) Terrace development (7,705 ha)	(1) Terrace development (7,735 ha)	Almost as planned
(2) Forestation (3,008 ha)	(2) Forestation (845 ha)	Lower than planned because the use of land as forestland was not sufficiently promoted
(3) Agro-forestry (3,018 ha)	(3) Agro-forestry (2,287 ha)	An area of the target land decreased due to urban development and increasing population.
(4) Dry field improvement (7,817 ha)	(4) Dry field improvement (6,103 ha)	An area of the target land decreased due to urban development and increasing population.
Torrent and bank stabilization (To control sediment runoff through constructing check dams or gully plugs or revetment work)		
Torrent stabilization		
(1) Check dam (70 units)	(1) Check dam (20 units)	Fewer than planned because it was difficult to prepare an extensive area of land required for its construction
(2) Small check dam (139 units)	(2) Small check dam (209 units)	More than planned as substitute for check dams and gully plugs.
(3) Gully plug (2,080 units)	(3) Gully plug (1,333 units)	Fewer than planned because the functions of the gully plug were not adequate
Bank stabilization		
(4) Revetment work (1.6 km)	(4) Revetment work (12.2 km)	Increased in proportion with expanded demand
(5) Riverside line work (92.0 km)	(5) Riverside line work (none)	Not implemented because it was changed to re-greening which was in greater demand
(6) Re-greening (460 ha)	(6) Re-greening (3,610 ha)	Larger than planned because the riverside line work was not implemented
Road construction (Construction of roads for implementing this project and for community use in the mountainous area)		
(1) New road construction (68.4 km)	(1) New road construction (7 km)	Shorter than planned because some roads had been developed with the Indonesian government's budgets prior to the project's implementation
(2) Road improvement (45.4 km)	(2) Road improvement (46 km)	Almost as planned

(3) Planting on the slope (122.3 km)	(3) Planting on the slope (148 km)	The length was extended than originally planned with the money saved by reducing new road construction.
(4) Roadside planting (145 km)	(4) Roadside planting (25 km)	Shorter than planned because planting was judged to be inappropriate
Equipment (To install automatic water level recorders with the aim of monitoring sediment runoff volume and water volume)		
(1) Automatic water level recorder (12 units)	(1) Automatic water level recorder (8 units)	Fewer than planned because the existing monitoring station would be used
Supporting activities (Additional activities carried out for enhancing the effects of this project)		
(1) Training (none)	(1) Training (in 63 villages)	About cultivation, soil conservation, irrigation techniques and system management
(2) Irrigation facilities (none)	(2) Irrigation facilities (614 ha)	Development of water intake, reservoir and water pipes
Consulting service		
(1) Total (351MM) International: 107, Local: 244	(1) Total (1,128MM) International: 235, Local :893	More than planned because new supporting activities were added and the project's duration was prolonged

Source: Ministry of Home Affairs

### 2.2.2 Project Period

At the time of appraisal, the duration of the project covered a period of 78 months from December 1995 to July 2002. In fact, however, it was extended to a period of 133 months from December 1995 to December 2006. The main reasons for the prolongation were that 1) the consultant contract was signed only in March 1997, which was deferred by nine months from June 1996 as originally planned, 2) the torrent and bank stabilization work was undertaken in July 2000, that is, later by 35 months from August 1997, and 3) new additional supporting activities extended the project's duration by 12 months. These delays were attributable to administrative adjustments among the National Development Planning Agency (BAPPENAS), the executing agency, and local governments concerning amendments to the original plan {revisions of the plan as to farm/forest land conservation and torrent/bank stabilization and addition of new components (i.e. supporting activities)}.

### 2.2.3 Project cost

The total project cost was estimated at 4,856 million yen (including ODA loans of 4,128 million yen) at the time of appraisal, whereas the actual cost was 4,002 million yen (including ODA loans of 3,960 million yen). Thus, it was within the planned amount. The chief reason for this cutback stemmed from the depreciation of the local currency.

In sum, while the project cost was within the planned budget, the project plan was much longer than planned, and therefore, the evaluation for efficiency is moderate.

## 2.3 Effectiveness (Rating: a)

### 2.3.1 Sediment runoff volume and control rate of sediment runoff

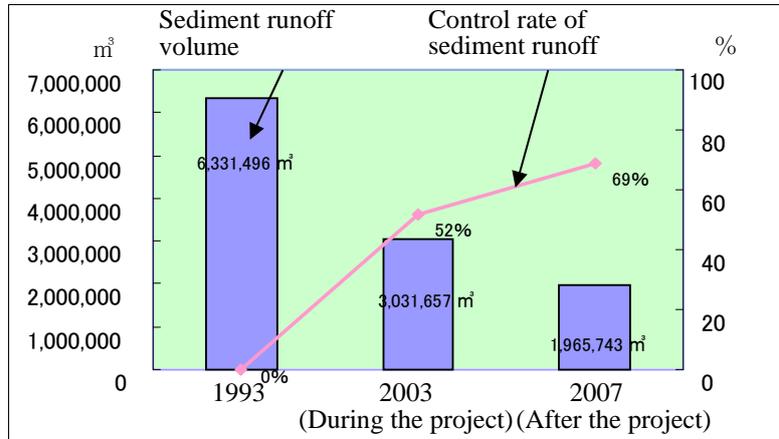
One of the objectives of farm/forest land conservation and torrent/bank stabilization under this project lay in controlling sediment runoff. Hence, an annual sediment runoff volume and a control rate of sediment runoff<sup>1</sup> for twelve tributaries of the Citarik River were calculated. As indicated in Figure 2, an annual sediment runoff volume was 6,331,496 tons in 1993 before the project had been implemented. However, it decreased to 3,031,657 tons in 2003 during the implementation of the project. It was demonstrated that it further dropped to 1,965,743 tons in 2007 after the project had been completed. The control rate of sediment runoff was improved from 0% in 1993 prior to the implementation of the project to 52% in 2003 during the project implementation and 69% in 2007 after the project implementation. A comparison between the annual sediment runoff volume and the actual control rate of sediment runoff in 2007, on the one hand, and the planned values, 1,202,980 tons and 81% respectively, on the other, reveals that both indicators have achieved more than 85% of the planned values.<sup>2</sup>

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<sup>1</sup>  $\{(\text{Sediment runoff before the plan} - \text{sediment runoff after the plan}) / \text{Sediment runoff before the plan}\} \times 100$

<sup>2</sup> The main reasons for failing to achieve the planned values by 100% are primarily twofold. First, the actual outputs were less than originally planned, particularly reduction in the area for farm/forest land conservation. Second, many trees/plants were planted during the dry season, instead of the rainy season, because of the delayed procurement of seedlings and fertilizers due to slow administrative procedures, thereby lowering their survival rate to about 37%. Note that the above discussed decreases in sediment runoff volume and higher control rates of sediment runoff are attributed not only to the effects of this project but also to the effects of external factors such as flood control and river improvements that are not directly related to this project

Figure 2: Sediment runoff volume (m<sup>3</sup>) and control rate of sediment runoff (%)

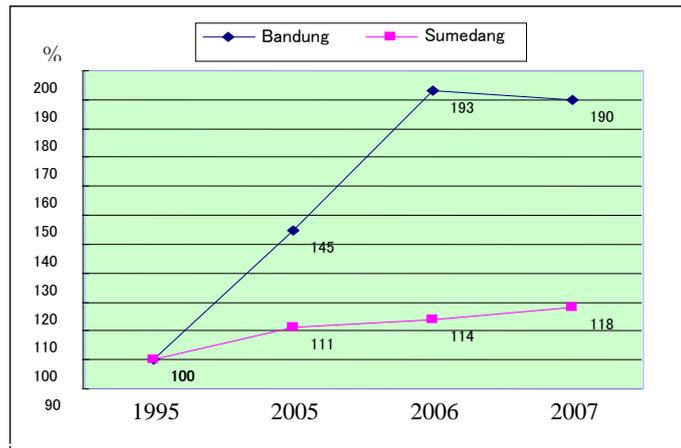


Source: F/S and executing agency

### 2.3.2 Increase rates of average unit yield of major agricultural crops

Another objective of the farm/forest land conservation and torrent/bank stabilization carried out under this project lay in improving farm productivity. Hence, we calculated the increase rates of the average unit yield of major agricultural crops<sup>3</sup> for Bandung and Sumedang Prefectures which were the target areas of this project. When we computed the increase rates of the average unit yield vis-à-vis the mean unit yield of 1995 as the benchmark (100%), we discovered that the rate had indeed improved in both regencies as indicated by Figure 3.<sup>4</sup>

Figure 3: Increase rates of average unit yield of major agricultural crops (%)



Source: F/S and the executing agency

<sup>3</sup> Cassava, potato, cabbage, hot pepper, and tomato

<sup>4</sup> In all likelihood the above increase rates of the average unit yield of major agricultural crops are due not only to the effects of this project but due also to the effects of external factors such as extensive use of chemical fertilizers that are not directly related to this project.

### 2.3.3 Economic internal rate of return(EIRR)

The economic internal rate of return (EIRR) of this project was not known at the time of appraisal. It was 14.72% according to the computation<sup>5</sup> at the time of ex-post evaluation.

Based upon the above, this project has largely achieved its objectives, and its effectiveness is high.

## 2.4 Impact

### 2.4.1 Environmental impact

This project was expected to mitigate the damage caused by floods through preventing sediment runoff. Therefore, we checked the occurrence of floods in the basin of the Citarik River. As indicated by Table 2, the flood caused by 60 ml of rainfall in 2005 during the project's implementation inflicted damage on an area of 2,800 ha. In 2007 after the project had been implemented, there were two cases of a similar rainfall. Both cases caused floods, but they inflicted damage only on an area of approximately 15 ha, thus drastically reducing the flooded area. In all likelihood, this was because the farm/forest land conservation and torrent/bank stabilization conducted under this project reduced sediment runoff into the Citarik River, thereby decreasing flood inundation.<sup>6</sup>

Table 2: Occurrence of floods

Indicator	1994	2005	2006	2007	
Date of flood	Unknown	Feb. 21	None	Feb. 20	April 24
Damaged area (ha)	3,124	2,800	-	15	13
Rainfall (mm/day)	Unknown	60	-	60	44

Source: Collection of appraisal materials, Citarum River Basin Control Office, and Meteorological Agency

### 2.4.2 Findings of the environmental survey on beneficiary households

We carried out an environmental survey on 120 households<sup>7</sup> among 293,641

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<sup>5</sup> The expenses include construction cost and operation and maintenance cost. Returns include income from sales of major crops and economic effects such as decreased sediment runoff and mitigated damage caused by floods. The project life is set as 20 years.

<sup>6</sup> However, it is assessed that the above decrease in damage caused by floods was due in part to the effects of external factors such as flood control and river improvement work that are not directly related to this project in addition to the effects of this project.

<sup>7</sup> The sampling method used for this survey is as follows. First, we selected, in the light of geographical scattering, the two rivers (Cikruh and Cijalupang Rivers), where all of the project's components were

households located within the catchment basin of the Citarik River (100% response rate). Thirty-nine (39) households pointed out that “there had been sediment runoff” before the project’s implementation. Only one household replied that “there was still sediment runoff” after the project. This finding endorses the result of the above analysis carried out on the project’s effectiveness (2.3.1 Sediment runoff volume and control rate of sediment runoff).

#### 2.4.3 Findings of the economic survey on beneficiary households

We conducted an economic survey on the same 120 households discussed in the above 2.4.2 section (100% response rate). The mean agricultural income per household after the project is nearly twice as the income prior to the project, that is, from Rp. 769,886 to Rp. 1,502,521 (the inflation-adjusted price). Therefore, we conclude that the project has produced certain effects at the level of the beneficiary household in terms of its economic impact although it has brought about only a limited impact on the growth of GRDP.

#### 2.4.4 Findings of the social survey on beneficiary households

We carried out a social survey on the same 120 households (response rate 100%). Ninety-nine (99) households (about 83%) and 90 households (about 75%) of the 120 households responded that access to markets and to schools respectively had improved owing to the construction or improvement of roads under this project. Thus, we can safely infer that the project has produced certain social impacts.

### 2.5 Sustainability (Rating: b)

#### 2.5.1 Operation and maintenance organization (Part 1)

[Farmland and forestland conservation] Farmer’s groups

##### 2.5.1.1 Organization

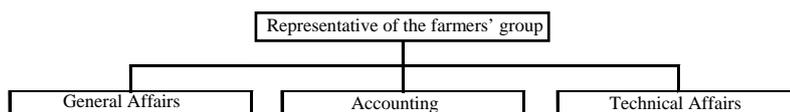
In addition to the existing 320 farmers’ groups (284 in Bandung and 36 in Sumedang), farmers of all ages and both sexes who had received technical cooperation from NGOs under this project have established out of their own free will 386 groups (274 in Bandung and 112 in Sumedang) that will assume responsibilities for the

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expected to show their effects, out of three tributaries (Cipanjalu River, Cikruh River and Cijalupang River). Second, we selected the villages of Sindangsari and Cisempur along the Cikruh River and the villages of Nagreg and Marggash along the Cijalupang River by taking into account their geography (upstream or downstream), economic level and accessibility. Third, we randomly selected 30 households in each village.

operation and maintenance of terraces, forests, agro-forestry and fields with the aim of conserving farmland and forestland. The organizational chart of such farmers' group varies by each group, but the typical organization is indicated in Figure 6 below. Each organization has approximately 50 households as its members.

Figure 6: Organizational chart of the farmers' group



Source: Interviews at the time of ex-post evaluation

#### 2.5.1.2 Technology

The farmers' group underwent training concerning cultivation, soil conservation and irrigation technology provided by NGOs during the project (in-house training about twice a week for one year as to theories and field training of 14 days in total for two years as to practice). Even now, they are still able to receive technical assistance whenever necessary from NGOs. At the same time, it is possible for them to have technical assistance from extension workers who are dispatched by the government of Bandung or Sumedang in response to their needs. We conclude, therefore, that there are no technical problems as to the operation and maintenance of farmland and forestland in particular.

#### 2.5.1.3 Finances

The farmers' group has no budget as a group. However, as discussed in the following case (2.5.2.5 Case of the Hurip Mukti Group), no money is necessary in the operation and maintenance of farmland and forestland. Thus, we believe that there is no financial problem in the operation and maintenance of farm/forest land.

#### 2.5.1.4 Conditions of operation and maintenance

The farmland and forestland in the area were in good conditions in terms of their maintenance. The main reason that we heard during our beneficiary survey was that farmers could feel every day that they would be able to produce crops stably as long as they maintained their farmland and forestland appropriately. That is, they enjoyed economic returns from proper maintenance.

### 2.5.1.5 Case of the Hurip Mukti Group

The Hurip Mukti Group (shown in Photo 1), like other farmers' groups, receive assistance for the seeds of crops from the government of Bandung each year. In the year 2008, for instance, the group received 200 kg of corn seeds and 100 kg of soybean seeds. We observed that the seeds were equally distributed at a ratio of 15 kg per hectare in case of corn and 14 kg per hectare in case of soybean according to the acreage owned by each household including the representative's household and that subsequently the members were engaged in farm work together on the farmlands owned by all the 40 member households of the group (shown in Photo 2).

Likewise, we were told that in the evening of every Thursday, the group's representative and a member of each household got together to talk about the activities to be carried out and on the following Friday they performed operation and maintenance activities such as building up a broken terrace of each household as the group's activity.

Photo 1: Group (Part)



Photo 2: Members working together



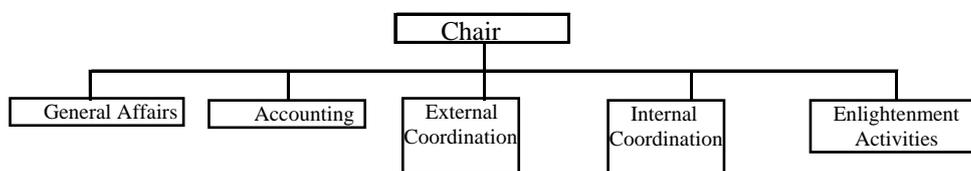
### 2.5.2 Operation and maintenance organization (Part 2)

**【Torrent and bank stabilization】 Village Maintenance Committee (KKLD)**

#### 2.5.2.1 Organization

Every Village Development Committee (LKMD) that has received assistance from NGOs under this project in 63 villages has established of its own free will the Village Maintenance Committee (KKLD) with the aim of operating and maintaining check dams, small check dams, gully plugs, revetment and re-greened zones. Although the organization of each KKLD is different, its representative organizational chart is illustrated in Figure 7. Most typically, several hundred of households belong to each KKLD.

Figure 7: Organizational chart of Village Maintenance Committee (KKLD)



Source: Interviews at the time of ex-post evaluation

#### 2.5.2.2 Technology

This project did not extend assistance to villagers who were the members of KKLD during its implementation with building the capacity to operate and maintain the torrent and bank facilities. Hence, presumably it will be difficult to maintain properly the facilities for torrent and bank conservation.

#### 2.5.2.3 Finances

KKLD does not have its own budget. In addition, no villagers spend any money for the operation and maintenance of torrent and bank facilities. When any torrent or bank facilities need repair work, it is done with the village's budget allocated by the local government each year. However, no budget is secured as operation and maintenance expenses for torrent and bank facilities.

#### 2.5.2.4 Conditions of operation and maintenance

We observed that the torrent and bank facilities had not been properly maintained. During our beneficiary survey we often heard a reason that villagers could actually feel or see few effects of torrent and bank conservation in their daily living, whereby it was difficult for them to recognize the advantages of appropriate maintenance of the torrent and bank facilities.

### 2.5.3 Operation and maintenance organization (Part 3)

**【Road and irrigation facilities】** The Public Works Department of each regency, etc

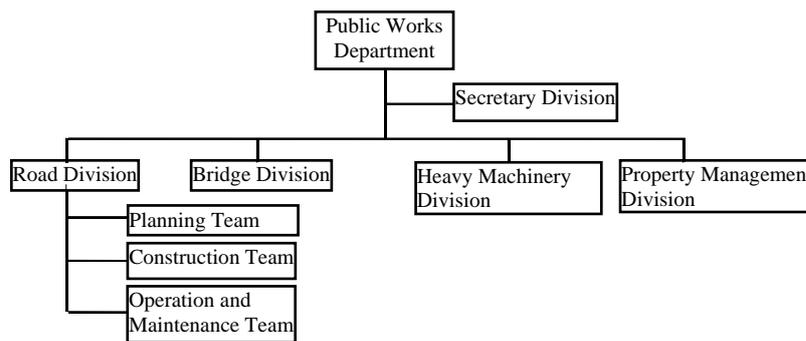
#### 2.5.3.1 Organization

With respect to the roads in the regency of Bandung, nine out of 25 persons in the Road Division of the Public Works Department in the government of Bandung form the Operation and Maintenance Team in charge of the operation and maintenance (Figure 8). As for the irrigation facilities, five out of 15 persons in the Irrigation

Division under the Irrigation, Drainage, Minerals and Energy Department of the government of Bandung form the Operation and Maintenance Team in order to maintain the facilities (Figure 9).

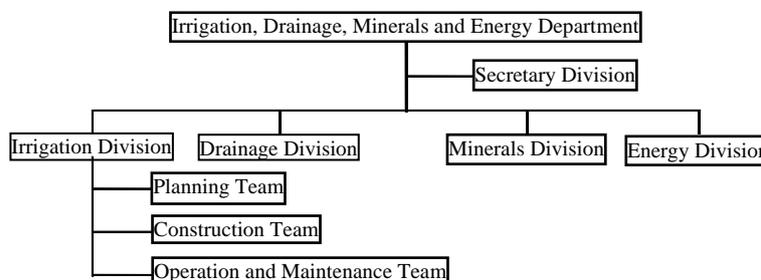
As regards roads in Sumedang, ten out of 33 persons in the Road Division under the Public Works Department in the government of Sumedang assume responsibilities for their operation and maintenance (Figure 10). On the other hand, twelve out of 32 persons in the Irrigation Division under the Water Resources Development Department in the government of Bandung are in charge of the operation and maintenance of irrigation facilities (Figure 11).

Figure 8: Organizational chart of the Public Works Department, Bandung government



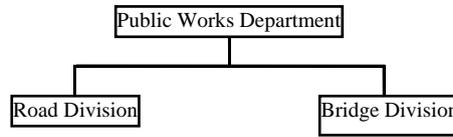
Source: Interviews at the time of ex-post evaluation

Figure 9: Organizational chart of the Irrigation, Drainage, Minerals and Energy Department, Bandung Government



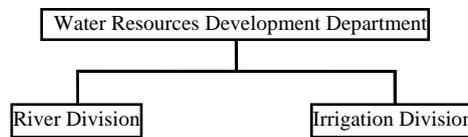
Source: Interviews at the time of ex-post evaluation

Figure 10: Public Works Department, Sumedang Government



Source: Interviews at the time of ex-post evaluation

Figure 11: Water Resources Development Department.  
Sumedang Government



Source: Interviews at the time of ex-post evaluation

### 2.5.3.2 Technology

Responsibilities for the operation and maintenance of roads and irrigation facilities constructed under other projects rest with the Public Works Department and the Irrigation, Drainage, Minerals and Energy Department in the government of Bandung and the Public Works Department and the Water Resources Development Department in the government of Sumedang. Thus, we foresee no technical problems in terms of operation and maintenance of the roads and irrigation facilities developed under this project.

### 2.5.3.3 Finances

The total budget of the Public Works Department in the Bandung government was Rp. 208 billion in 2007. The operation and maintenance of roads required Rp. 21 billion, but only Rp. 7 billion was allocated. Likewise, the total budget of the Irrigation, Drainage, Minerals and Energy Department amounted to Rp. 2.1 billion. The operation and maintenance of irrigation facilities required Rp. 8 billion, out of which merely Rp. 1.8 billion was allocated.

In 2007 the total budget of the Public Works Department in the Sumedang government was Rp. 20 billion. The operation and maintenance of roads required Rp. 22.5 billion, out of which an amount of Rp. 7.5 billion was appropriated. The total budget of the Water Resources Development Division of the same government was Rp. 7.5 billion. Although an amount of Rp. 6.3 billion was necessary for the operation and

maintenance of irrigation facilities, only Rp. 1 billion rupiah was allocated.

As can be seen from the above, an adequate budget cannot be secured for the operation and maintenance of roads and irrigation facilities.

#### 2.5.3.4 Conditions of operation and maintenance

As discussed above, there is a problem that the regional governments are unable to secure sufficient budgets for operation and maintenance each year. Hence, many roads and irrigation facilities that need repairs cannot be dealt with when it is necessary. What is done to address the shortage of budgets is to prioritize repair works. Under such conditions, however, we discovered that the roads and irrigation facilities developed under this project had been maintained in good conditions in general.<sup>8</sup>

#### 2.5.4 Operation and maintenance organization (Part 4)

【Equipment (Automatic water level recorder)】 Citarum Forest Conservation Sub-center

##### 2.5.4.1 Organization

The Citarum Forest Conservation Sub-center, which is a regional office of the Ministry of Forests, plans to take responsibilities for the operation and maintenance of the automatic water level recorders. The reason why the word “plan” is used here is that the Citarum Forest Conservation Sub-Center refuses to accept the water level recorders because some of them began to malfunction before the governments of Bandung and Sumedang transfer them to the control of the Sub-center.

##### 2.5.4.2 Technology

The Sub-center has been monitoring the volume of water in other areas, and we foresee no particular technical problems with respect to the maintenance of the automatic water level recorders.

##### 2.5.4.3 Finances

The total budget of the Citarum Forest Conservation Sub-center was Rp. 11.6 billion in 2007. The maintenance of the automatic water level recorders will require Rp. 260 million. A budget to cover the expenses has been allocated. Hence, in all likelihood there will be no particular financial problems in the operation and

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<sup>8</sup> It appears that roads and irrigations facilities that had been constructed under other projects have not been sufficiently maintained due to a lack of budgets for their operation and maintenance.

maintenance of the automatic water level records.

#### 2.5.4.4 Conditions of operation and maintenance

Three (two in Bandung and one in Sumedang out of the eight water level recorders (five in Bandung and three in Sumedang) are malfunctioning. One of the two recorders in Bandung is not working because of the loss of its batteries, whereas the other is not functioning due to a trouble with its batteries. One recorder in Sumedang malfunctions because of a trouble with its batteries as well. The governments of both Bandung and Sumedang explored the possibility of procuring new batteries. However, they discovered that they had to import them from Singapore, which cost dearly. Thus, they have not yet procured them.

As discussed above, though some problems have been observed in terms of the operation and maintenance of torrent and bank facilities and the water level recorders, sustainability of this project is fair.

### 3 Conclusion, lessons learned and recommendations

#### 3.1 Conclusion

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

#### 3.2 Lessons learned

- 1) The supporting activities carried out by NGOs under a project increase consulting service. However, they will be able to fulfill a highly significant role in raising the effectiveness, impacts and sustainability of the project.

#### 3.3 Recommendations

- 1) The governments of both Bandung and Sumedang should enhance awareness of the necessity and advantages of proper operation and maintenance of the torrent and bank facilities in KKLD and carry out capacity building so that KKLD will be able to repair small-scale facilities single-handedly.
- 2) The Directorate General of Regional Development of the Ministry of Home Affairs, the executing agency, should summon administrative officials of the Bandung government, the Sumedang government and the Citarum Forest Conservation Sub-center as quickly as possible and pave the way for repairing the automatic water level recorders that are in malfunction so as to expedite their transfer to the

Sub-center at the earliest possible time.

- 3) The Public Works Department of the government of neither Bandung nor Sumedang receives an adequate budget for operation and maintenance of roads and irrigation facilities. Therefore, it is necessary for both governments to allocate a budget enough to do repair work.

#### Comparison between major plans and actual outputs

Item	Plan	Output
① Output	(a) Farm/forest land conservation Terrace development: 7,705 ha Afforestation: 3,008 ha Agro-forestry 3,018 ha Land improvement: 7,817 ha (b) Torrent and bank conservation Torrent conservation Check dam 70 units Small check dam 139 units Gully plug 2,080 units Bank conservation Revetment work 1.6 km Riverside line work 92.0 km Riverside re-vegetation 460 ha (c) Road construction New road construction 68.4 km Land improvement 45.4 km Planting on the slope 122.3 km Roadside planting 145 km (d) Equipment Automatic water level recorder 12 units (e) Consulting service 351 M/M (International 107, Local 244)	(a) Farm/forest land conservation Terrace development 7,735 ha Afforestation 845 ha Agro-forestry 2,287 ha Land improvement 6,103 ha (b) Torrent and bank conservation Torrent conservation Check dam 20 units Small check dam 209 units Gully plug 1,333 units Bank conservation — Revetment work 12.2 km Riverside line work — Riverside re-vegetation 3,610 ha (c) Road construction New road construction 7 km Land improvement 46 km Planting on the slope 148 km Roadside planting 25 km (d) Equipment Automatic water level recorder 8 units (e) Supporting activities Training (by NGO) 63 villages Irrigation facilities 614 ha (f) Consulting service 1,128 M/M (International 235, Local 893)
② Project Period	December 1995 ~ July 2002 (78 months)	December 1995 ~ December 2006 (133 months)
③ Project cost		
Foreign currency	¥1,313,000,000	¥544,000,000
Domestic currency	3,543,000,000	3,458,000,000
Total	4,856,000,000	4,002,000,000
(ODA loans)	4,128,000,000	3,960,000,000