

添付資料 2. 詳細協議議事録

日時： 2004年12月1日(水) 12:00~12:40

場所： Ministry of Public Works, Brantas Office

出席者：

インドネシア側：Ir. Imam Agus Nugrobo, Dipl.HE、Ir. Djoko Yudi Santoso, Dip. HE、
Ir. Rahayu、Ir. Hasan Ppriyadi、Ir. Gaudes Safti、Ir. Gandesi

日本側： 調査団；樋口 政男（貯水池計画/自然条件調査）、野沢逸男（水供給計画/運営
維持管理）、松崎憲四郎（環境社会配慮）

協議骨子：表敬訪問および本件調査方針・方法・内容について意見交換

協議内容要旨：

1. 調査団より本件調査の目的、調査方法・内容、調査工程等について概要を説明、

①要請背景、内容、範囲、上位計画との整合性確認

②基礎資料・情報収集、現地踏査スケジュール

③質問書の内容と回答（12月8日までに回答作成方）への協力要請

2. インドネシア側より、本件調査の目的、調査方法・内容、調査工程等を了解した旨および質問書への回答作成について協力する旨の回答があった。

日時： 2004年12月1日(水) 14:30~15:30

場所： BAPEDAL East Java Province,

出席者：

インドネシア側： Mr. Hartoyo - Head of BAPEDAL、 Ir. Dich Susilouah - Sub Division of EIA Bapedal、 Dewi J. Putriatmi - Deputy Haed East Java Bapedal

日本側： 調査団；樋口 政男（貯水池計画/自然条件調査）、野沢逸男（水供給計画/運営維持管理）、松崎憲四郎（環境社会配慮）

協議骨子：表敬訪問および本件調査方針・方法・内容について意見交換

協議内容要旨：

1. 双方にて出席者紹介後、調査団より本件調査の目的、調査方法・内容、調査工程等について概要を説明、
 - ①要請背景、内容、範囲、上位計画との整合性確認
 - ②基礎資料・情報収集、現地踏査スケジュール
 - ③EIAの必要性について確認
 - ④質問書の内容と回答（12月8日までに回答作成方）への協力要請
2. インドネシア側より、本件調査の目的、調査方法・内容、調査工程等を了解した旨および質問書への回答作成について協力する旨の回答があった。

また、本プロジェクトはEIAが必要とされる規模要件以下でありEIAの必要はないとの回答を得た。

日時： 2004年12月10日（金）13:00～15:30

場所： Brantas Office

出席者：

インドネシア側：Mr. Joko Yadi、Ms. Gandesi、他7名、BAPPEDALDA：2名

日本側： 調査団；稲葉 誠（総括）、久下 勝也（計画管理）、樋口 政男（貯水池計画/自然条件調査）、野沢逸男（水供給計画/運営維持管理）、松崎憲四郎（環境社会配慮）

協議骨子：表敬訪問および本件調査方針・方法・内容、署名等について意見交換

協議内容要旨：

1. 双方にて出席者紹介後、調査団より本件調査の目的、調査方法・内容、調査工程等について概要を説明、

- ①要請背景、内容、範囲、上位計画との整合性確認
- ②基礎資料・情報収集、現地踏査スケジュール
- ③EIAの必要性について確認
- ④その他（MD添付様資料の要求）

また、日本側から、プロジェクト実施前の約束にもかかわらず、運営維持管理について村や郡等の地方政府の財政的支援が得られなかったこと、水は神からの賜りものであり、灌漑のように直接水を使用することに対しては金を払うという意識がないこと、村落住民は乾期以外水道料を払わないことなど東西ヌサトゥンガラ州での水供給プロジェクトを例にあげ、料金支払い意志、料金徴収体制、支援体制等給水施設運営維持管理体制の十分な確保対策の必要性、さらに、環境社会配慮を十分確認しておくことなどを説明した。

2. インドネシア側より、本件調査の目的、調査方法・内容、調査工程等について次のような説明や要望があった。

- ①貯水池の堤体高さが15m以下なので、EIAは必要ない。
- ②可能ならば、ソロ側流域の2つの候補地を追加して欲しい。
- ③質問書への回答は15日には作成、提出できると考えている。
- ④可能ならば、他の2地点（ソロ側流域の2地点）についても要請したい。
- ⑤建設時期は何時頃になるか。
- ⑥PS-4およびNG-3は2005年に自己資金で建設予定であり、要請から取り下げる。

3. 日本側は次のように回答した。

- ①現地調査期間も相当に短いので、要請のあったプロジェクトについて協議したい。
- ②2005年2月にJICAから日本政府にレポートする。政府がレビューし、決定すればB/Dに5～6ヶ月かかる。建設は2006年頃になるであろう。
- ③PS-1は既に建設されており、要請される貯水池の数は12から9となる。

4. インドネシア側は日本側の回答に了解した。

日時： 2004年12月13日（月）10：00～

場所： Brantas Office

出席者：

インドネシア側：Mr. Joko Yadi、Ms. Gandesi、他2名

日本側： 調査団；稲葉 誠（総括）、久下 勝也（計画管理）、樋口 政男（貯水池計画/自然条件調査）、野沢逸男（水供給計画/運営維持管理）、松崎憲四郎（環境社会配慮）

協議内容要旨：

1. 団長から現地踏査の結果に基づいた懸念事項について説明

- ① 生活用水はWHOの基準を満足しない水が供給されている。
- ② 堆砂についての懸念
- ③ 維持管理のコスト・組織の必要性。灌漑が行われている所でも Cropping Pattern は変化していない（従来のように Paddy-Paddy-Palawija のパターンとなっている）
- ④ 貯水池により水没する土地に適切に補償することが必要
- ⑤ 生活用水供給の代替案として深井戸を設置することがあげられる。

2. インドネシア側から団長の懸念事項について説明

- ① H0 基準に適合する水を供給するにはコストがかかる。
- ② 堆砂について Brantas 川 Master Plan では Soil Erosion Plan が策定されているがコストがかかる。JBIC が Rehabilitation Study を行っている。
- ③ Groundwater より Small Pond の方が維持管理費が安い。帯水層がない地域に Small Pond を計画している。
- ④ 土地取得については現在交渉中である。プロジェクトが Authorize されたら土地取得を行う。

3. 料金徴収について次のような議論があった。

- ① 団長：Cropping Pattern を変化させること、水に対する対価を支払うことを（水は神からの授かりものである理解している人々）に理解させるためには時間がかかると説明。
- ② インドネシア側：Small Pond により経済が成長すれば、人々は水に対価を支払うようになる（時間がかかるが）
- ③ 団長：JICA はアフリカで類似のプロジェクトを実施したことがある。水の対価を徴収しないと、人々は Cropping Pattern を変えない。
- ④ インドネシア側：住民参加についての組織は Brantas 内にない。来年には組織変更があり、予算を取る予定である。灌漑用水に対して 2,000Rp/ha/月の対価を徴収し始めている。
- ⑤ インドネシア側：Watershed Management Plan は JBIC に提案している。パイロットスケールのプロジェクトは 2004 年にスタートする予定。違法伐採については政府が住民を雇用して対策している。Watershed Management Plan に Small Pond は含ま

れない。地すべり防止対策、森林の保全などが含まれる。

- ⑥ 団長：日本国政府が行う水供給プロジェクトは飲料水基準に適合することが必要である旨を説明。

日時： 2004年12月14日（金）10:00～12:30

場所： Brantas Office

出席者：

インドネシア側：Mr. Imam Agus Nugrobo, Mr. Joko Yadi、Ms. Gandesi、他12名

日本側： 調査団；稲葉 誠（総括）、久下 勝也（計画管理）、樋口 政男（貯水池計画/自然条件調査）、野沢逸男（水供給計画/運営維持管理）、松崎憲四郎（環境社会配慮）

協議骨子：表敬訪問および本件調査方針・方法・内容、署名等について意見交換

協議内容要旨：

1. 双方にて出席者紹介後、調査団より本件調査の現地調査内容等について概要を説明
2. JICA側の認識を説明
 - ① 生活用水の水質はWHOの基準に適合することが必要
 - ② 堆砂についての懸念
 - ③ 維持管理のコスト・組織の必要性。料金を徴収しないと Cropping Pattern を変えることができない
 - ④ JICA 環境社会配慮ガイドラインに基づく IEE の必要性。
3. Oro-Oro Ombo の行政当局の説明
 - ① 1998年に Small Pond を建設して村が運営しているが、堆砂はない（根拠：貯水容量が変化していない）。
 - ② 運営においても問題はない。維持管理の予算は取っていない。貯水池の状態は良好であるので必要ない。ゲートは村人が管理しているが、No Pay である。村人から要求があれば修理を行う。その費用は非常時予算があるので拠出できる。現在まで拠出したことはない。
 - ③ 原水は無料であるが、Small Pond を Fishing に利用しており、Rp5,000/day の料金を徴収している。
4. Kabpaten Malang の行政当局の説明
料金は徴収していない。
5. Nganjuk の行政当局の説明
灌漑用水の料金は徴収していない。75,000Rp/ha/year を徴収することを計画している。
6. Trenggarek の行政当局：
料金は徴収していない。
7. インドネシア側のコメント
 - ① Small Pond は営利を目的とした事業ではなく、社会事業であり、コストのみでは適否を判断できない。
 - ② PDIM は Water Resource 当局の管轄であり、処理後の水が PDAM の管轄である。
 - ③ JICA 側は生活用水は地下水が安いとしているが、Brantas 側は地下水による供給について生活用水および灌漑用水も含めて考えていた。

- ④ Brantas 側 : Small Pond を建設すると下流側の流量が減少するが、現在まで下流側からのクレームはない。

添付資料 3. 聞き取り調査表

Interview Survey and Evaluation Sheet
February 28, 2005 Preparatory Study Team

Shaded Parts show the cancelled sites. Revised to add PC-1(Pacitan) on Dec. 23, 2004

KABUPATEN	Ngarjuk		Kediri		Trenggarek		Probolinggo		Pasuruan		Malang		Pacitan	
	Oro-Oro Ombo	Jatigreges	Winong	Kalipang	Ngilenteng	Gurah Bindo	Pelan Kerep	Tegal Pao	Brintik	Sidowayah	Lowek Jati	Gentong	Kwangen	
Pond Name	NG-1	NG-3	KD-1	KD-2	TR-3	PB-1	PB-2	PB-3	PS-4	PS-1	MA-1	MA-2	PC-1	
Notation	IRR/DWS No NEED Rehabil. Only NEED	IRR/DWS NEED NEED 2nd	IRR/DWS	IRR/DWS NEED 2nd	IRR/DWS NEED	IRR/DWS NEED	IRR/DWS NEED	IRR/DWS NEED	IRR/DWS NEED 2nd	IRR/DWS Already constructed	IRR/DWS NEED 2nd	IRR/DWS NEED 1st	IRR/DWS NEED 1st	
DWS	C	B	D	A	B	B	B	C	A	D	A	B	B	
0. Water Demand Classification														
1. Community														
1.1 Present	2004	2003	2002	2003	2003	2004	2003	2004	2004		2004	2003	2004	
a. Population	1,446	3,704	1,888	4,853	3,489	7,509	4,979	784	1,998		6,474	3,617	3,081	
b. Household Total	369	916	503	1,558	984	2,261	1,338	220	625		1,936	1,002	802	
c. Farm household	362		450	1,400	815	2,259	1,323	216	625		1,452	485	400	
d. Av. Income(Rp/HH/Y)	2,304,000	550,000/HH/m	?	50,000 to 100,000/HH/m	400,000/HH/y	700,000 to 1,100,000	1,000,000	350,000/HH/m			?	7,000,000	400,000/HH/m	
1.2 Future : 2012														
a. Population Growth rate	#1 Pump up is necessary.	Village head doesn't know the situation.	?					Village chief doesn't understand project well.						
b. Total Population			?											
c. Total Household			?											
d. Beneficial Population	800?		?	2,240	917	209	1338	1380	171		5,907	2,147	768	
e. Beneficial Household Total	209?		?	720	262	403	370	370	55		1,718	592	200	
f. Fam household	Beneficial figure was ambiguous										75%	80%		
g. Av. Income(Rp/HH/y)														
2. Natural Condition														
2.1 Location	Oro-Oro Ombo	Jatigreges	Petungroto	Kalipang	Sumberdadi	Kedungrejo	Sumberkare	Curah Temu	Berierwojo	Oro-Oro-Pule	Baturetno	Argosari	Cokrokembang	
a. Village	Ngatos	Pace	Petungroto	Grogol	Trenggalek	Tugal/Tugasari/Kulon	Wonomerto	Kuto Anyar	Kejayan	Kejayan	Singosari	Jabung	Ngadilojo	
b. Sub District	Nganjuk	Nganjuk	Kediri	Kediri	Trenggalek	Bantaran/Leces.	Probolinggo	Probolinggo	Pasuran	Pasuran	Malang	Malang	Pacitan	
c. District	201.97	113.96	419.89	367.47	209.28	105.85	140.9	74.66	93.74	151.20	517.77	557.15	82.4	
d. Elevation(m)														
2.2 Hydrology														
a. Station	Bandong	Gerjeng	Majo(2a)	Grogol	Tuga(40a)	Leces(177)	Pacitan(147a)	Kedun Sumur	Solowongko		Sinosari(51)	Jabung(03)	Lorok	
b. Record year	1986-2000	1985-2000	1985-2000	1985-2000	1987-2000	1985-2000	1985-2000	1985-2000	1985-2000		1985-2000	1985-2000	1983-1996	
c. Av. Rainfall(mm/y)	1,808	1,509	1,924	1,803	2,010	1,908	1,734	2,390	2,023		2,122	2,447	2,163	
2.3 Climate														
a. Station	Nganjuk	Nganjuk	Wingsi Dam	Wingsi Dam	Wingsi Dam	Wondlangan	Wondlangan	Wondlangan	P3G		Sengguru Dam	Sengguru Dam	Wingsi Dam	
b. Record year	1997-2001	1997-2001	1997-2001	1997-2001	1997-2001	1997-2001	1997-2001	1997-2001	1997-2000		1997-2001	1997-2001	1997-2001	
c. Av. Temperature(°C)	23.6	23.8	25.7	25.7	25.7	27.7	27.7	27.7	27.4		23.4	23.4	25.7	
d. Sunshine(%)	52.0	52.0	62.3	62.3	62.3	73.4	73.4	73.4	79.6		63.6	63.6	62.3	
e. Humidity(%)	74.5	74.5	78.1	78.1	78.1	76.5	76.5	76.5	77.4		76.3	76.3	76.1	
f. Wind(km/h)	3.2	3.2	1.5	1.5	1.5	4.0	4.0	4.0	4.0		4.3	4.3	1.5	
3. Agriculture														
3.1 Present														
a. Soil Characteristics	Oxis., Incepti- Andisol	Inceptisol	Oxis., Incepti- Andisol	Inceptisol, Andisol	Enti-sol	Alfisol, Oxisol	Inceptisol, Alfisol	Alfisol,Entisol Inceptisol	Andisol, Oxisol		Inceptisol Andisol, Oxisol	Oxisol, Entisol Andisol		
b.1 Paddy area (ha)	227	40	108	117	20	0	600	4	81		31,000	106	254	
b.2 Cropping Pattern	P-P/Ma	P-P/Ma	P-Ma/Gn	P-P/Pol	P-Pol	-	P-Pa	P-Tob	P-Pal		P-P/Pol	P-P/Pol	P-Pol/Pol	
b.3 Cropping Pattern	P-P/Per-50%													
c.1 Rain-Fed Paddy Area (ha)	-	178	-	434	26	2000	150	12	125		13,935	15	65	
c.2 Cropping Pattern	-	P-P/Pol		P-Cas	P-Pol	P-Pal	P	P	P		P-Pol(S.c. Sb.)	P-Pol(Cass.)	P-Pol-	
d.1 Up-land Field Area (ha)	80	88	490	170	20	855	855	231	81		498,913	277	40	
d.2 Cropping Pattern	Ma	Ma	Ma	Ma?	Ma?	Pol(Com)	Pol(Com)	Pol	Pol		P-Pol(S.c. Sb.)	Sug. Cane	Cassaba	
e. Irrigable Area (ha)	124	40	100	117	20	0	600	0	81			65	125	
Case-I(Wet Session) (ha)		46	27	117	20	0	-	-	-					
Case-II (Dry Session I) (ha)		46	27	117	20	0	-	-	-					
Case-III (Dry Session II) (ha)		46	27	117(Cas/Pol)	5	0	-	-	-					

KABUPATEN	Nganjuk		Kediri		Trenggarek	Probolinggo			Pasuruan		Malang		Pacitan
	Pond Name	Oron-Oron Dumbo	Jatagregas	Winong	Kalipang	Nglenteng	Curah Bindo	Pelan Kerep	Tegal Pao	Brintik	Sidowayah	Lowck Jabu	Gentong
Notation	NG-1	NG-3	KD-1	KD-2	TR-3	PB-1	PB-2	PB-3	PS-4	PS-1	MA-1	MA-2	PC-1
3.2 Future													
a. Soil Characteristics	-	*46	*27	*12	15	25	200	61	50		*182	80	*23
b.1 Paddy area (ha)	-				if water supplied								
* Paddy area (ha) as per App 9													
b.2 Cropping Pattern	P-P-Pol	P-P-Pol	P-P-Pol	P-P-Pol	P-P-Ma		P-Pol	P-Tob-Pal Tob=Tobacco	P-Pol		P-P-Pol	P-P-Pol	P-P-P
c.1 Rain-Fed Paddy Area (ha)	-	-	-	-	-	-	-	-	-	-	-	-	-
c.2 Cropping Pattern	-	-	-	-	-	-	-	-	-	-	-	-	-
d.1 Up-land Field Area (ha)	-	-	-	-	-	-	-	-	-	-	-	-	-
d.2 Cropping Pattern	-	-	-	-	-	-	-	-	-	-	-	-	-
4 Water Resource, Demand & Tariff													
4.1 Water Resources for Irrigation	Ledok	Tributary of Kulak	Jepun	Kandangan	Pendem	No resource	Cresikan Karangkeni	Bancak	Spring 30km from village		Kalimat	Sumber wedus	*Carbon Creek
a. Name of the River									24l/sec			Jasuto	
4.2 Water Resources for Domestic													
a. Shallow Well (l/sec)	12x3mDep	?	?	1l/d	90x8m 90HH	4Wells 200HH	200 to 800HH	25 x 7HH			350x20mDep 10to15HH/well	250x20mDep 4to5HH/well	530x10m Dep
b. Deep Well (l/sec)	-	-	-	-	-	-	-	-	-	-	1x150m, 5l/s to 270HH	half funded by WB.	more than 100m Dep.
c. Spring Capacity(l/sec)	3.1	-	-	3l/s	13x 0.5l/s	Ø100mm Pipe 20l/hr All HH	60HH 200m	50mm 145HH	3" pipe 30km			6 Spr 0.5 to 1.0km	1" pipe 60HH
Distance	3km								The area excluding Brintek				PDAM 78HH
Covered Population	for 3 Villages 290HH				PDAM 22HH (800Rp/m ³)						Bathing washing	Bathing washing	Bathing washing
d. River	-	-	insufficient in dry season	4l/s in dry season	-	-	-	-	-	-			
4.3 Water Consumption, Demand (m ³ /d)													
4.3.1 Irrigation Water													
(1) Present State													
1) Unit Consumption of Irrigation Water (l/sec/ha):									P: 440l/s/ha Pol: 30l/s/ha		Secretary doesn't well.		?
2) Water Consumption Cropping Pattern I Cropping Pattern II									P: 6h x9times Pol: 6h x9times 1500Rp/time x3times/Mx3M HIPPA				
3) Present Irrigation Water Tariff(Rp/ha/Y)	?	30,000 to 84,000	Paddy: Free Pol: 180,000 /session	196,000 to 280,000Rp /ha/y	Free HIPPA not function		Free HIPPA not function	Free HIPPA not function			200,000Rp /ha/yearx2/y HIPPA not function	250,000Rp /ha/y HIPPA not function	Free HIPPA not function
4) O & M Organization and System													
(2) Future													
1) Unit Demand of Irrigation Water (l/sec/ha):													
2) Future Water Demand													
3) Payable Water Tariff(Rp/ha/session)							?	150,000	25,000	no relation for ha 18,000Rp/M	Secretary Steering Committee matter	250,000Rp /ha/y	?
4.3.2 Domestic Water (Drinking, bathing, cooking etc.)													
(1) Present State													
1) Present Water Consumption	25 l/HH/d	50 l/HH/d	?	75 l/HH/d	60 l/HH/d	60 l/HH/d 120l for Cow	80l/HH/d	100l/HH/d	60l/HH/d		300l/HH/d	225l/HH/d	?
2) Present Water Tariff(Rp/M)	Free	3,000	1,000 to 3,000	near pipe 1,000 to 5,000	5,000	1,500(PT) to 2,000(5HH)	Free	500	Free		Free	Free	Free
3) Electricity Charge(Rp/HH/M)	10,000 to 15,000				20,000	10,000 to 15,000	30,000	50,000 (Rp/4HH/M)	20,000		50,000	25,000	6,000 to 7,000

KABUPATEN	Ngarjuk				Kediri				Trenggerek	Probolinggo			Pasuruan		Malang		Pacitan	
	Oro-Oro Ombo	Jatigrages	Winong	Kalipang	Ngjentreng	Curah Bindo	Pelan Kerep	Tegal Pao	Brintik	Sidowayah	Lowek Jati	Gentong	Kwangen					
Notation	NG-1	NG-3	KD-1	KD-2	TR-3	PB-1	PB-2	PB-3	PS-4	PS-1	MA-1	MA-2	PC-1					
4) O & M System, Organization Co	50,000Rp/M Karang Taruna 2 persons 2x25,000Rp/M	A HIPPAM 2 Public tanks only 1 working	B 2 persons 30,000Rp/Mx1 15,000Rp/Mx1 (Collector)	A HIPPAM 2 persons paid from 150,000Rp/M tariff collected	A collected when necessary not exist	C 20,000Rp/M HIPPAM	A NO	D HIPPAM 1 Chief+3p not function	C NO	D								
(2) Future 1) Unit Demand of Domestic Water (lpcd) 2) Future Water Demand 3) Payable Water Tariff(Rp/HH/M)	Elec Charge Not shown	D 3,000	B 2,500	B ?	C <2,000	A 3,000	B 5,000	C ?	D 3,000	B								
5. Water Quality	Very bad	D Very bad	D Very bad	D Very bad	D Very bad	D Very bad	D Very bad	D Very bad	D Very bad	D Bad but relatively good	B Bad but relatively good	B						
6. Sedimentation a. U. Yields (mm/km ² /year) b. V25 (1,000m ³) unit?	Bad but relatively good	B Bad but relatively good	B Very bad	D Very bad	D Very bad	D Very bad	D Very bad	D Very bad	D Very bad	D Bad but relatively good	B Very bad	D Bad but relatively good	B					
7. Necessary Access Road (km) for Development of this Rural Water Supply Project	Widening of access road necessary	Widening of access road necessary	Widening of access road necessary	Widening of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Construction of access road necessary	Widening of access road necessary	
8. Others Water borne disease					Normal	Normal	Normal	Normal	Dianheca 30% of Population 7 persons dead in 2000									
A	4	2	1	1	4	2	2	1	0	1	3	1	1	0	0	0	0	0
B	3	2	4	2	1	2	4	2	1	4	1	4	4	3	1	2	3	3
C	2	2	1	0	1	0	2	2	4	0	0	0	0	0	0	0	0	0
D	1	2	2	5	2	2	2	2	3	2	2	3	3	4	4	4	4	3
POINT	2,500	2,500	1,680	2,680	2,500	2,750	2,500	1,750	2,360	2,360	2,000	2,130						
Ranking	3	3	11	1	3	2	3	12	7	7	10	9						
Grading	B ⁻	B ⁻	C	B	B ⁻¹	B	B ⁻¹	C	B ⁻	B ⁻	B ⁻	B ⁻						
A: 3.5-4.0, A ⁻ : 3.0-3.5	B: 2.5-3.0,	B ⁻ : 2.0-2.5	C: 1.5-2.0,	C ⁻ : 1.0-1.5	D: 0.5-1.0,	D ⁻ : 0.0-0.5												

Evaluation Item and Grade

- 1 Four Factors: Importance, Relevancy, Necessity, Urgency
- 2 Need of Rural Water Supply First
- 3 Beneficial Population: P<500; =D, 500<P<1000; =C, 1000<P<2000; =B, 2000<P; =A
- 4 Poverty Reduction: Grade high for Low Income Village: A: <2.0MRp.; 2.0MRp<B<3.5MRp. 3.5MRp<C<5.0MRp. D>5.0MRp

- 5 Present Water Consumption: Grade high for low consumption
- 6 Payable Water Tariff: Low seems high necessity for BHN and Grade should be high.
- 7 Water Quality:
- 8 Sedimentation

添付資料 4. 質問書および回答

Answers to Questionnaire
for
Preparatory Study
on
The Project for East Java Small Ponds Construction
for Rural Water Supply
in Republic of Indonesia
Japan International Cooperation Agency

December 2004

Ministry of Public Works

Questions A: General

1. Confirmation of the contents of the requested project (the Project for the East Java Small Ponds Construction for Rural Water Supply)

1-1 Background of the project

We understood that this project was authorized by the Government of Indonesia.

Please explain the reason why this project was requested in high priority from your country from viewpoints of national and regional development planning.

Answer

Indonesia has rainy season and dry season, and many rural areas are facing the following conditions:

- Shortage water or available water is not sufficient during dry season,
- Domestic and irrigation water is limited only during dry season,
- Yearly cropping pattern is Paddy-Polowijo during rainy season only.

The residents lived in these areas are staying low living standard, therefore, there are many requests of construct “Embung”, small pond, were made by local regencies since before to get the water in dry season. However, these developments have not been executed because of the limited budget from Government of Indonesia.

The small ponds development would improve the living standard in rural areas by provision of sustainable water in dry season, and support the well-balance development between urban and rural societies. It also can play multipurpose function, not only for domestic use, but be well useful to meet water demand for irrigation, cattle stock, fishery, tourism, and so on.

In East Java Province, “the Wonorejo Multipurpose Dam Construction Project” has been commenced by JBIC loan in 1994, and “the Identification Study and Detailed Design of Small Ponds” also has been implemented by October 2002 as a part of the “Review Study for Water Resources Development in Brantas River Basin” by using the remaining budget of the same loan. In the Study, 86 of small pond sites were identified, and feasibility for selected 36 sites and detailed design for selected 15 sites were carried out.

In 2003, a serious drought was happened in Indonesia, especially in Java Island. So, many residents in rural areas are strongly requesting to the each local regency to settle the water shortage in dry season. In East Java Province, the study and design of small ponds are already available, but the budgets for development of these small ponds are not available at this moment. Accordingly, the implementation of the Project was requested to Japanese Grant Aid.

1-2 Outline of the Project

(1) Objective of the requested Project

Please explain the objective of the requested Project.

Answer

Small ponds purposes for rural water supply demand and irrigation water

(2) Project area

Please provide the drawing showing covered area of each project site including roads, housing and irrigation areas, etc. as attached in Appendix-1

(3) NG-1 (Oro-Oro Ombo), TR-3 (Ngilentreng) and MA-2 (Gentong)

The Preparatory Study Team recognized that the three small ponds were not selected for the D/D study based on the results of the F/S, which were screened and ranked with technical, economical and socioeconomic aspects. How do you explain the feasibility of the three sites?

Answer

In the above study, each small pond project was evaluated in view of technical, economical, and socio-economic aspects. So, irrigation benefit is one of the major aspects to increasing the feasibility. However, as mentioned in the above, serious water shortage was happened in 2002, and water shortage of living water is occurred in many areas. Therefore, we re-evaluated the above study to put priority for the living water supply, due to strongly request from Local Government (attached -1)

(4) Benefited population

The Preparatory Study Team acknowledged that numbers of the benefited population for each Project area were reported differently in the F/S & D/D reports and the Request Letter from the Government of Indonesia. Please clarify and determine the numbers of the benefited population for each Project area.

Answer

The numbers of the benefited population for each Project area shown in the Request Letter from the Government of Indonesia are the total population of each village.

(5) Project cost

The Preparatory Study Team recognized that the Project costs for each Project area were reported differently in the F/S & D/D reports and the Request Letter from the Government of Indonesia. Please reconsider and determine the Project costs for each Project area.

Answer

In F/S and D/D stage, the cost estimate was made based on the assumption that the construction works are carried out by local contractors. However, in application form, the cost estimate has been modified, taking into consideration that construction works under grant aid will be increased because of limited construction period, construction by Japanese contractors and also different unit prices.

(6) River sedimentation

The river sedimentation is considered as the most serious problem in planning, design, and O&M of reservoirs. Please explain how the amount of the river sedimentation was evaluated for each small pond in the D/D study and how the unit cost of sediment excavation was estimated for each small pond in the D/D study.

Answer

The river sedimentation was evaluated based on the rainfall data, topographic data, land use data, etc. Related data are being collected and calculation shall be made in B/D stage.

(7) Watershed conservation

The watershed conservation is recognized as the most challenging issue in hydrology and environmental science. Please explain contents of the watershed conservation for each pond in the D/D study and how the cost of the watershed conservation was estimated for each pond in the D/D study.

Answer

Watershed conservation did not have been specified. It will be discussed with residents surrounding the each project in B/D stage. Tentatively, the cost of the watershed conservation with re-greening and terracing is estimated at 10 million Rp/ha.

(8) O&M works and capacity

Which organization has an authority to execute O&M works for each Project? How does/did the organization execute the O&M works for similar small ponds in east Java technically and administratively? How will the organization implement the O&M works for each Project?

Answer

As mentioned in the Application Form, the development and management of small ponds would be mainly implemented by the following three agencies according to the community's requests. These agencies have already agreed to implement the proposed project and look for the budget. When the budgets for the construction will be prepared, these agencies would be as follows;

Brantas River Basin Development Executing Office

- Construction supervision of small ponds and related facilities,
- Instruction of operation & maintenance of the facilities at the beginning stage (1-2 years), and
- Rehabilitation works, if necessary.

Each Regional Planning Development Agency

- Land compensation of small ponds and related areas,
- Assistance for strengthen of Water Users Associations/ communities,
- Operation and maintenance works of the facilities.

Each Regional Irrigation Office

- Instruction of cropping pattern for farmers, and
- Inspection of the facilities.

(9) Water tariff

Which body has an authority to decide water tariff? If yes, please explain the present situation of water tariff system and water tariff collection system for the existing similar small pond with water supply facility nearby or in East Java area.

Answer

Commonly water tariff is proposed by PDAM (Perusahaan Daerah Air Minum) and decided by local government. However, settlement of water tariff for small scale limited water supply system like proposed small ponds is not clear, may be decided upon discussion with local people.

(10) Public subsidies

Please describe administration of public subsidies for the operation and maintenance works of the similar existing facilities, and explain the availability and amount of public subsidies for each Project area.

Answer

For the small ponds:

- Chiefs of the village or the beneficiary organization such as HIPPA and HIPPAM proposed to Local Government.
- Local Government allocated the budget on the yearly budget.

(11) Water right

Please explain previous cases of conflicts/ adjustments on water right in each Project area from a viewpoint of coordination.

Answer

There is no conflict up to now

(12) Willingness to pay

Please describe willingness to pay for drinking water and irrigation, respectively in each Project area.

Answer

Local people who will receive benefit have willingness to pay.

2. Question on water resources

2-1 Surface water

- (1) Please describe names, addresses, functions, organization systems with charts, and contact persons,

Answer

1. Brantas Project
Jl. Menganti 312 Surabaya East Java
Function: Planning, Design, Construction and O&M
2. Jasa Tirta I Public Corporation
Jl. Surabaya 2A Malang East Java
Function: O&M for Main River
3. Water Resources Public Work Services East Java / District.
Function: O&M Small Dam.

The organization systems with charts and contact persons are shown in Appendix-2.

- (2) Please summarize the past water supply development projects with irrigation development and the existing conditions of water supply and irrigation facilities and services in the Project area,

Answer

The existing conditions for each Project area are shown in Appendix-3. The villagers take the water from other villages and there is no water for irrigation in dry season.

- (3) Please explain the water supply development and O&M works plan, and clarify O&M capacity in connection with previous water supply and irrigation projects for each project area or the nearby Project area,

Answer

In order to storage river water in rainy season and supply in dry season, the dam will be constructed and water will be conveyed through canal or pipeline by gravity. O&M will be carried out voluntarily by beneficiaries after handed over.

- (4) Please summarize the initial investment, replacement, sediment excavation and O&M costs for each Project,

Answer

Excavation of sedimentation material and O & M will be carried out voluntarily by local people who received benefit, and then no O/M cost is anticipated.

- (5) Please describe the operation and maintenance plans for each Project area. Please provide the typical examples for operation and maintenance system including organization, water tariff, and financial statement similar to the project,

Answer

Removal of sedimentation materials will be voluntarily conducted by excavation by manpower of local people and dump trucks for transportation regularly.

- (6) Please describe the water balance between water supply capacity and water demand projection for each Project area,

Answer

The water balance calculations for each Project area are shown in Appendix-4.

- (7) Please summarize regulations of river maintenance flow and provide the data of river maintenance flow for each small pond,

Answer

Law of Republic of Indonesia, No. 7, of 2004 regarding water resources.

- (8) Please describe water quality of rivers in each Project area based on the analyzed data,

Answer

Not yet analyzed.

- (9) Please explain present conditions of sedimentation for each Project area, and describe countermeasures for sedimentation for each small pond,

Answer

Data of present condition are being collected. Construction of sediment trap, plantation and improvement of shelf-like paddy field are considered as countermeasures against sedimentation.

- (10) Please summarize regulations of water right and provide the data of river flow based on water right related to the Project,

Answer

Regulation of water right is being discussed in Water Law, which is under preparation.

- (11) Please explain any cases of conflicts/adjustments on water right in water sources development in each Project site,

Answer

There is no conflict up to now

- (12) Please describe procedure of water right coordination in each project area,

Answer

We don't have any experience of conflict of water right, there is no have procedure.

- (13) Please summarize river basin protection plans for each project area and east Java,

Answer

In D/D, construction of sediment trap, plantation reforestation/re-greening and improvement of shelf-like paddy field are considered as countermeasure for water shed management.

- (14) Pleases describe development potential of other surface water sources and the reason why the sources were not utilized for the Project.

Answer

There is no other surface water source except river water which can be managed by Directorate of water resources.

2-2 Ground water and springs

- (1) Please describe the potential of the underground and springs in the Project area and provide technical reports and information on groundwater and springs.

Answer

No observation might have been conducted for groundwater, so there is no data for aquifer capacity. However local people cannot bear cost for pumping up and O&M mainly for irrigation. In addition, some shallow well and spring water will disappear in dry season.

- (2) Please summarize the initial investment, replacement, and O&M costs for each Project area in the case that groundwater and spring can develop.

Answer

No alternative study was made.

- (3) Please describe the suitability of groundwater and spring water quality for drinking and irrigation purposes in connection with contaminations especially for nitrate and coliform. Please provide technical reports and information on groundwater and spring water quality.

Answer

Groundwater and spring water qualities are satisfactory. The O&M is very costly and not satisfactory for environmental impact, if the sources will be used mainly for irrigation.

Summary described in “Identification Study and Detailed Design of Small Ponds” are shown in Appendix-3.

Questions B : Required data and information

No.	Item	Availability (Y/N)	Agency of Information Source	Name of Materials
1.	Development Plan			
1.1	National and Regional Development Plan			
	1) National development program	Y	BAPPENAS	National Development Program (PROPENAS)
	2) Program for development and management of water resources	Y	Departement of Public Works	Strategy of Planning (RENSTRA), tahun 2004-2005
	3) National development plan for rural areas	Y	Departement of Public Works	Strategy of Planning (RENSTRA), tahun 2004-2005
	4) National development plan for water supply and irrigation sector	Y	Departement of Public Works	
	5) Regional development plan for East Java and the Kabupatens related to the Project	Y	Water Resources Public Works Service, East Java Province	Strategy of Planning (RENSTRA), tahun 2004-2005
	6) Regional development plan for the Kabupatens related to the project	Y	Water Resources Public Works Service, Distric	Strategy of Planning (RENSTRA), tahun 2004-2005
	7) Land use plan of the Kabupatens related to the project	Y	Dinas Agriculture District	Strategy of Planning (RENSTRA), tahun 2004-2005
1.2	Water Supply Development Plan			
	1) Final report "Additional Engineering Service review of Water Resources Development Study for Water Supply in Brantas River Basin "Component Study (1), latest edition	Y	Brantas	
	2) Final report "Identification Study and Detailed Design of Small Ponds"	Y	PU, Brantas Office	Identification Study and Detailed Design of Small Ponds
	3) Other water supply development plan, if any			
1.3	Irrigation Development Plan			
	1) Irrigation development plan related to East Java and the Kabupaten where the project sites locate.	N	Water Resources Public Works Service, East Java Province	
2.	Counterpart Agency			
2.1	Ministry of Public Works			
	1) Organization chart	Y		attached as Appendix - 2
	2) Number of personnel			
	3) Budget			
	4) Budgetary arrangement for Irrigation and Water Supply			
	5) Budgetary arrangement for organizing water users associations			
	6) Functions for implementation of the project		Counter part ministry	
2.2	Directorate General for Water Resources Development			
	1) Organization chart	Y		attached as Appendix - 2
	2) Number of personnel	N	Directorat General for Water	
	3) Budget	N		
	4) Budgetary arrangement for Irrigation and Water Supply	N		
	5) Budgetary arrangement for organizing water users associations	N		
	6) Functions for implementation of the project	N	Counter part Office in PU	

東ジャワ農村水供給小規模貯水池建設計画予備調査

No.	Item	Availability (Y/N)	Agency of Information Source	Name of Materials
2.3	Ministry of Environment			
	1) Organization chart	Y		attached as Appendix - 2
	2) Number of personnel	N	Ministry of Environment	
	3) Budget	N		
	4) Budgetary arrangement for Irrigation and Water Supply	N		
5) Functions for implementation of the project	N	Responsible ministry for environmental issues		
2.4	Brantas River Basin Development Executing Office			
	1) Organization chart	Y		attached as Appendix - 2
	2) Number of personnel	Y		
	3) Budget	Y		
	4) Budgetary arrangement for Irrigation and Water Supply	N	Water Resources Public Works Service, Distric	
	5) Budgetary arrangement for organizing water users associations	N	Water Resources Public Works Service, Distric	
6) Functions for implementation of the project		Executing agency under PU		
2.5	Public Works of East Java Province			
	1) Organization chart	Y		attached as Appendix - 2
	2) Number of personnel	N		
	3) Budget	N		
	4) Budgetary arrangement for Irrigation and Water Supply	N	Water Resources Public Works Service, East Java Province	
	5) Budgetary arrangement for organizing water users associations	N	Water Resources Public Works Service, East Java Province	
6) Functions for implementation of the project	N	liaison to central office.		
2.5	Regional Planning and Development agency related with the project			
	1) Organization chart	Y		attached as Appendix - 2
	2) Number of personnel	N	Regional Planning	
	3) Budget	N		
	4) Budgetary arrangement for Irrigation and Water Supply	N		
	5) Budgetary arrangement for organizing water users associations	N		
6) Functions for implementation of the project	N	Approval on development plan (project)		
2.7	Regional Irrigation Office Related with the Project			
	1) Organization chart	N		
	2) Number of personnel	N		
	3) Budget	N		
	4) Budgetary arrangement for Irrigation and Water Supply	N		
	5) Budgetary arrangement for organizing water users associations	N		
6) Functions for implementation of the project	N			
2.8	Environmental Department of East Java Province			
	1) Organization chart	Y		attached as Appendix - 2
	2) Number of personnel	N		
	3) Budget	N		
4) Functions for implementation of the project	N	Regional Office of ED, liaison to central office		

東ジャワ農村水供給小規模貯水池建設計画予備調査

No.	Item	Availability (Y/N)	Agency of Information Source	Name of Materials	
2.9	Community Cooperative Related with the Project				
	1) Organization chart	Y		attached as Appendix - 2	
	2) Number of personnel	N			
3) Present activity and Budget	N				
3.	Law and Regulation Regarding Water Supply		GOR	attached as Appendix - 5	
	1) Water laws	Y			
	2) Laws and regulations for drinking water	Y			
	3) Laws and regulations regarding irrigation	Y			
4.) Laws and regulations regarding water right					
4.	Data and Information on Natural Condition of the Project Area				
	Maps and other Information				
	4.1 1) Topographic maps; 1/100,000, 1/25,000, 1/1,000 to 1/200.	N	BAKOSURTANAL	East Java is classified as moderate area according to BMG and $k=0.12$ is adopted for stability analysis.	
	2) Geological maps; 1/100,000, 1/25,000, 1/1,000 to 1/200	N	Dir. Gen. Geology (MEMR)		
	3) Aerial photograph	N	BAKOSURTANAL		
	4) Hydro-geological maps	N	BAKOSURTANAL		
	5) Soil maps	N	BAKOSURTANAL		
	6) Land use maps	N	BAKOSURTANAL		
	7) Vegetation maps	N	Pusat Penelitian dan Pengembangan Tanah dan Agroklimat		
	8) Earthquake data (acceleration)	N	BMG (Badan Meteorologi dan Geofisika)		
	4.2 Meteorological and Hydrological Data for the last 10 years				
	1) Air temperature - monthly mean	Y	Final report "Identification Study and Detailed Design of Small Ponds"		attached as Appendix - 6
	2) Humidity - monthly mean	Y	same as above		attached as Appendix - 6
	3) Wind direction & velocity - monthly mean	Y	same as above		attached as Appendix - 6
	4) Evaporation - monthly mean	Y	same as above		attached as Appendix - 6
	5) Precipitation - daily, monthly & annual	Y	same as above		attached as Appendix - 6
	6) Isotheral (contour maps of precipitation) maps	Y			
7) Measurement stations with location maps	N				
8) Climate maps	Y	In the report			
9) Discharge - daily, monthly & annual	Y	In the report			
10) Water level - daily & monthly	Y	In the report			
11) Water quality - turbidity, SS, pH, heavy metals, COD, BOD, etc.	Y	In the report			
12) Sedimentation	Y	In the report			
13) Measurement stations with location maps	N	BMG(Badan Meteorologi dan Geofisika)			
14) Maps of river network	N				
15) Location map of volcanoes	N				
16) Activity condition of volcanoes	N				
17) Sedimentation information of ash from volcanoes	N				

東ジャワ農村水供給小規模貯水池建設計画予備調査

No.	Item	Availability (Y/N)	Agency of Information Source	Name of Materials
5.	Data and Information Regarding Ground Water and Springs 1) Well and spring inventory sheets 2) Location map of wells and springs 3) Hydro-geological maps and profiles 4) Technical reports of groundwater and springs 5) Monitoring records of groundwater level, yields, etc. 6) Monitoring records of groundwater and spring water quality 7) Records of groundwater and spring water abstraction 8) Results of geophysical investigation	N N N N N N N N	Water Resources Public Work Services, East Java Province	
6.	Data and Information Regarding Water Supply and Irrigation in and around the Project Areas	Y	Brantas Project	appendix-7
6.1	Outline of Existing Water Supply and Irrigation facilities 1) Water production capacity 2) Covered service area and covered household 3) Served population and category of consumer (type of water use) 4) Operation and maintenance organization and cost 5) Present problem with related to the above operation and maintenance organization and 6) History of the system (construction, maintenance, improvement & rehabilitation etc.) 7) Administrative area map or service area map	Y Y Y Y Y Y N	Brantas Project JICA & Brantas Project JICA & Brantas Project HIPPA Brantas Project Brantas Project	appendix-7
6.2	Detail Data and Information of the Existing Water Supply and Irrigation Facilities 1) Inventory sheets of water supply facilities such as intake facility, transmission pipeline, purification plant, distribution facilities and etc. 2) Brief specification, general layout, typical sectional drawings construction cost and year of construction 3) Control, instrumentation, and record and data communication system 4) History of improvement or rehabilitation 5) Typical maintenance record 6) Organization of Operation and maintenance including personnel for administration, operation and maintenance 7) Electric power supply and consumption 8) Fuel supply and consumption 9) Present condition and problem related to the function, operation and personnel, etc; (quantity, quality of water, water pressure, electric power shortage, ability of personnel and management, etc.) 10) Supply and consumption of chemical agent especially for purification facility and distribution facility	N N N N N N N N N N N	Water Resources Public Works Service, East Java Province Water Resources Public Works Service, East Java Province Water Resources Public Works Service, East Java Province Water Resources Public Works Service, East Java Province Water Resources Public Works Service, East Java Province	

東ジャワ農村水供給小規模貯水池建設計画予備調査

No.	Item	Availability (Y/N)	Agency of Information Source	Name of Materials
7.	Others			
7.1	Statistic Data			
	1) Census of the country	N		
	2) Census of the province	N		
	3) Social and economic index	N		
7.2	Capable/Licensed Consultants			
	1) Water supply engineering	Y	Brantas Project	
	2) Topographic survey	Y	Brantas Project	
	3) Geological and geotechnical survey	Y	Brantas Project	
	4) Water quality testing	Y	Brantas Project	
	5) Environmental study	Y	Brantas Project	
	6) Social survey	Y	Brantas Project	
7.3	Construction Materials Related to the Water Supply and Irrigation			
	1) List of domestic production of valves and pipe materials	Y		
	2) Any custom restriction on importation of the possible construction materials	Y	Brantas Project	
7.4	Unit Price for Construction Related to the Water Supply and Irrigation			
	1) Unit price regarding construction material	Y	Brantas Project	attached as Appendix-8
	2) Unit price regarding construction work such as earth work, pipe installation fittings, concrete construction, etc.	Y	Brantas Project	attached as Appendix-8
	3) Unit price regarding construction equipment, vehicles etc. for waterworks			attached as Appendix-8
	4) Unit price of design and construction engineers	Y	Brantas Project	15 to 25 million Rp./month
	5) Unit price of labours	Y	Brantas Project	

Question C: Environmental and Social Issues

C1: Alternatives

Were the alternatives been considered before this request? <Yes/No>

If <Yes>, please describe outline of the alternatives in the following table.

No.	Project Name	Brief description of alternatives
1.	Oro-Oro Ombo	No
2.	Kulak Secang	No
3.	Winong	No
4.	Kalipang	No
5.	Ngelentreng	No
6.	Lower Jati	No
7.	Gentong	No
8.	Sidowayah	No
9.	Brintik	No
10.	Curah Bindo	No
11.	Pelan Kerep	No
12.	Tegal Pao	No

C2: Consultation with stakeholders

Have consultations with stakeholders been held to explain the projects? <Yes/No>

If <Yes>, please provide information including name of stakeholder, date, place, targeted area for the public consultation (e.g. within the 10 km radius from the project site), used media to announce (e.g. newspaper, radio), total number of attendees of attendees, raised opinions/questions from the stakeholders.

No.	Project Name	Brief description of alternatives
1.	Oro-Oro Ombo	Hearing was made in and around village.
2.	Kulak Secang	Same as above
3.	Winong	Same as above
4.	Kalipang	Same as above
5.	Ngelentreng	Same as above
6.	Lower Jati	Same as above
7.	Gentong	Same as above
8.	Sidowayah	Same as above
9.	Brintik	Same as above
10.	Curah Bindo	Same as above
11.	Pelan Kerep	Same as above
12.	Tegal Pao	Same as above

C3: EIA process

Is Environmental Impact Assessment (EIA) including Initial Environmental Examination (IEE) required for the project according to the laws or guidelines? <Yes/No>

If <Yes>, please fill out the following table.

Explanation

According to “Decree of Minister of Settlements and Regional Infrastructure Number : 17/KPTS/M/2003 Regarding to Determination of Type Business and /Activities in Settlement and Regional Infrastructure Sector Which Should Be Completed With Environmental management Activities and Environmental Monitoring Activities” prepared under Article 3 clause (4) of Government Regulation Number 27 of 1999 regarding Environmental Impact, Environmental Impact Assessment (EIA) is not requested because all reservoirs created by the proposed small dam is less than 50 ha. The said Decree is attached as Appendix - 8

No.	Project Name	Required only IEE	Required both IEE and EIA	Required only EIA	Others (if any)
1.	Oro-Oro Ombo	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
2.	Kulak Secang	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
3.	Winong	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
4.	Kalipang	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
5.	Nglentreng	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
6.	Lower Jati	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
7.	Gentong	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
8.	Sidowayah	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
9.	Brintik	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
10.	Curah Bindo	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
11.	Pelan Kerep	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	
12.	Tegal Pao	Implemented On going Planning	Implemented On going Planning	Implemented On going Planning	

C4: EIA approval

In the case when EIA steps were taken, has the EIA approved by the relevant authorities? <Yes/ No>

If <Yes>, please fill out the following table.

No.	Project Name	Status of EIA approval
1.	Oro-Oro Ombo	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
2.	Kulak Secang	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
3.	Winong	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
4.	Kalipang	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
5.	Ngelentreng	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
6.	Lower Jati	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
7.	Gentong	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()

8.	Sidowayah	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
9.	Brintik	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
10.	Curah Bindo	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
11.	Pelan Kerep	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()
12.	Tegal Pao	Approved: without a supplementary condition Approved: with a supplementary condition Under appraisal Not yet started an appraisal process Others: ()

C5: Required environmental and social permits other than EIA

Permit/license/approval other than EIA approval are required for the project?

<Yes/No>

If <Yes>, please fill out the following table.

No.	Project Name	Required Permit/License/ Approval	Regulatory Authority	Current Status of the Issue
1.	Oro-Oro Ombo			
2.	Kulak Secang			
3.	Winong			
4.	Kalipang			
5.	Nglentreng			
6.	Lower Jati			
7.	Gentong			
8.	Sidowayah			
9.	Brintik			
10.	Curah Bindo			
11.	Pelan Kerep			
12.	Tetal Pao			

C6: Ambient water quality

Have ambient water quality of the river been monitored? Please find out the following table and provide the monitoring data.

No.	Project Location	Have ambient water quality been monitored? (Yes or No)	Provision of monitoring data (*)
1.	Oro-Oro Ombo	No.	If <Yes>, please provide the monitoring data.
2.	Kulak Secang	No.	If <Yes>, please provide the monitoring data.
3.	Winong	No.	If <Yes>, please provide the monitoring data.
4.	Kalipang	No.	If <Yes>, please provide the monitoring data.
5.	Nglentreng	No.	If <Yes>, please provide the monitoring data.
6.	Lower Jati	No.	If <Yes>, please provide the monitoring data.
7.	Gentong	No.	If <Yes>, please provide the monitoring data.
8.	Sidowayah	No.	If <Yes>, please provide the monitoring data.
9.	Brintik	No.	If <Yes>, please provide the monitoring data.
10.	Curah Bindo	No.	If <Yes>, please provide the monitoring data.
11.	Pelan Kerep	No.	If <Yes>, please provide the monitoring data.
12.	Tegal Pao	No.	If <Yes>, please provide the monitoring data.

(*) Monitoring data should include location map of monitoring points and summary table of monitoring data.

C7: Mitigation measures for water pollution

What mitigation measures will be taken to reduce water pollution? Please fill out the following table.

No.	Project Location	Mitigation measures for water pollution	
		Construction phase	Operation phase
1.	Oro-Oro Ombo	No.	No.
2.	Kulak Secang	No.	No.
3.	Winong	No.	No.
4.	Kalipang	No.	No.
5.	Nglentreng	No.	No.
6.	Lower Jati	No.	No.
7.	Gentong	No.	No.
8.	Sidowayah	No.	No.
9.	Brintik	No.	No.
10.	Curah Bindo	No.	No.
11.	Pelan Kerep	No.	No.
12.	Tegal Pao	No.	No.

C8: Water pollution in similar type of ponds

Have water pollution problems (especially, eutrophication) in similar type of existing ponds been caused? <Yes()No>

If <Yes>, please fill out the following table.

Location	Name of pond	Description of water pollution problems

C9: Wastes Disposal

Please fill out the following table of wastes disposal plan.

No.	Project Location	Type of waste generated		Disposal plan	Requirement Under Indonesia regulation
		Construction phase	Operation phase		
1.	Oro-Oro Ombo	Excavated soil	Sedimentation	To be spoiled to designate area.	None
2.	Kulak Secang	Same as above	Same as above	Same as above	None
3.	Winong	Same as above	Same as above	Same as above	None
4.	Kalipang	Same as above	Same as above	Same as above	None
5.	Nglentreng	Same as above	Same as above	Same as above	None
6.	Lower Jati	Same as above	Same as above	Same as above	None
7.	Gentong	Same as above	Same as above	Same as above	None
8.	Sidowayah	Same as above	Same as above	Same as above	None
9.	Brintik	Same as above	Same as above	Same as above	None
10.	Curah Bindo	Same as above	Same as above	Same as above	None
11.	Pelan Kerep	Same as above	Same as above	Same as above	None
12.	Tegal Pao	Same as above	Same as above	Same as above	None

C10 : Ambient noise levels

Have ambient noise levels of the project sites been monitored? Please fill out the following table and provide the monitoring data.

No.	Project Location	Have ambient noise levels Been monitored ? (Yes or No)	Provision of Monitoring Data (*)
1.	Oro-Oro Ombo	No.	If <Yes>, please provide the monitoring data
2.	Kulak Secang	No.	If <Yes>, please provide the monitoring data
3.	Winong	No.	If <Yes>, please provide the monitoring data
4.	Kalipang	No.	If <Yes>, please provide the monitoring data
5.	Nglentreng	No.	If <Yes>, please provide the monitoring data
6.	Lower Jati	No.	If <Yes>, please provide the monitoring data
7.	Gentong	No.	If <Yes>, please provide the monitoring data
8.	Sidowayah	No.	If <Yes>, please provide the monitoring data
9.	Brintik	No.	If <Yes>, please provide the monitoring data
10.	Curah Bindo	No.	If <Yes>, please provide the monitoring data
11.	Pelan Kerep	No.	If <Yes>, please provide the monitoring data
12.	Tegal Pao	No.	If <Yes>, please provide the monitoring data

(*) Monitoring data should include location map of monitoring points and summary table of monitoring data

C13 : Geology and Topography

Are the project sites located in hazard areas such as land slips, active faults and soil erosion?

Please fill out the following table.

No.	Project Location	Type of hazard area
1.	Oro-Oro Ombo	None
2.	Kulak Secang	None
3.	Winong	None
4.	Kalipang	None
5.	Nglentreng	None
6.	Lower Jati	None
7.	Gentong	None
8.	Sidowayah	None
9.	Brintik	None
10.	Curah Bindo	None
11.	Pelan Kerep	None
12.	Tegal Pao	None

C14 : Mitigation measures for natural hazards

What mitigation measures will be taken to reduce natural hazards? Please fill out the following table.

No	Project Location	Mitigation measures for natural hazards	
		Construction Phase	Operation Phase
1	Oro-Oro Ombo	None	None
2	Kulak Secang	None	None
3	Winong	None	None
4	Kalipang	None	None
5	Nglentreng	None	None
6	Lower Jati	None	None
7	Gentong	None	None
8	Sidowayah	None	None
9	Brintik	None	None
10	Curah Bindo	None	None
11	Pelan kerep	None	None
12	Tegal Pao	None	None

C15: Ambient sediment quality

Have ambient sediment quality of the project sites been monitored? Please fill out the following table and provide the monitoring data.

Data are being collected.

No	Project Location	Have ambient sediment quality been monitored? (Yes or No)	Provision of Monitoring Data (*)
1	Oro-Oro Ombo		If <Yes>, please provide the monitoring data
2	Kulak Secang		If <Yes>, please provide the monitoring data
3	Winong		If <Yes>, please provide the monitoring data
4	Kalipang		If <Yes>, please provide the monitoring data
5	Nglentreng		If <Yes>, please provide the monitoring data
6	Lower Jati		If <Yes>, please provide the monitoring data
7	Gentong		If <Yes>, please provide the monitoring data
8	Sidowayah		If <Yes>, please provide the monitoring data
9	Brintik		If <Yes>, please provide the monitoring data
10	Curah Bindo		If <Yes>, please provide the monitoring data
11	Pelan kerep		If <Yes>, please provide the monitoring data
12	Tegal Pao		If <Yes>, please provide the monitoring data

(*) Monitoring data should include location map of monitoring points and summary table of monitoring data

C16: Ecologically important areas

Are any of the following areas located inside or around the project site? <Yes/No>

- Primeval forests, tropical rain forests,
- Ecologically valuable habitats (e.g. wetlands, breeding, feeding, spawning and besting areas)?

If <Yes>, please fill out the following table.

No	Project Location	Does the project site encompass ecologically important areas? (Yes or No)	Type of ecologically important area	Affected area by the project (m2)
1	Oro-Oro Ombo	No		
2	Kulak Secang	No		
3	Winong	No		
4	Kalipang	No		
5	Nglentreng	No		
6	Lower Jati	No		
7	Gentong	No		
8	Sidowayah	No		
9	Brintik	No		
10	Curah Bindo	No		
11	Pelan kerep	No		
12	Tegal Pao	No		

C17: Habitats of the threatened or endangered species

Are any of the followings areas located inside or around the project site?

<Yes/No>

- Habitats of threatened or endangered species designated by the Indonesia laws or international treaties and conventions.

If <Yes>, please fill out the following table

No	Project Location	Inhabitation of Threatened or Endangered Species		
		IUCN (Yes or No)	CITES (Yes or No)	Indonesian Laws (Yes or No)
1	Oro-Oro Ombo	No.	No.	No.
2	Kulak Secang	No.	No.	No.
3	Winong	No.	No.	No.
4	Kalipang	No.	No.	No.
5	Nglentreng	No.	No.	No.
6	Lower Jati	No.	No.	No.
7	Gentong	No.	No.	No.
8	Sidowayah	No.	No.	No.
9	Brintik	No.	No.	No.
10	Curah Bindo	No.	No.	No.
11	Pelan kerep	No.	No.	No.
12	Tegal Pao	No.	No.	No.

C18: Protected areas

Are any of the following areas located inside the project site? <Yes/No>

- Protected areas (e.g., national parks) designated by the Indonesia laws or international treaties and conventions

If <Yes>, please fill out the following table

No	Project Location	Type of Protected area	Affected area by the project (ha)	Title of designated Indonesian laws or international treaties and conventions
1	Oro-Oro Ombo			
2	Kulak Secang			
3	Winong			
4	Kalipang			
5	Nglentreng			
6	Lower Jati			
7	Gentong			
8	Sidowayah			
9	Brintik			
10	Curah Bindo			
11	Pelan kerep			
12	Tegal Pao			

C19: protection measures for biota and ecosystem

What protection measures will be taken to reduce impacts on biota and ecosystems?
Please fill out the following table.

No	Project Location	Protection measures for biota and ecosystem	
		Construction Phase	Operation Phase
1	Oro-Oro Ombo	No.	No.
2	Kulak Secang	No.	No.
3	Winong	No.	No.
4	Kalipang	No.	No.
5	Nglentreng	No.	No.
6	Lower Jati	No.	No.
7	Gentong	No.	No.
8	Sidowayah	No.	No.
9	Brintik	No.	No.
10	Curah Bindo	No.	No.
11	Pelan kerep	No.	No.
12	Tegal Pao	No.	No.

C20: Water rights

Is it required to make an agreement with the water rights holders to implement the projects?

Please fill out the following table.

No	Project Location	Name of water rights holders	Is it required to make an agreement with the water right holders? (Yes or No)	Current status of agreement status with the water right holders
1	Oro-Oro Ombo			
2	Kulak Secang			
3	Winong			
4	Kalipang			
5	Nglentreng			
6	Lower Jati			
7	Gentong			
8	Sidowayah			
9	Brintik			
10	Curah Bindo			
11	Pelan kerep			
12	Tegal Pao			

C21: Fishing activities

Are these fishing activities downstream of the project sites? Please fill out the following table.

No	Project Location	Fishing activities (Yes or No)	Number of fisherman
1	Oro-Oro Ombo		
2	Kulak Secang		
3	Winong		
4	Kalipang		
5	Nglentreng		
6	Lower Jati		
7	Gentong		
8	Sidowayah		
9	Brintik		
10	Curah Bindo		
11	Pelan kerep		
12	Tegal Pao		

C22: Land acquisition

Have required lands for the projects been acquired? Please fill out the following table.

No	Project Location	Total land (m2) for the project	Land to be acquired (m2)	Already acquired land (m2)	Development of land acquisition plan (Yes or No)
1	Oro-Oro Ombo		12,000	0	
2	Kulak Secang		8,500	0	
3	Winong		6,400	0	
4	Kalipang				
5	Nglentreng		2,500	0	
6	Lower Jati		25,000	0	
7	Gentong		10,000	0	
8	Sidowayah		4,500	0	
9	Brintik		2,500	0	
10	Curah Bindo		11,000	0	
11	Pelan kerep		2,500	0	
12	Tegal Pao				

C23: Resettlement

Is resettlement caused by the project implementation? Please fill out the following table.

No	Project Location	Resettlement caused by the project (Yes or No)	Total Number of households whose lands or assets are affected
1	Oro-Oro Ombo	No.	
2	Kulak Secang	No.	
3	Winong	No.	
4	Kalipang	No.	
5	Nglentreng	No.	
6	Lower Jati	No.	
7	Gentong	No.	
8	Sidowayah	No.	
9	Brintik	No.	
10	Curah Bindo	No.	
11	Pelan kerep	No.	
12	Tegal Pao	No.	

C24: Indigenous peoples

Are any of the following areas located inside or around the project site? <Yes/No>

- Inhabitant areas of indigenous peoples or lands that are closely related to indigenous peoples livelihood

If <Yes>, please fill out the following table.

No.	Project Location	Existence of inhabitant areas of indigenous peoples (Yes or No)	Existence of lands that are closely related to indigenous peoples livelihood (Yes or No)
1.	Oro-Oro Ombo	No.	No.
2.	Kulak Secang	No.	No.
3.	Winong	No.	No.
4.	Kalipang	No.	No.
5.	Nglentreng	No.	No.
6.	Lower Jati	No.	No.
7.	Gentong	No.	No.
8.	Sidowayah	No.	No.
9.	Brintik	No.	No.
10.	Curah Bindo	No.	No.
11.	Pelan Kerep	No.	No.
12.	Tegal Pao	No.	No.

C25 : Cultural property

Are any of the following areas located inside or around the project site ? <Yes/No>

- Cultural properties (e.g., archeological, historical, cultural, and religious heritage sites)?

If <Yes>, please fill out the following table.

No.	Project Location	Type of cultural property	Affected area by the project (m ²)
1.	Oro-Oro Ombo		
2.	Kulak Secang		
3.	Winong		
4.	Kalipang		
5.	Nglentreng		
6.	Lower Jati		
7.	Gentong		
8.	Sidowayah		
9.	Brintik		
10.	Curah Bindo		
11.	Pelan Kerep		
12.	Tegal Pao		

C26 : Transmitted diseases such as HIV/AIDS

What mitigation measures will be taken to prevent introduction of transmitted diseases such as HIV/AIDS by immigrated construction workers ?

Socialization such as education shall be made.

C27 : Water-borne and water-related diseases

Are there any water-borne and water-related diseases (e.g. malaria) around the project site? What mitigation measures will be taken to suppress/prevent spreading of the diseases? Please fill out the following table.

No.	Project Location	Name of water-borne and water-related diseases	Mitigation measures
1.	Oro-Oro Ombo	Not expected	
2.	Kulak Secang	Not expected	
3.	Winong	Not expected	
4.	Kalipang	Not expected	
5.	Nglentreng	Not expected	
6.	Lower Jati	Not expected	
7.	Gentong	Not expected	
8.	Sidowayah	Not expected	
9.	Brintik	Not expected	
10.	Curah Bindo	Not expected	
11.	Pelan Kerep	Not expected	
12.	Tegal Pao	Not expected	

Questionnaire D

1. Relevant organizations related to water resources development and management, respectively
 - 1) Flow chart of administration related to surface water development and management including national level, provincial level (Dinas PU Pengairan, Brantas River Development Office, PTPA (Panitia Tana Pengaturan Air)), basin level (PJT, PPTPA), Kabupaten “District” level (Dinas PU Pengairan, etc.), Kecamatan “Sub-district” level, Desa “Village” level, and others, and the explanation of the role and function
 - 2) Flow chart of administration related to groundwater development and management including national level, provincial level (Dinas PU Pengairan, P2AT, Dinas Energi Dan Sumberdaya Mineral, etc.), basin level, Kabupaten “District” level (Dinas PU Pengairan, etc.), Kecamatan “Sub-district” level, Desa “Village” level, and others, and the explanation of the role and function
 - 3) Relationship between water supply sector and the above-mentioned administration
 - 4) Relationship between irrigation sector and the above-mentioned administration

2. List of Indonesian Consultants/Laboratories related to the Project
 - 1) Stakeholder analysis
 - 2) Social investigation
 - 3) Economic analysis
 - 4) Water quality analysis
 - 5) Geological and geotechnical investigation
 - 6) Geodetic survey
 - 7) Environment

添付資料 5. 運転維持管理費の算定

1. 要約

1.1 運転維持管理費試算ケース

水供給小規模貯水池の総運転維持管理費の試算においては、浄水場の運転形態として次の3つのケースを想定した。

ケース1：年間を通じて定常運転（60lpcdを確保）、

ケース2：乾期は定常運転（60lpcd）、雨期は定常運転の半分の浄水量（30lpcd）、

ケース3：乾期のみ定常運転、雨期は運転休止。

1.2 運転維持管理費と徴収方法

表1.1は、各対象村落についての貯水池維持管理費（浚渫費）と浄水場運転維持管理費を合わせた水供給小規模貯水池の1世帯当りの想定運転維持管理費を要約したものである。運転維持管理費の徴収方法は、毎月徴収できる場合、生活用水の必要に迫られる乾期時のみでしか徴収できないと想定した場合の1世帯当りの運転維持管理費（徴収料金）を示している。1世帯当りの運転維持管理費のうち大きい方の数字はケース1に対応し、小さいほうの数字はケース3に対応している。ケース2の場合には、その中間である。表1.1には、インドネシア国政府からの要請書に取り上げられている小規模貯水池詳細設計書、「Feasibility Study Report, Attachment Economic Analysis Volume I, II, Identification Study and Detailed Design of Small Ponds」、中に記述されている裨益人口、裨益世帯数も参考までに示してある。

表1.2は、貯水池の維持浚渫費用も含め、同様に、月々の1世帯あたり想定運転維持管理費（徴収料金）の詳細を示したものである。

1.3 現地聞き取り調査時の支払い可能料金

表1.1には、現地での聞き取り調査によって得られた、現状1ヶ月当たりの水道料金、電気料金、将来支払い可能と予想している水道料金も備考欄に示してある。現在の水道料金は無料～5千Rp、電気料金はPC-1地域の6千～7千Rp、MA-1の5万Rp、PB-3の3万Rpを除けば、1万～2.5万Rpである。一般的に、電気料金を超える水道料金は有り得ないとのことである。

1.4 PDAM(水道供給公社)の水道料金

他方、Nganjuk県のOro Oro Ombo(NG-1)、Jatigreges(NG-3)地域の調査の際に入手した情報によれば、PDAM(水道公社)の料金体系として、以下の数字が得られている。

0～10m³：850Rp/m³、10～20m³：950Rp/m³、20～30m³：1,175Rp/m³、30m³以上：1,250Rp/m³

また、PDAMに浄水を供給しているスラバヤ市内にあるSIDOARJO浄水場訪問時に得られた情報では、PDAMは、浄水場から受水した上水を2,500Rp/m³の料金で給水しているとのことであった。

1.5 料金支払いの可否の判定

上述の水道料金、電気料金等を考慮すると、1世帯当りの運転維持管理費を支払うことが可能と思われる地域は、表1.1に○、△、×の記号で示したように、MA-1のみである。これはMA-1地域の裨益人口が他の地域に比較して格段に多いため、その分一人当たり運転維持管理費が小さくなっているためである。MA-1地域の場合、今回の聞き取り調査による裨益人口は、表に合せ示した詳細設計書の裨益人口の3倍以上となっている。仮に、詳細設計書に示された裨益人口、世帯あたり人数で1世帯あたりの運転維持管理費を求めると、18,000Rp～25,000Rpと見積もられ、支払い能力をかなり上回る結果となってしまう。

一方、PB-1 地域は逆に、詳細設計書に示す裨益人口は今回の調査で得られた裨益人口の 4.5 倍程度となっている。同様にして検討してみると、1 世帯あたりの運転維持管理費は 20,000Rp 程度と見積もられる。この場合でも、まだ支払い能力をかなり上回る結果となる。

1.6 問題点

MA-1 地域近隣には、世銀支援による深井戸給水施設も設置されており、現在 1 世帯あたり 10,000Rp の料金が徴収されている。前述の PDAM に水道料金に比べて相当高い料金であるが、深井戸給水施設がこの料金で現在運営されているので、小規模貯水池水供給施設の運転維持管理費負担も難しくないように思われる。

しかしながら、以下の点を考慮すると、たとえ事業化の可能性があるとはいえ、今回の調査結果のみで、MA-1 地域で事業化を進めていくことには無理があると考えられる。

- a. 現地での聞き取り調査は 2,3 時間で村長や助役を対象にして行ったものであり、住民の直接の声を聞いたものではない。
- b. 現在は無料で生活用水を入手しており、実際に水道水が供給された場合に、地域住民に 10,000Rp 程度の費用を毎月支払うだけの強い要望と支払い意志があるか否かの確認が不十分である。
- c. 直接飲料できる深井戸水質と薬品処理した浄水水質に対する住民の嗜好が不明である。
- d. 水伝搬性病気等の衛生・環境問題と生活用水との関連に対する意識がそれほど高いとは思われず、環境・衛生改善という点から見た浄水の必要性という認識が不明である。
- e. 短時間の聞き取りであり、1 世帯あたりの維持管理費算出のための裨益人口、裨益世帯数の精度は高いとは思えない。表 4.2 に今回調査時、要請書、詳細設計 (IS&DD) における、裨益人口、裨益世帯数の比較を示してあるが、どの数字にも一致は見られない。
- f. 所得、支払い可能水道料金等の経済指標は目安的な値として聞き取っている。
- g. 浄水場用地の確保、高度な技術を要する浄水場運転維持管理技術者の定常的な確保、浚渫土砂の処分場の確保等の問題が未解決である。
- h. 現在生活用水利用組合 HIPAM もなく維持管理組織の胚となるべき組織がない。
- i. 高度な運転技術を要する浄水施設の運転維持管理を行っていくためには、深井戸給水の維持管理に比較して、格段の知識・技術が必要となる。
- j. MA-1 地域近隣では深井戸による給水が現に行われており、深井戸給水という代案も十分考えられる。その際、当然のことながら、深井戸による給水は上水のみであり、灌漑用水は含まれない。
- k. 聞き取り調査によれば、作物生産様式は今後とも現況の作物生産様式である Paddy-Paddy-Polowijo の様式を踏襲していくようである。しかしながら、農業従事者の所得向上の観点から考えると、野菜や果物の生産等より換金性の高い生産様式も検討の余地があると考えられる。
- l. 小規模貯水池建設に当たっては、上水の需要量の他に灌漑用水の需要量予測も必要となってくる。当然のことながら、灌漑用水は原水のままで供給されることになるが、灌漑用水の需要量は土壌と作物生産様式に関係しており、k に指摘した作物の生産様式に変更があれば、需要量も異なってくる。

1.7 提案

したがって、村落住民を対象に裨益人口・世帯数、水道水供給の必要性、緊急性、水伝搬性病気、水汲み労働、所得、支払い可能水道料金、作物生産様式等の社会・経済調査を十分に行うとともに、浄水場施設事業者、PDAM 深井戸施設給水関係者等既存の水道事業関係者に聞き取りを行い、上述の事項を明確にした後に事業実施の有無を決定すべきと考える。

表 1.1 小規模貯水池総運転維持管理費（貯水池維持管理費＋浄水場運転維持管理費）

記号	貯水池名	裨益人口	世帯当り人数	徴収月数	1世帯当り総運転維持管理費 (Rp/M)	判定	備考
NG-1	Oro-Oro Ombo	860	3.8	毎月	28,000-30,000	×	水道料は無料。支払い可能料金：回答無し。電気料は1万～1.5万Rp。
				6ヶ月	58,000-60,000	×	
				3ヶ月	113,000-121,000	×	
KD-1	Winong	?	?				
KD-2	Kalipang	2,410 (1,597)	3.1	毎月	10,000-11,000	△	水道料は1～5千Rp。支払い可能料金：回答なし。電気料は1万～1.5万Rp。
				6ヶ月	21,000-23,000	×	
				3ヶ月	40,000-46,000	×	
TR-3	Ngilentreng	990 (588)	3.5 (4)	毎月	25,000-27,000	×	水道料は5千Rp。支払い可能料金：2千Rp。電気料は2万Rp。
				6ヶ月	52,000-54,000	×	
				3ヶ月	101,000-108,000	×	
PB-1	Curah Bindo	1,430 (6,497)	3.3 (4)	毎月	74,000-76,000	×	水道料は0.4～1.5千Rp。支払い可能料金：3千Rp。電気料は1～1.5万Rp
				6ヶ月	150,000-152,000	×	
				3ヶ月	298,000-304,000	×	
PB-2	Pelan Kerep	1,490 (1,856)	3.7 (4)	毎月	17,000-19,000	×	水道料は無料。支払い可能料金：5千Rp。電気料は3万Rp。
				6ヶ月	35,000-37,000	×	
				3ヶ月	67,000-75,000	×	
PB-3	Tegal Pao	?	?				
MA-1	Lowek Jati	6,300 (2,047)	3.4 (4)	毎月	5,000-7,000	○	水道料は無料。支払い可能料金：1万Rp。電気料は5万Rp。
				6ヶ月	12,000-15,000	△	
				3ヶ月	20,000-30,000	×	
MA-2	Gentong	2,310 (955)	3.6 (4)	毎月	19,000-21,000	×	水道料は無料。支払い可能料金：1万Rp。電気料は2.5万Rp。
				6ヶ月	39,000-42,000	×	
				3ヶ月	76,000-83,000	×	
PC-1	Kwangen	820 (847)	3.8 (4)	毎月	181,000-183,000	×	水道料は無料。支払い可能料金：1万Rp。電気料は6～7千Rp。
				6ヶ月	362,000-365,000	×	
				3ヶ月	722,000-730,000	×	

()内の数字は、小規模貯水池詳細設計書による。

表 1.2 貯水池・浄水場運転維持管理費

記号	貯水池名	水道料金(現在、 将来)(世帯/月) 電気代	運転維持管理 費	年間を通じて定常運転 (60lpcd)			乾期は定常運転 (60lpcd)、雨期は 定常運転の半分 の浄水量(30lpcd)				乾期は定常運転 (60lpcd)、 雨期は運転休止				浚渫費用	
				乾期6ヶ月、3ヶ月			乾期 6ヶ月間		乾期 3ヶ月間		乾期 6ヶ月間		乾期 3ヶ月間		年間浚渫 費用 千Rp/Y	月 1世帯 Rp/M
				1-①	1-②	1-③	2-1-①	2-1-②	2-2-①	2-2-②	3-1-①	3-1-②	3-2-①	3-2-②		
毎月徴収	6ヶ月間	3ヶ月間	毎月徴収	6ヶ月間	毎月徴収	3ヶ月間	毎月徴収	6ヶ月間	毎月徴収	3ヶ月間	毎月徴収	3ヶ月間				
NG-1	Oro-Oro Ombo	水:P/無料 F/? 電:1~1.5万Rp	水道料 浚渫費 合計	29,130 1,110 30,240	58,260 2,210 60,470	116,520 4,420 120,940	28,320 1,110 29,430	56,630 2,210 58,840	28,020 1,110 29,130	112,060 4,420 116,480	27,780 1,110 28,890	55,560 2,210 57,770	27,220 1,110 28,330	108,850 4,420 113,270	3,000	1,105
KD-1	Winong			-	-	-	-	-	-	-	-	-	-	-	58,000	
KD-2	Kalipang	水:P/1~5千Rp F/? 電:?	水道料 浚渫費 合計	9,720 1,720 11,440	19,430 3,430 22,860	38,860 6,860 45,720	9,190 1,720 10,910	18,380 3,430 21,810	8,950 1,720 10,670	35,780 6,860 42,640	8,720 1,720 10,440	17,440 3,430 20,870	8,240 1,720 9,960	32,960 6,860 39,820	16,000	1,715
TR-3	Nglentreng	水:P/5000Rp F/<2000Rp 電:2万Rp	水道料 浚渫費 合計	23,740 3,250 26,990	47,470 6,490 53,960	94,940 12,970 107,910	23,110 3,250 26,360	46,210 6,490 52,700	22,790 3,250 26,040	91,160 12,970 104,130	22,530 3,250 25,780	45,060 6,490 51,550	21,930 3,250 25,180	87,690 12,970 100,660	11,000	3,241
PB-1	Curah Bindo	水:P/400~1.5千Rp F/3,000Rp 電:1~1.5万Rp	水道料 浚渫費 合計	16,040 60,000 76,040	32,070 120,000 152,070	64,130 240,000 304,130	15,420 60,000 75,420	30,830 120,000 150,830	15,160 60,000 75,160	60,610 240,000 300,610	14,930 60,000 74,930	29,850 120,000 149,850	14,420 60,000 74,420	57,680 240,000 297,680	312,000	60,000
PB-2	Pelan Kerep	水:P/無料 F/5000Rp 電:3万Rp	水道料 浚渫費 合計	17,380 1,250 18,630	34,760 2,490 37,250	69,520 4,970 74,490	16,660 1,250 17,910	33,310 2,490 35,800	16,370 1,250 17,620	65,450 4,970 70,420	16,110 1,250 17,360	32,220 2,490 34,710	15,550 1,250 16,800	62,170 4,970 67,140	6,000	1,242
PB-3	Tegal Pao			-	-	-	-	-	-	-	-	-	-	-	640,000	
MA-1	Lowek Jati	水:P/無料 F/10,000Rp 電:5万Rp	水道料 浚渫費 合計	6,620 860 7,480	13,240 1,710 14,950	26,480 3,420 29,900	5,720 860 6,580	11,440 1,710 13,150	5,310 860 6,170	21,220 3,420 24,640	4,900 860 5,760	9,800 1,710 11,510	4,080 860 4,940	16,310 3,420 19,730	19,000	854
MA-2	Gentong	水:P/無料 F/10,000Rp 電:2.5万Rp	水道料 浚渫費 合計	11,720 9,050 20,770	23,430 18,100 41,530	46,860 36,200 83,060	11,060 9,050 20,110	22,120 18,100 40,220	10,780 9,050 19,830	43,110 36,200 79,310	10,520 9,050 19,570	21,030 18,100 39,130	9,960 9,050 19,010	39,820 36,200 76,020	66,000	9,048
PC-1	Kwangen	水:P/無料 F/10,000Rp 電:6~7千Rp	水道料 浚渫費 合計	30,530 152,080 182,610	61,060 304,150 365,210	122,120 608,300 730,420	29,610 152,080 181,690	59,220 304,150 363,370	29,310 152,080 181,390	117,240 608,300 725,540	29,080 152,080 181,160	58,160 304,150 362,310	28,510 152,080 180,590	114,040 608,300 722,340	413,000	152,074

2. 試算ケース

水供給小規模貯水池の総運転維持管理費の試算においては、浄水場の運転形態として次の3つのケースを想定した。

ケース1：年間を通じて定常運転（60lpcdを確保）（資料1参照）、

1-①：毎月水道料金が徴収可能と想定した場合

1-②：乾期を6ヶ月とし、乾期のみ水道料金の徴収が可能と想定した場合

1-③：乾期を3ヶ月とし、同上の想定

ケース2：乾期は定常運転（60lpcd）、雨期は定常運転の半分の浄水量（30lpcd）（資料2参照）、

2-1-①：乾期6ヶ月：毎月水道料金が徴収可能と想定した場合

2-1-②：同上：乾期のみ水道料金の徴収が可能と想定した場合

2-2-①：乾期3ヶ月：毎月水道料金が徴収可能と想定した場合

2-2-②：同上：乾期のみ水道料金の徴収が可能と想定した場合

ケース3：乾期のみ定常運転、雨期は運転休止（資料3参照）。

3-1-①：乾期6ヶ月：毎月水道料金が徴収可能と想定した場合

3-1-②：同上：乾期のみ水道料金の徴収が可能と想定した場合

3-2-①：乾期3ヶ月：毎月水道料金が徴収可能と想定した場合

3-2-②：同上：乾期のみ水道料金の徴収が可能と想定した場合

3. 運転維持管理費見積り

3.1 見積り方法

運転維持管理費の見積りは、以下に示す方法で行う。

- ① スラバヤ市 SIDOARJO 浄水場の運転指標を参考とする。（資料4参照）
- ② 国際協力機構&㈱日水コン、「スラウェシ島地方水道整備計画基本設計調査報告書」2000年10月に述べられている、運転維持管理費用参考とする。（資料5参照）
- ③ 薬剤使用量：SIDOARJO 浄水場の水質（資料6参照）、今回プロジェクトサイトの水質（資料7参照）を大まかに比較し、今回プロジェクトの薬剤使用量を設定する。
- ④ 薬剤価格：SIDOARJO 浄水場での価格を参考とする。
- ⑤ 人員配置：スラウェシ島での計画値を参考とする。
- ⑥ 人件費：同じ東ジャワ州に属し、今回のプロジェクトサイトに最も近いので、SIDOARJO 浄水場の人件費を参考とする。
- ⑦ 電気代：SIDOARJO 浄水場の規模は今回のプロジェクトの50～300倍程度なので電気代については参考とならない。使用電気代については、スラウェシの値を参考とする。（SIDOARJO 浄水場は、平均浄水量210 l/sec、本プロジェクトでは、0.6～4.4 l/sec。）
- ⑧ 1世帯あたりの人数は、調査時点での人数を採用する。
- ⑨ 人口増加率は、0.8%とする。（ジャワ州での計画採用値）

3. 2 化学薬品使用量の予想

3. 2. 1 凝集剤使用量の予想

(1) 硫酸アルミニウム (硫酸ばんど)

1) 注入率(mg/l)

今回の水質試験結果によれば、濁度は各サイトで異なり、最小値はPB-3サイトで83,8(mg/l)、最高値はMA-1サイトで2,070である。その他は、205~1176の範囲にあり、平均値は800である。今回の試験値は雨期の値であり、乾期時は相当に低くなると思われる。ここでは、雨期を11月から4月、乾期を5月から10月の各6ヶ月、雨期時の濁度800、乾期時の濁度200、通年の値として600の濁度を想定する。この濁度に対応する液体硫酸アルミニウム注入率は、100ppm程度である。(水道施設設計指針)。

2) 一ヶ月あたり使用量

SIDOARJO浄水場では、液体硫酸アルミニウムの使用量は、注入率56.8ppm(平均値)の時、浄水量1m³あたり、0.126Kg/m³(765,054Kg/6,048,983m³)である。したがって、この値から類推すると、100ppmの場合には、約0.245Kg/m³の使用量となる。

(2) 高分子凝集剤

SIDOARJO浄水場では、高濁度の原水を処理するため、高分子凝集剤を併用している。本プロジェクトの場合にも高い濁度の原水を処理するため、高分子凝集剤を併用する。注入率はSIDOARJO浄水場と同様0.20ppmと仮定する。

(3) Ph調整剤

1) 注入率(mg/l)

凝集剤注入により、原水のアルカリ度が低下する。硫酸アルミニウム液体の凝集剤の場合、1mg/l注入するとアルカリ度は0.24(mg/l)程度減少する。アルカリ度の目安は、水の腐食性との関係から、最低でも20(mg/l)程度は必要と言われている。今回のプロジェクトの場合、凝集剤注入率は100ppmと想定したので、アルカリ度は24低下する。

水質試験結果によれば、原水のアルカリ度は、KD-1サイトで31.6、TR-3サイトで30.6、MA-1サイトで16.1となっており、これらのサイトでは、凝集剤の注入によりアルカリ度は、それぞれ17.6、16.6、-7.9となることが予想される。したがって、この3サイトについては、Ph調整剤を注入することにする。

ここでは、液体苛性ソーダを注入する。液体苛性ソーダの場合、アルカリ度を1ppm高めるためには、4.0(mg/l)必要(水道施設設計指針)である。アルカリ度の最低値を25(mg/l)とすると、上記3サイトでおおよそ次の注入量が必要となる。

KD-1サイト： $(25-17.6) \times 4.0=30(\text{mg/l})$

TR-3サイト： $(25-16.6) \times 4.0=34(\text{mg/l})$

MA-1サイト： $(25+7.9) \times 4.0=132(\text{mg/l})$

2) 一ヶ月あたり使用量

各サイトでの月あたり浄水量にこの注入量を乗じて求める。

(4) 塩素(殺菌剤他)

1) 注入率

水質試験結果によれば、鉄分含有量は全てのサイトにおいて飲料水基準値を超えている。また、TR-3、PB-2、PB-3サイトを除いて、マンガン含有量が基準値を超えている。鉄分は通常の凝集・沈殿により、またマンガン分は塩素注入等により除去可能である。

SIDOARJO浄水場の場合、相当の鉄分の量が多く、10ppm以上の値が見られる場合もある。鉄分除去のために特別な対策は採っておらず、通常の凝集・沈殿や塩素処理当で対応しているものと思われる。

この浄水場の場合、塩素注入率の通年平均実績値2.3ppmとなっている。本プロジェクトの場合には、マンガン分の除去として、塩素注入量を若干増やすことで対処する。

マンガン 1ppm の除去に対して、塩素 1.29ppm が消費される。(水道施設設計指針) TR-3、PB-2、PB-3 サイト以外ではマンガン濃度は 0.14ppm～0.46ppm であり、水質基準の 0.1ppm に対して、0.04～0.36ppm オーバーしている。

ここでは、マンガン含有量を 0.4ppm として塩素消費量を求めてみると、 $0.4 \times 1.29 = 0.516\text{ppm}$ となる。したがって、塩素注入量は合計で、 $2.3\text{ppm} + 0.5\text{ppm} \rightarrow 3.0\text{ppm}$ とする。

2) 注入量

浄水量に注入量を乗じて求める。

3. 3 電気量

前述のように、電気量については、スラウェシの値を参考とし、 $85\text{Rp}/\text{m}^3$ する。

3. 4 運転維持管理要員

スラウェシでの要員計画の値、5 人浄水施設とする。

3. 5 スペアパーツ費用

スラウェシ島地方給水での値を参考とし、 $100\text{Rp}/\text{m}^3$ とする。

4. 対象地域の人口、世帯数等

対象地域の受益人口および世帯数、1 世帯あたりの人数を下表 4.1 に示す。受益人口は 2012 年時点の推計値であり、世帯数、1 世帯あたりの人口は調査時点の数値である。

表 4.1 裨益人口、世帯数他

記号	貯水池名	2012 年	現地調査時点			備 考
		裨益人口	裨益人口	世帯数	世帯当り人数	
NG-1	Oro ² Ombo	860	800	209	3.8	
KD-1	Winong	?	?	?	?	回答が得られなかった。
KD-2	Kalipang	2,410	2,240	720	3.1	聞き取り世帯数を修正。(1,100 → 720)
TR-3	Nglentreng	990	917	262	3.5	
PB-1	Curah Bindo	1,430	1,338	403	3.3	
PB-2	Pelan Kerep	1,490	1,380	370	3.7	
PB-3	Tegal Pao	?	?	?	?	回答が得られなかった。
MA-1	Lowek Jati	6,300	5,907	1,718	3.4	
MA-2	Gentong	2,310	2,147	592	3.6	
PC-1	Kwangen	820	768	200	3.8	

表 4.2 は、参考までに、現地調査で得られた人口、要請書に示された人口、「Identification Study and Detailed Design of Small Ponds¹」(以下、IS&DD とする。) 報告書中に示されている人口を一覧表にしたものである。

¹ 正式名称: PT. TATA GUNA PATRIA & PT. VIRMA KARYA、「Feasibility Study Report, Attachment Economic Analysis Volume I, II, Identification Study and Detailed Design of Small Ponds」, October 2002

要請書に示されている人口は、MA-1を除けば3者の中でもっとも多い上、現地調査によって得られた数値やIS&DDの数値よりはるかに大きいので、裨益人口ではなく村落の全人口と思われる。

NG-1地域については、IS&DDでは生活用水の必要性を考えていないが、現地調査においては生活用水も必要とのことであった。しかし、灌漑施設のリハビリテーションが優先的に必要であり、生活用水や灌漑用水の必要性についてはそれほど緊急を要していない印象であった。

現地調査によって得られたMA-1の人口は、要請書に示されている人口より大きくしかも、IS&DD中の裨益人口の3倍近くにもなっていることから、全人口を裨益人口と見なしている可能性がある。

表 4.2 裨益人口、裨益世帯数の比較

記号	貯水池名	現地調査		要請書		IS&DD	
		裨益人口	裨益世帯数	人口	世帯数	裨益人口(2012)	裨益世帯数
NG-1	Oro ² Ombo	800	209	1,419	?	生活用水不要	
KD-1	Winong	?	?	2,112	?	1,124	?
KD-2	Kalipang	2,240	720	4,459	?	1,597	?
TR-3	Nglentreng	917	262	3,301	?	588	147
PB-1	Curah Bindo	1,338	403	12,578	?	6,467	1,617
PB-2	Pelan Kerep	1,380	370	3,967	?	1,856	464
PB-3	Tegal Pao	?	?	676	?	生活用水不要	
MA-1	Lowek Jati	5,907	1,718	5,413	?	2,047	512
MA-2	Gentong	2,147	592	3,260	?	955	239
PC-1	Kwangen	820	200	3,071	?	847	212

運転維持管理費

5. 1 月間運転維持管理日

(1) ケース1：年間を通じて定常運転（60lpcd を確保）

1) 運転維持管理費

記号	貯水池名	月間運転維持管理費(1,000Rp/M)					年間維持管理費用 (1,000Rp/Y)
		人件費	薬品費	電気代	予備品	合計	
NG-1	Oro ² Ombo	6,000	257	132	155	6,544	78,528
KD-1	Winong	-	-	-	-	-	-
KD-2	Kalipang	6,000	723	369	434	7,526	90,312
TR-3	Ngilentreng	6,000	384	151	178	6,713	80,556
PB-1	Curah Bindo	6,000	429	219	257	6,905	82,860
PB-2	Pelan Kerep	6,000	447	228	268	6,943	83,316
PB-3	Tegal Pao	-	-	-	-	-	-
MA-1	Lowek Jati	6,000	4,030	964	1,134	12,128	145,536
MA-2	Gentong	6,000	693	353	416	7,462	89,544
PC-1	Kwangen	6,000	246	125	148	6,519	78,228

2) 月々の水道料金

1-① 毎月水道料金の徴収が可能な場合

1-② 乾期時（5月～10月の6ヶ月間）のみ水道料金を徴収

（年間維持管理費を乾期時の6ヶ月で徴収）

1-③ 乾期を3ヶ月と想定し、乾期のみ水道料金を徴収

（年間維持管理費を乾期時の3ヶ月で徴収）

記号	貯水池名	月1世帯当り費用 (Rp/HH/M)		
		1-①	1-②	1-③
NG-1	Oro ² Ombo	29,128	58,256 (29,128 x 12/6)	116,512 (29,128 x 12/3)
KD-1	Winong	-	-	-
KD-2	Kalipang	9,714	19,428 (9,714 x 12/6)	38,856 (9,714 x 12/3)
TR-3	Ngilentreng	23,733	47,466 (23,733 x 12/6)	94,932 (23,733 x 12/3)
PB-1	Curah Bindo	16,032	32,064 (16,032 x 12/6)	64,128 (16,032 x 12/3)
PB-2	Pelan Kerep	17,380	34,760 (17,380 x 12/6)	69,520 (17,380 x 12/3)
PB-3	Tegal Pao	-	-	-
MA-1	Lowek Jati	6,619	13,238 (6,619 x 12/6)	26,476 (6,619 x 12/3)
MA-2	Gentong	11,715	23,430 (11,715 x 12/6)	46,860 (11,715 x 12/3)
PC-1	Kwangen	30,528	61,056 (30,528 x 21/6)	122,112 (30,528 x 12/3)

(2) ケース2-1 : 乾期を6ヶ月、雨期を6ヶ月とし、乾期は定常運転(60lpcd)、雨期は定常運転の半分(30lpcd)の浄水量

1) 運転維持管理費

記号	貯水池名	月間運転維持管理費(1,000Rp/M)						年間維持管理費用 (1,000Rp/Y)
		期	人件費	薬品費	電気代	予備品	合計	
NG-1	Oro ² Ombo	乾期	6,000	258	132	155	6,544	(6 x 6,544 + 6 x 6,272) = 76,896
		雨期	6,000	129	66	77	6,272	
KD-1	Winong		-	-	-	-	-	
KD-2	Kalipang	乾期	6,000	723	369	434	7,526	(6 x 7,526 + 6 x 6,763) = 85,734
		雨期	6,000	361	184	217	6,763	
TR-3	Nglenteng	乾期	6,000	384	151	178	6,713	(6 x 6,713 + 6 x 6,357) = 78,420
		雨期	6,000	192	76	89	6,357	
PB-1	Curah Bindo	乾期	6,000	429	219	257	6,905	(6 x 6,905 + 6 x 6,453) = 80,148
		雨期	6,000	214	109	129	6,453	
PB-2	Pelan Kerep	乾期	6,000	447	228	268	6,943	(6 x 6,943 + 6 x 6,471) = 80,484
		雨期	6,000	223	114	134	6,471	
PB-3	Tegal Pao		-	-	-	-	-	
MA-1	Lowek Jati	乾期	6,000	4,030	964	1,134	12,128	(6 x 12,128 + 6 x 9,064) = 127,152
		雨期	6,000	2,015	482	567	9,064	
MA-2	Gentong	乾期	6,000	693	353	416	7,462	(6 x 7,462 + 6 x 6,732) = 85,164
		雨期	6,000	346	177	208	6,732	
PC-1	Kwangen	乾期	6,000	246	125	148	6,519	(6 x 6,519 + 6 x 6,260) = 76,674
		雨期	6,000	123	63	74	6,260	

2) 月々の水道料金

2-1-① 毎月水道料金の徴収が可能な場合

2-1-② 乾期時(5月～10月の6ヶ月間)のみ水道料金を徴収
(年間維持管理費を乾期時の6ヶ月で徴収)

記号	貯水池名	月1世帯当り費用 (Rp/HH/M)	
		2-1-①	2-1-②
NG-1	Oro ² Ombo	$(6 \times 6,544 + 6 \times 6,272) / 12 / 860 \times 3.8 \times 1,000 = \mathbf{28,314}$	$\mathbf{28,314} \times 12/6 = \mathbf{56,628}$
KD-1	Winong		-
KD-2	Kalipang	$(6 \times 7,526 + 6 \times 6,763) / 12 / 2,410 \times 3.1 \times 1,000 = \mathbf{9,190}$	$\mathbf{9,190} \times 12/6 = \mathbf{18,380}$
TR-3	Nglenteng	$(6 \times 6,713 + 6 \times 6,357) / 12 / 990 \times 3.5 \times 1,000 = \mathbf{23,103}$	$\mathbf{23,103} \times 12/6 = \mathbf{46,206}$
PB-1	Curah Bindo	$(6 \times 6,905 + 6 \times 6,453) / 12 / 1,430 \times 3.3 \times 1,000 = \mathbf{15,413}$	$\mathbf{15,413} \times 12/6 = \mathbf{30,826}$
PB-2	Pelan Kerep	$(6 \times 6,943 + 6 \times 6,471) / 12 / 1,490 \times 3.7 \times 1,000 = \mathbf{16,655}$	$\mathbf{16,655} \times 12/6 = \mathbf{33,310}$
PB-3	Tegal Pao		-
MA-1	Lowek Jati	$(6 \times 12,128 + 6 \times 9,064) / 12 / 6,300 \times 3.4 \times 1,000 = \mathbf{5,718}$	$\mathbf{5,718} \times 12/6 = \mathbf{11,436}$
MA-2	Gentong	$(6 \times 7,462 + 6 \times 6,732) / 12 / 2,310 \times 3.6 \times 1,000 = \mathbf{11,060}$	$\mathbf{11,060} \times 12/6 = \mathbf{22,120}$
PC-1	Kwangen	$(6 \times 6,519 + 6 \times 6,260) / 12 / 820 \times 3.8 \times 1,000 = \mathbf{29,610}$	$\mathbf{29,610} \times 12/6 = \mathbf{59,220}$

(3) ケース2-2 : 乾期を3ヶ月、雨期を9ヶ月とし、ケース2-1と同じ運転条件 (乾期は60lpcd、雨期は30lpcdの浄水量)

1) 運転維持管理費

記号	貯水池名	月間運転維持管理費(1,000Rp/M)						年間維持管理費用 (1,000Rp/Y)
		期	人件費	薬品費	電気代	予備品	合計	
NG-1	Oro ² Ombo	乾期	6,000	258	132	155	6,544	(3 x 6,544 + 9 x 6,272) = 76,080
		雨期	6,000	129	66	77	6,272	
KD-1	Winong		-	-	-	-	-	
KD-2	Kalipang	乾期	6,000	723	369	434	7,526	(3 x 7,526 + 9 x 6,763) = 83,445
		雨期	6,000	361	184	217	6,763	
TR-3	Nglenteng	乾期	6,000	384	151	178	6,713	(3 x 6,713 + 9 x 6,357) = 22,789
		雨期	6,000	192	76	89	6,357	
PB-1	Curah Bindo	乾期	6,000	429	219	257	6,905	(3 x 6,905 + 9 x 6,453) = 78,792
		雨期	6,000	214	109	129	6,453	
PB-2	Pelan Kerep	乾期	6,000	447	228	268	6,943	(3 x 6,943 + 9 x 6,471) = 79,068
		雨期	6,000	223	114	134	6,471	
PB-3	Tegal Pao		-	-	-	-	-	
MA-1	Lowek Jati	乾期	6,000	4,030	964	1,134	12,128	(3 x 12,128 + 9 x 9,064) = 117,968
		雨期	6,000	2,015	482	567	9,064	
MA-2	Gentong	乾期	6,000	693	353	416	7,462	(3 x 7,462 + 9 x 6,732) = 82,974
		雨期	6,000	346	177	208	6,732	
PC-1	Kwangen	乾期	6,000	246	125	148	6,519	(3 x 6,519 + 9 x 6,260) = 75,897
		雨期	6,000	123	63	74	6,260	

- 2) 水道料金
 2-2-① 毎月水道料金を徴収する場合
 2-2-② 乾期を3ヶ月と想定し、乾期のみ水道料金を徴収
 (年間維持管理費を乾期時の3ヶ月で徴収)

記号	貯水池名	月1世帯当り費用 (Rp/HH/M)	
		2-2-①	2-2-②
NG-1	Oro ² Ombo	$(3 \times 6,544 + 9 \times 6,272) / 12 / 860 \times 3.8 \times 1,000 = \mathbf{28,013}$	$28,013 \times 12 / 3 = \mathbf{112,052}$
KD-1	Winong		
KD-2	Kalipang	$(3 \times 7,526 + 9 \times 6,763) / 12 / 2,410 \times 3.1 \times 1,000 = \mathbf{8,945}$	$8,945 \times 12 / 3 = \mathbf{35,780}$
TR-3	Ngilentreng	$(3 \times 6,713 + 9 \times 6,357) / 12 / 990 \times 3.5 \times 1,000 = \mathbf{22,789}$	$22,789 \times 12 / 3 = \mathbf{91,156}$
PB-1	Curah Bindo	$(3 \times 6,905 + 9 \times 6,453) / 12 / 1,430 \times 3.3 \times 1,000 = \mathbf{15,152}$	$15,152 \times 12 / 3 = \mathbf{60,608}$
PB-2	Pelan Kerep	$(3 \times 6,943 + 9 \times 6,471) / 12 / 1,490 \times 3.7 \times 1,000 = \mathbf{16,362}$	$16,362 \times 12 / 3 = \mathbf{65,448}$
PB-3	Tegal Pao		
MA-1	Lowek Jati	$(3 \times 12,128 + 9 \times 9,064) / 12 / 6,300 \times 3.4 \times 1,000 = \mathbf{5,305}$	$5,305 \times 12 / 3 = \mathbf{21,220}$
MA-2	Gentong	$(3 \times 7,462 + 9 \times 6,732) / 12 / 2,310 \times 3.6 \times 1,000 = \mathbf{10,776}$	$10,776 \times 12 / 3 = \mathbf{43,104}$
PC-1	Kwangen	$(3 \times 6,519 + 9 \times 6,260) / 12 / 820 \times 3.8 \times 1,000 = \mathbf{29,310}$	$29,310 \times 12 / 3 = \mathbf{117,240}$

(4) ケース3-1 乾期6ヶ月、雨期6ヶ月とし、乾期は60lpcdの浄水量、雨期は浄水を休止した場合

1) 運転維持管理費

記号	貯水池名	月間運転維持管理費(1,000Rp/M)						年間維持管理費用 (1,000Rp/Y)
		期	人件費	薬品費	電気代	予備品	合計	
NG-1	Oro ² Ombo	乾期	6,000	258	132	155	6,544	(6 x 6,544 + 6 x 6,030) = 75,444
		雨期	6,000	0	30	0	6,030	
KD-1	Winong		-	-	-	-	-	
KD-2	Kalipang	乾期	6,000	723	369	434	7,526	(6 x 7,526 + 6 x 6,030) = 81,336
		雨期	6,000	0	30	0	6,030	
TR-3	Nglenteng	乾期	6,000	384	151	178	6,713	(6 x 6,713 + 6 x 6,030) = 76,458
		雨期	6,000	0	30	0	6,030	
PB-1	Curah Bindo	乾期	6,000	429	219	257	6,905	(6 x 6,905 + 6 x 6,030) = 77,610
		雨期	6,000	0	30	0	6,030	
PB-2	Pelan Kerep	乾期	6,000	447	228	268	6,943	(6 x 6,943 + 6 x 6,030) = 77,838
		雨期	6,000	0	30	0	6,030	
PB-3	Tegal Pao		-	-	-	-	-	
MA-1	Lowek Jati	乾期	6,000	4,030	964	1,134	12,128	(6 x 12,128 + 6 x 6,030) = 108,948
		雨期	6,000	0	30	0	6,030	
MA-2	Gentong	乾期	6,000	693	353	416	7,462	(6 x 7,462 + 6 x 6,030) = 80,952
		雨期	6,000	0	30	0	6,030	
PC-1	Kwangen	乾期	6,000	246	125	148	6,519	(6 x 6,519 + 6 x 6,030) = 75,294
		雨期	6,000	0	30	0	6,030	

2) 水道料金

ケース 3-1-① 毎月水道料金を徴収

ケース 3-1-② 乾期のみ水道料金を徴収

記号	貯水池名	月 1 世帯当り費用 (Rp/HH/M)	
		3-1-①	3-1-②
NG-1	Oro ² Ombo	$(6 \times 6,544 + 6 \times 6,030) / 12 / 860 \times 3.8 \times 1,000 = 27,780$	27,780 x 12/6 = 55,560
KD-1	Winong		-
KD-2	Kalipang	$(6 \times 7,526 + 6 \times 6,030) / 12 / 2,410 \times 3.1 \times 1,000 = 8,719$	8,719 x 12/6 = 17,438
TR-3	Nglenteng	$(6 \times 6,713 + 6 \times 6,030) / 12 / 990 \times 3.5 \times 1,000 = 22,526$	22,526 x 12/6 = 45,052
PB-1	Curah Bindo	$(6 \times 6,905 + 6 \times 6,030) / 12 / 1,430 \times 3.3 \times 1,000 = 14,925$	14,925 x 12/6 = 29,850
PB-2	Pelan Kerep	$(6 \times 6,943 + 6 \times 6,030) / 12 / 1,490 \times 3.7 \times 1,000 = 16,107$	16,107 x 12/6 = 32,214
PB-3	Tegal Pao		-
MA-1	Lowek Jati	$(6 \times 12,128 + 6 \times 6,030) / 12 / 6,300 \times 3.4 \times 1,000 = 4,900$	4,900 x 12/6 = 9,800
MA-2	Gentong	$(6 \times 7,462 + 6 \times 6,030) / 12 / 2,310 \times 3.6 \times 1,000 = 10,513$	10,513 x 12/6 = 21,026
PC-1	Kwangen	$(6 \times 6,519 + 6 \times 6,030) / 12 / 820 \times 3.8 \times 1,000 = 29,077$	29,077 x 12/6 = 58,154

(5) ケース 3-2 : 乾期 3 ヶ月、雨期 9 ヶ月とし、乾期は 60lpcd の浄水量、雨期は浄水を休止した場合

1) 運転維持管理費

記号	貯水池名	月間運転維持管理費(1,000Rp/M)						年間運転維持管理費 (1,000Rp/Y)
		期	人件費	薬品費	電気代	予備品	合計	
NG-1	Oro ² Ombo	乾期	6,000	258	132	155	6,544	(3 x 6,544 + 9 x 6,030) = 73,902
		雨期	6,000	0	30	0	6,030	
KD-1	Winong		-	-	-	-	-	
KD-2	Kalipang	乾期	6,000	723	369	434	7,526	(3 x 7,526 + 9 x 6,030) = 76,848
		雨期	6,000	0	30	0	6,030	
TR-3	Nglenteng	乾期	6,000	384	151	178	6,713	(3 x 6,713 + 9 x 6,030) = 74,409
		雨期	6,000	0	30	0	6,030	
PB-1	Curah Bindo	乾期	6,000	429	219	257	6,905	(3 x 6,905 + 9 x 6,030) = 74,985
		雨期	6,000	0	30	0	6,030	
PB-2	Pelan Kerep	乾期	6,000	447	228	268	6,943	(3 x 6,943 + 9 x 6,030) = 75,099
		雨期	6,000	0	30	0	6,030	
PB-3	Tegal Pao		-	-	-	-	-	
MA-1	Lowek Jati	乾期	6,000	4,030	964	1,134	12,128	(3 x 12,128 + 9 x 6,030) = 90,564
		雨期	6,000	0	30	0	6,030	
MA-2	Gentong	乾期	6,000	693	353	416	7,462	(3 x 7,462 + 9 x 6,030) = 76,656
		雨期	6,000	0	30	0	6,030	
PC-1	Kwangen	乾期	6,000	246	125	148	6,519	(3 x 6,519 + 9 x 6,030) = 73,827
		雨期	6,000	0	30	0	6,030	

2) 水道料金

ケース 3-2-① 毎月水道料金を徴収

ケース 3-2-② 乾期のみ水道料金を徴収

記号	貯水池名	月 1 世帯当り費用 (Rp/HH/M)	
		3-2-①	3-2-②
NG-1	Oro ² Ombo	$(3 \times 6,544 + 9 \times 6,030) / 12 / 860 \times 3.8 \times 1,000 = 27,212$	27,212 x 12/3 = 108,848
KD-1	Winong		-
KD-2	Kalipang	$(3 \times 7,526 + 9 \times 6,030) / 12 / 2,410 \times 3.1 \times 1,000 = 8,238$	8,238 x 12/3 = 32,952
TR-3	Nglentreng	$(3 \times 6,713 + 9 \times 6,030) / 12 / 990 \times 3.5 \times 1,000 = 21,922$	21,920 x 12/3 = 87,680
PB-1	Curah Bindo	$(3 \times 6,905 + 9 \times 6,030) / 12 / 1,430 \times 3.3 \times 1,000 = 14,420$	14,420 x 12/3 = 57,680
PB-2	Pelan Kerep	$(3 \times 6,943 + 9 \times 6,030) / 12 / 1,490 \times 3.7 \times 1,000 = 15,541$	15,541 x 12/3 = 62,164
PB-3	Tegal Pao		-
MA-1	Lowek Jati	$(3 \times 12,128 + 9 \times 6,030) / 12 / 6,300 \times 3.4 \times 1,000 = 4,077$	4,077 x 12/3 = 16,308
MA-2	Gentong	$(3 \times 7,462 + 9 \times 6,030) / 12 / 2,310 \times 3.6 \times 1,000 = 9,955$	9,955 x 12/3 = 39,820
PC-1	Kwangen	$(3 \times 6,519 + 9 \times 6,030) / 12 / 820 \times 3.8 \times 1,000 = 28,510$	28,510 x 12/3 = 114,040

資料1 東ジャワ 各村落の浄水場運営維持管理費用 (水需要量: 60lpcd)

1 記号	NG-1	KD-1	KD-2	TR-3	PB-1	PB-2	PB-3	MA-1	MA-2	PC-1
2 村落名	Oro-Oro Ombo	Petungroto	Kalipang	Sumberdadi	Tugel/Tigisan/Kul	Sumberkare	Ourah Temu	Baturentuno	Argosari	Cokrokembang
3 貯水池名	Oro-Oro Ombo	Winong	Kalipang	Nglenteng	Curah Bindo	Pelan Kerep	Tegal Pao	Lowek Jati	Gentong	Kwangen
4 調査時点受益人口(人)	800	?	2,240	917	1,338	1,380	?	5,907	2,147	768
同上世帯数	209	?	720	262	403	370	?	1,718	592	200
1世帯あたり人数	3.8	?	3.1	3.5	3.3	3.7	?	3.4	3.6	3.8
5 人口調査年	2004	2002	2003	2003	2004	2003	2004	2004	2004	2004
6 人口増加率(年率:%)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
7 2012年受益人口(人)	860	?	2,410	990	1,430	1,490	?	6,300	2,310	820
8 水需要量(lpcd)	60	60	60	60	60	60	60	60	60	60
8.1 (l/sec)	0.6	0.0	1.7	0.7	1.0	1.0	0.0	4.4	1.6	0.6
8.2 (m ³ /D)	51.6	0.0	144.6	59.4	85.8	89.4	0.0	378.0	138.6	49.2
8.3 (m ³ /M)	1,548	0	4,338	1,782	2,574	2,682	0	11,340	4,158	1,476
9 Manpower Cost										
Persons	5.0	?	5.0	5.0	5.0	5.0	?	5.0	5.0	5.0
Unit Price(1000Rp/M)	1,200	?	1,200	1,200	1,200	1,200	?	1,200	1,200	1,200
Amonut (1000Rp/M)	6,000	?	6,000	6,000	6,000	6,000	?	6,000	6,000	6,000
10 Chemical Agents										
10.1 Al ₂ (SO ₄) ₃										
Unit Consumption(mg/l)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Volume(Kg/M)	379	0	1,062	436	630	656	0	2,775	1,018	361
Unit Price (Rp/Kg)	600	600	600	600	600	600	600	600	600	600
Amonut (1000Rp/M)	227	0	637	262	378	394	0	1,665	611	217
10.2 Polymer: Magnasol										
Unit Consumption(mg/l)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Volume(Kg/M)	0.31	0.00	0.87	0.36	0.51	0.54	0.00	2.27	0.83	0.30
Unit Price (Rp/Kg)	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500
Amonut (1000Rp/M)	8	0	23	9	14	14	0	60	22	8
10.3 Ca(OH) ₂ or NaOH										
Unit Consumption(mg/l)	0.0	30.0	0.0	34.0	0.0	0.0	0.0	132.0	0.0	0.0
Volume(Kg/M)	0.0	0.0	0.0	66.6	0.0	0.0	0.0	1,646.6	0.0	0.0
Unit Price (Rp/Kg)	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
Amonut (1000Rp/M)	0	0	0	87	0	0	0	2,141	0	0
10.4 Chlorine										
Unit Consumption(mg/l)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Volume(Kg/M)	5.2	0.0	14.6	6.0	8.6	9.0	0.0	38.1	14.0	5.0
Unit Price (Rp/Kg)	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300
Amonut (1000Rp/M)	22	0	63	26	37	39	0	164	60	21
Chemical Agents Total	258	0	723	384	429	447	0	4,030	693	246
11 Electricity										
Electricity (Rp/m ³)	85	85	85	85	85	85	85	85	85	85
Amonut (1000Rp/M)	132	0	369	151	219	228	0	964	353	125
12 スペアパーツ(1000Rp/M)	155	0	434	178	257	268	0	1,134	416	148
13 月間維持管理費用(1000Rp/M)	6,544	?	7,525	6,713	6,905	6,943	?	12,128	7,462	6,519
14 年間維持管理費用(1000Rp/Y)	78,531		90,303	80,558	82,860	83,316		145,532	89,543	78,228
15 1世帯あたり費用(Rp/HH/M)	29,128		9,714	23,733	16,032	17,380		6,619	11,715	30,528

月一帯あたり費用(Rp/HH/M)=月間維持管理費用(1000Rp)÷受益人口×1世帯あたりの人数

資料2 東ジャワ 各村落の浄水場運営維持管理費用 (水需要量: 30lpcd)

1	記号	NG-1	KD-1	KD-2	TR-3	PB-1	PB-2	PB-3	MA-1	MA-2	PC-1
2	村落名	Oro-Oro Ombo	Petungroto	Kalipang	Sumberdadi	Tugel/Tigsan/Kul	Sumberkare	Ourah Temu	Baturentuno	Argosari	Cokrokembang
3	貯水池名	Oro-Oro Ombo	Winong	Kalipang	Nglenteng	Curah Bindo	Pelan Kerep	Tegal Pao	Lowek Jati	Gentong	Kwangen
4	調査時点受益人口(人)	800	?	2,240	917	1,338	1,380	?	5,907	2,147	768
	同上世帯数	209	?	720	262	403	370	?	1,718	592	200
	1世帯あたり人数	3.8		3.1	3.5	3.3	3.7		3.4	3.6	3.8
5	人口調査年	2004	2002	2003	2003	2004	2003	2004	2004	2004	2004
6	人口増加率(年率: %)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
7	2012年受益人口(人)	860	?	2,410	990	1,430	1,490	?	6,300	2,310	820
8	水需要量(lpcd)	30	30	30	30	30	30	30	30	30	30
8.1	(l/sec)	0.3	0.0	0.8	0.3	0.5	0.5	0.0	2.2	0.8	0.3
8.2	(m ³ /D)	25.8	0.0	72.3	29.7	42.9	44.7	0.0	189.0	69.3	24.6
8.3	(m ³ /M)	774	0	2,169	891	1,287	1,341	0	5,670	2,079	738
9	Manpower Cost										
	Persons	5.0	?	5.0	5.0	5.0	5.0	?	5.0	5.0	5.0
	Unit Price(1000P/M)	1,200	?	1,200	1,200	1,200	1,200	?	1,200	1,200	1,200
	Amonut (1000Rp/M)	6,000	?	6,000	6,000	6,000	6,000	?	6,000	6,000	6,000
10	Chemical Agents										
10.1	Al ₂ (SO ₄) ₃										
	Unit Consumption(mg/l)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Volume(Kg/M)	189	0	531	218	315	328	0	1,388	509	181
	Unit Price (Rp/Kg)	600	600	600	600	600	600	600	600	600	600
	Amonut (1000Rp/M)	114	0	319	131	189	197	0	833	305	108
10.2	Polymer: Magnasol										
	Unit Consumption(mg/l)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
	Volume(Kg/M)	0.15	0.00	0.43	0.18	0.26	0.27	0.00	1.13	0.42	0.15
	Unit Price (Rp/Kg)	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500
	Amonut (1000Rp/M)	4	0	11	5	7	7	0	30	11	4
10.3	Ca(OH) ₂ or NaOH										
	Unit Consumption(mg/l)	0.0	30.0	0.0	34.0	0.0	0.0	0.0	132.0	0.0	0.0
	Volume(Kg/M)	0.0	0.0	0.0	33.3	0.0	0.0	0.0	823.3	0.0	0.0
	Unit Price (Rp/Kg)	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
	Amonut (1000Rp/M)	0	0	0	43	0	0	0	1,070	0	0
10.4	Chlorine										
	Unit Consumption(mg/l)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	Volume(Kg/M)	2.6	0.0	7.3	3.0	4.3	4.5	0.0	19.1	7.0	2.5
	Unit Price (Rp/Kg)	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300
	Amonut (1000Rp/M)	11	0	31	13	19	19	0	82	30	11
	Chemical Agents Total	129	0	361	192	214	223	0	2,015	346	123
11	Electricity										
	Electricity (Rp/m ³)	85	85	85	85	85	85	85	85	85	85
	Amonut (1000Rp/M)	66	0	184	76	109	114	0	482	177	63
12	スベアパーツ(1000Rp/M)	77	0	217	89	129	134	0	567	208	74
13	月間維持管理費用(1000Rp)	6,272	?	6,763	6,357	6,453	6,471	?	9,064	6,731	6,259
14	1世帯あたり費用(Rp/HH/M)	27,916		8,730	22,473	14,981	16,199		4,947	10,568	29,313

月一帯あたり費用(Rp/HH/M)=月間維持管理費用(1000Rp)÷受益人口×1世帯あたりの人数

資料3 東ジャワ 各村落の浄水場運営維持管理費用 (水需要量: 0lpcd)

1	記号	NG-1	KD-1	KD-2	TR-3	PB-1	PB-2	PB-3	MA-1	MA-2	PC-1
2	村落名	Oro-Oro Ombo	Petungroto	Kalipang	Sumberdadi	Tugel/Tigsan/Kul	Sumberkare	Ourah Temu	Baturentuno	Argosari	Cokrokembang
3	貯水池名	Oro-Oro Ombo	Winong	Kalipang	Nglenteng	Curah Bindo	Pelan Kerep	Tegal Pao	Lowek Jati	Gentong	Kwangen
4	調査時点受益人口(人)	800	?	2,240	917	1,338	1,380	?	5,907	2,147	768
	同上世帯数	209	?	720	262	403	370	?	1,718	592	200
	1世帯あたり人数	3.8		3.1	3.5	3.3	3.7		3.4	3.6	3.8
5	人口調査年	2004	2002	2003	2003	2004	2003	2004	2004	2004	2004
6	人口増加率(年率: %)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
7	2012年受益人口(人)	860	?	2,410	990	1,430	1,490	?	6,300	2,310	820
8	水需要量(lpcd)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
8.1	(l/sec)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8.2	(m ³ /D)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
8.3	(m ³ /M)	0	0	1	0	0	0	0	2	1	0
9	Manpower Cost										
	Persons	5.0	?	5.0	5.0	5.0	5.0	?	5.0	5.0	5.0
	Unit Price(1000P/M)	1,200	?	1,200	1,200	1,200	1,200	?	1,200	1,200	1,200
	Amonut (1000Rp/M)	6,000	?	6,000	6,000	6,000	6,000	?	6,000	6,000	6,000
10	Chemical Agents										
10.1	Al ₂ (SO ₄) ₃										
	Unit Consumption(mg/l)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Volume(Kg/M)	0	0	0	0	0	0	0	0	0	0
	Unit Price (Rp/Kg)	600	600	600	600	600	600	600	600	600	600
	Amonut (1000Rp/M)	0	0	0	0	0	0	0	0	0	0
10.2	Polymer: Magnasol										
	Unit Consumption(mg/l)	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
	Volume(Kg/M)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Unit Price (Rp/Kg)	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500	26,500
	Amonut (1000Rp/M)	0	0	0	0	0	0	0	0	0	0
10.3	Ca(OH) ₂ or NaOH										
	Unit Consumption(mg/l)	0.0	30.0	0.0	34.0	0.0	0.0	0.0	132.0	0.0	0.0
	Volume(Kg/M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
	Unit Price (Rp/Kg)	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
	Amonut (1000Rp/M)	0	0	0	0	0	0	0	0	0	0
10.4	Chlorine										
	Unit Consumption(mg/l)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
	Volume(Kg/M)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Unit Price (Rp/Kg)	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300
	Amonut (1000Rp/M)	0	0	0	0	0	0	0	0	0	0
	Chemical Agents Total	0	0	0	0	0	0	0	1	0	0
11	Electricity										
	Electricity (Rp/m ³)	85	85	85	85	85	85	85	85	85	85
	Amonut (1000Rp/M)	30	30	30	30	30	30	30	30	30	30
12	スベアパーツ(1000Rp/M)	0	0	0	0	0	0	0	0	0	0
13	月間維持管理費用(1000Rp)	6,030	?	6,030	6,030	6,030	6,030	?	6,031	6,030	6,030
14	1世帯当たり費用(Rp/HH/M)	26,839		7,784	21,319	14,000	15,094		3,291	9,467	28,238

月一帯当たり費用(Rp/HH/M)=月間維持管理費用(1000Rp)÷受益人口×1世帯あたりの人数

資料 4

Summary: Production Cost of SIDOARJO Water Treatment Plant January to November 2004

ITEMS	January	February	March	April	May	June	July	August	September	October	November	December	Total
Raw Water Consumption (m³)	579,271	493,176	547,038	526,617	596,971	515,570	633,711	697,622	670,024	539,368	396,936		6,196,304
Raw Water Cost (1000Rp)	28,964	24,659	27,352	26,331	29,849	25,779	31,686	34,881	33,501	26,968	19,847		309,817
Unit Raw Water Cost (Rp/Prod. m ³)	53	52	51	51	51	51	52	51	51	51	51		51
Production Volume (m³)	551,328	478,005	537,684	517,002	586,148	507,218	614,924	683,730	654,500	529,497	388,947		6,048,983
Sales Amount (1000Rp)	634,027	549,706	618,337	594,552	674,070	583,301	707,163	786,290	752,675	608,922	447,289		6,956,330
Contract Volume (m ³)	535,680	501,120	535,680	518,400	535,680	518,400	535,680	535,680	518,400	535,680	518,400		5,788,800
Ave. Production Volume (m³/d)	17,785	17,072	17,345	17,233	18,908	16,907	19,836	22,056	21,817	17,081	12,965		18,111
Electricity													
Electricity Consumption (KWh)	27,600	26,000	27,600	26,400	30,000	26,800	31,600	33,600	32,800	28,000	22,400		312,800
Electricity Charge (1,000Rp)	20,878	19,395	20,878	20,408	22,180	20,589	22,831	23,808	23,447	21,131	18,454		233,999
Electricity Consumption (KWh/Prod.m ³)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	#DIV/0!	0.05
Unit Electricity Cost (Rp/Prod. m³)	38	41	39	39	38	41	37	35	36	40	47		39
Chemical Additives													
Aluminum Sulfate (Kg)	89,416	78,660	81,300	57,070	61,382	57,970	63,502	75,800	82,648	63,014	54,292		765,054
Unit Price of Aluminum Sulfate(Rp/Kg)	468	468	632	633	632	632	632	633	633	632	633		633
Aluminum Sulfate Cost(1,000Rp)	41,802	36,774	51,422	36,097	38,824	36,666	40,165	47,944	52,275	39,856	34,340		456,165
Aluminum Sulfate Density (ppm)	72.89	73.96	67.96	49.61	47.07	51.37	46.41	49.83	56.75	53.49	62.74		56.84
Caustic Soda (Kg)	-	-	-	-	894	-	-	3,651	224	-	-		4,769
Unit Price of Caustic Soda (Rp/Kg)					1,265			1,265	1,263				
Caustic Soda Cost (1,000Rp)	0	0	0	0	1,131	0	0	4,618	283	0	0		6,032
Caustic Soda Density (ppm)	-	-	-	-	1.53	-	-	5.34	0.34	-	-		
Polymer (Kg): Magnasol	175	200	175	100	75	100	100	100	100	75	25		1,225
Unit Price of Polymer (Rp/Kg)	25,246	25,245	25,246	25,630	25,640	27,940	27,940	27,280	27,280	27,027	27,040		26,219
Polymer (1,000Rp)	4,418	5,049	4,418	2,563	1,923	2,794	2,794	2,728	2,728	2,027	676		32,118
Polymer (ppm)	0.32	0.42	0.33	0.19	0.13	0.20	0.16	0.15	0.15	0.14	0.06		0.20
Chlorine (Kg)	1,000	1,000	1,000	2,000	1,000	1,000	2,000	1,000	2,000	1,000	1,000		14,000
Unit Price of Chlorine (Rp/Kg)	4,290	4,290	4,290	4,290	4,290	4,290	4,290	4,290	4,290	4,290	3,900		4,262
Chlorine (1,000Rp)	4,290	4,290	4,290	8,580	4,290	4,290	8,580	4,290	8,580	4,290	3,900		59,670
Chlorine (ppm)	1.81	2.09	1.86	3.87	1.71	1.97	3.25	1.46	3.06	1.89	2.57		2.31
Total Rp (1,000Rp)	50,510	46,113	60,130	47,240	46,168	43,750	51,539	59,580	63,866	46,173	38,916		553,985
Unit Chemicals Cost (Rp/Prod.m³)	92	96	112	91	79	86	84	87	98	87	100		92
Direct Manpower (15persons)	18,132	18,173	17,314	17,152	17,904	17,404	17,135	17,191	17,250	16,977	18,897		193,529
Unit Direct Manpower Cost (Rp/Prod.m³)	33	38	32	33	31	34	28	25	26	32	49		32
Total O & M Cost (1000Rp)	118,484	108,340	125,674	111,131	116,101	107,522	123,191	135,460	138,064	111,249	96,114		1,291,330
Total Unit O & M Cost (Rp/Prod. m³)	215	227	234	215	198	212	200	198	211	210	247		213

資料 5

インドネシア国 スラウェシ島地方水道整備計画 運転維持管理費

October, 2000、 JICA、 日水コン

	I K K				
	Limbung	Pompauna	Sausu	Toili	Wori
Beneficial Population	8,530	7,860	4,620	11,100	2,290
1 Water Supply Volume					
(l/sec)	10.7	9.9	6.3	14.0	2.9
(m ³ /D)	924.5	855.4	544.3	1,209.6	250.6
(m ³ /M)	27,734.4	25,660.8	16,329.6	36,288.0	7,516.8
(m ³ /Y)	337,435.2	312,206.4	198,676.8	441,504.0	91,454.4
2 Manpower Cost					
Persons	5.0	5.0	5.0	6.0	5.0
Unit Price(P/M)	450	450	600	340	450
Amonut (1000Rp/M)	2,250	2,250	3,000	2,040	2,250
3 Chemical Agents					
(1) Al ₂ (So ⁴) ₃					
Unit Consumption(mg/l)	15.0	15.0	10.0	15.0	10.0
Volume(Kg/M)	465.9	431.1	182.9	609.6	84.2
Unit Price (Rp/Kg)	2,500	2,500	2,500	2,500	2,500
Amonut (1000Rp/M)	1,165	1,078	457	1,524	210
(2) Ca(OH) ₂					
Unit Consumption(mg/l)	10.0	5.0	10.0	5.0	10.0
Volume(Kg/M)	310.6	143.7	182.9	203.2	84.2
Unit Price (Rp/Kg)	600	600	600	600	600
Amonut (1000Rp/M)	186	86	110	122	51
(3) Chlorine					
Unit Consumption(mg/l)	2.0	2.0	2.0	2.0	2.0
Volume(Kg/M)	55.5	51.3	32.7	72.6	15.0
Unit Price (Rp/Kg)	9000	9000	9000	9000	9000
Amonut (1000Rp/M)	499	462	294	653	135
4 Electricity					
Amonut (1000Rp/Y)	16,670	13,330	Generator 14,310	Generator 52,470	6,870
Electricity (Rp/m ³)	49	43	72	119	75

資料 6 SIDOARJO 浄水場水質データ

Classification	Test Item		Unit	Drinking Water	Clean Water	WHO Guideline (2003)		Raw Water Class B	2004	2004	2004	2004	2004	2004	2004	2004	2004	2004	2004
	Item	Notation		Allowable Value	Allowable Value	GV (*1)	ACV (*2)		January	February	March	April	May	June	July	August	September	October	November
	Temperature	T	°C	± 3		-	-		27	27	24	25	26	27.7	26	26	26.5	29	
	Turbidity		NTU	5	25	-	5 NTU	-	53	330	286	124	90	680	67.1	63.3	18	26.6	24.8
	Total Dissolved Solids	TDS	mg/l	1,000	1,500	-	1,000	1,500	555	270	428	950	300	216	330	444	630	715	470
1. Bacteriological	Coliform	CT	MPN/100ml	0	50	0	-			-	-	-	-	-	-	-	-	-	-
	Escherichia coli	E-coli	MPN/100ml	0	10	0	-			-	-	-	-	-	-	-	-	-	-
2. Toxic Substances	Lead	Pb	mg/l	0.05	0.05	0.01	-	0.1	0.03	0.03	0.02	0.29	0.03	0.04	0.04	0.24	0.22	0.17	0.12
	Arsenic	As	mg/l	0.05	0.05	0.01 (P)	-	0.05	0	0	0	0	0	0	0	0	0	0	0
	Selenium	Se	mg/l	0.01	0.01	0.01	-	0.01	-	-	-	-	-	-	-	-	-	-	-
	Chromium	Cr ⁶⁺	mg/l	0.05	0.05	0.05 (P)	-	0.05	0	0	0	0	0	0	0	0	0	0	0
	Cyanide	Cn	mg/l	0.1	0.1	0.07	-	0.05	0	0	-	0	0	0	0	0	0	0	0
	Cadmium	Cd	mg/l	0.005	0.005	0.003	-	0.01	0	0	0	0	0	0	0	0	0	0	0
	Barium	Ba	mg/l	1.00	-	0.7	-	1	0.6	0.56	0.62	0.56	0.65	0.7	0.6	0.52	0.49	0.5	0.5
	Mercury	Hg	mg/l	0.001	0.001	0.001	-	0.001	-	-	-	-	-	-	-	-	-	-	-
	Silver	Ag	mg/l	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Affecting Human Health Substances	Fluoride	F	mg/l	1.50	1.5	1.5	-	1.5	0.82	0.79	0.66	0.79	0.65	0.62	0.62	0.73	0.65	0.64	0.62
	Nitrate	NO ₃ ⁻	mg NO ₃ /l	10.0	10	?	-	10	3,21	2.48	2.56	3.15	2.05	1.78	2.14	2.17	3.18	5.65	5.5
	Nitrite	NO ₂ ⁻	mg NO ₂ /l	1.0	1.0	50 (*3)	-	Nil	0.17	0.14	0.03	0	0.01	0	0	0.05	0.04	0	
4. Domestic Use Concerning Items	Color		TCU	15	50	-	15 TCU												
	Taste		dilution (*7)	-		-	-												
	Odour		dilution (*7)	-		-	-												
	pH			6.5 - 8.5	6.5 - 9.0	-	-	6-8.5	6.9	7.6	7.1	6.95	7.6	7.33	7.86	7.38	7.3	7.4	7.54
	Total Hardness	(CaCO ₃)	°f (*8)	500	500	-	-												
	Calcium	Ca	mg/l	-	-	-	-												
	Magnesium	Mg	mg/l	-	-	-	-												
	Magnesium + Sodium SO ₄		mg/l	-	-	-	-												
	Sulfate	SO ₄	mg/l	400	400	-	250	400	23.6	0	19.8	22.7	24.74	42.14	24.41	18.86	19.81	16.44	22.67
	Sulfur	S	mg/l					Nil	0	0	0	0	0	0	0	0	0	0	0
	Chloride	Cl	mg/l	250	600	-	250	600	304	72	68	340	44	32	6.8	120	212	260	120
	Iron	Fe	mg/l	0.3	1.0	-	0.3	5	1.44	4.51	10.51	5.15	3.09	17.25	2.93	2.3	0.67	0.12	1.03
	Manganese	Mn	mg/l	0.1	0.5	0.4	0.1	0.5	0	0	0	0	0	0	0	0	0	0	0
	Copper	Cu	mg/l	1.0	-	2 (P)	1	1	0.59	0.57	0.44	0.56	0.43	0.42	0.42	0.46	0.44	0.38	0.4
	Zinc	Zn	mg/l	5.0	-	-	3	5	2.05	2.05	3.1	2.03	3.1	2.86	2.67	2.01	1.9	1.88	1.87
	Oxygen abs KMnO ₄		mg/l	10.0	10.0	-	-	10	14.67	4.97	14.05	13.59	12	17.35	6.37	9.3	4.42	10.73	5.21
	Dissolved Oxygen	DO	mg/l					?	2	2	2	2	3	2	3	2	2	2	3
	Ammonium (NH ₃ + NH ₄)		mg/l	-	-	-	1.5	0.5	1.03	1.03	0.01	0.1	0.39	0.28	0.18	0.11	1.29	1.88	0.85
	Total Nitrogen (Excluding NO ₃)		mg/l	-	-	-	-												
	Biochemical Oxygen Demand	BOD	mg/l	-	-	-	-	8	8	7	16	15	14	20	8	12	6	14	7
Chemical Oxygen Demand	COD	mg/l	-	-	-	-	10	10	11.8	34	24	20	28	15	18	9	20	12	
Anionic Detergent		mg/l	0.05	0.5			0.5	1.58	1.76	1.08	1.54	1.08	2.15	2.1	1.45	0.98	0.88	0.88	
Phenol		mg/l	0.005	0.005	-	-	0.002	0	0	0	0	0	0	0	0	0	0	0	
Oil Grease		mg/l	nil	nil			Nil	0	0	0	0	0	0	0	0	0	0	0	
Pesticide Total		mg/l	nil	nil	-	-	Nil	-	-	-	-	-	-	-	-	-	-	-	
Carbon Chloroform Extract		mg/l					0.5	-	-	-	-	-	-	-	-	-	-	-	
PCB		mg/l	nil	nil	0.2		Nil	-	-	-	-	-	-	-	-	-	-	-	

資料7 各対象地域の水質

PRAMETER		SATUAN (Unit)	Drinking & Clean Water		HASIL ANALISA (ANALYSIS RESULT)											
			Standard		NG-1	KD-1	KD-2	TR-3	MA-1	GW	SELLOW WELL	MA-2 RIVER	MA-2 SPRING	PB-1	PB-2	PB-3
			Drinking Water	Clean Water												
Physical Items	Wama (Color)	TCU	15	50	192.0**	50.0*	320.0**	160.0**	256.0**	30.0*	40.0*	100.0**	40.0*	192.0**	448.0**	160.0**
	Turbidity	NTU	5	25	1020.0**	600.0**	654.0**	610.0**	2070.0**	0.69	81.3**	205.0**	1.28	782.0**	1176.0**	83.8**
	Total Disol. Solid (TDS)	mg/l	1,000	1,500	277.5	271.8	377.6	357.16	374.8	289.8	433.4	217.6	260.65	409.8	388.73	259.8
	Total Susp Solid (TSS)	mg/l			1000.0	525.0	2750.0	450.0	2200.0	3.0	100.0	155.0	3.0	300.0	575.0	20.0
Chemical Items	pH		6.5 – 8.5	6.5- 9.0	7.34	7.34	7.24	7.37	7.22	6.54	7.17	7.46	6.58	7.19	7.20	7.28
	Barium (Ba)	mg/l	1.0	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Besi (Fe)	mg/l	0.3	1.0	1.094**	3.015**	1.768**	2.763**	4.410**	0.135	0.967*	0.793*	0.170	2.93**	4.168**	1.623**
	Mangan (Mn)	mg/l	0.1	0.5	0.327*	0.456*	0.233*	0.000	0.426*	0.000	0.000	0.426*	0.000	0.136*	0.053	0.012
	Tembaga (Cu)	mg/l	1.0	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Seng (Zn)	mg/l	5.0	15	0.117	0.154	0.106	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.023
	Chromium (Cr)	mg/l	0.05	0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Cadmium (Cd)	mg/l	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.004	0.000	0.000	0.000
	Raksa (Hg)	mg/l	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Plumbum (Pb)	mg/l	0.05	0.05	0.047	0.054**	0.037	0.082**	0.071**	0.010	0.091**	0.063**	0.031	0.100**	0.066**	0.107**
	Arsen (As)	mg/l	0.05	0.05	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Sianida (CN)	mg/l	0.1	0.1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Sulhda (S)	mg/l	0.00	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Fluorida (F)	mg/l	1.5	1.5	0.000	0.000	0.000	0.133	0.059	0.207	0.000	0.059	0.281	0.059	0.059	0.000
	Klorida (Cl)	mg/l	250	600	75.54	37.77	151.09	37.77	75.4	11.33	113.32	75.40	2.27	37.77	37.77	10.58
	Sulfat (SO ₂)	mg/l	400	400	7.677	3.808	0.084	41.798	7.985	27.718	14.255	24.635	9.013	4.902	4.902	4.383
	Amonia (NH ₃) sdg N	mg/l			0.097	0.393	0.266	0.287	0.245	0.224	0.118	0.160	0.414	0.688	0.562	0.172
	Nitral (NO ₃)	mg/l	10	10	4.323	3.626	5.857	1.952	1.116	0.000	2.510	3.207	0.000	2.928	2.649	4.602
	Nitrit (NO ₂)	mg/l	1.0	1.0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Zat Organik (KMn O ₄)	mg/l	10	-	8.38	3.99	8.76	5.38	7.85	0.000	3.32	1.21	0.30	5.80	7.63	9.16
	Oksigen Terlarut (DO)	mg/l	-	-	4.52	6.03	5.09	5.07	4.78	6.92	6.21	6.57	5.63	4.83	4.43	5.14
	BOD 5.20	mg/l	-	-	5.08	4.28	5.08	5.35	4.79	4.20	5.93	4.50	4.96	4.36	4.32	3.55
	COD	mg/l	--	-	8.75	8.53	8.36	8.43	8.70	6.93	9.35	6.92	8.44	7.47	7.93	6.70
	Total Alkalinity	mg/l	-	--	68.01	31.59	55.69	30.63	16.06	97.46	84.07	66.94	80.32	70.29	78.18	68.54
	Minyak lemak(Oil, Grease, Fat)	mg/l	-	-	0.035	0.024	0.026	0.038	0.034	0.026	0.025		0.002	0.036	0.039	0.029
	Phospat (PO ₄)	mg/l	-	-	0.009	0.009	0.029	0.051	0.009	0.032	0.035	0.019	0.015	0.009	0.009	0.099
	Slicat (SiO ₂)	mg/l	-	-	27.477	30.912	34.347	30.912	8.364	37.915	58.545	13.940	34.569	17.173	29.195	27.477
Kesadahan(CaCO ₃)	mg/l	500	500	43.68	72.80	54.60	131.04	43.61	161.61	240.24	98.28	113.56	61.15	185.64	91.72	
Total Coliform (Jml per 100ml)			0.0	50					?2400**	0.0	?2400**	?2400**	?2400**	?2400**	?2400**	?2400**

添付資料 6. 収集資料リスト

様式

主管部長	文書管理課長	主管課長	情報管理課長	図書資料室受付印

収 集 資 料 リ ス ト

平成 年 月 日 作成

地 域	東南アジア	調 査 団	東ジャワ農村水供給小規模貯水池建設計画予備調査	調 査 の 種 類	予備調査	作 成 部 課	
国 名	インドネシア	等 名 称		現 地 調 査 期 間	2004年11月29日～2004年12月28日	担 当 者 氏 名	

番号	資 料 の 名 称	形 態	版 型	ペー ジ 数	オリジナル コピーの別	部 数	収集先名称又は発行機関	寄贈・購入 (価格)の	取扱区分	利用 表示	利 用 者 所 属 氏 名	納入予定日	納 入 確 認 欄
1	Sediment Analysis of the Existing Reservoirs		A4	5	コピー	1	Brantas River Basin D0		水文				
2	Plan of Operational Cost of Tegaren Pond in Kabupaten Trenggalek		A4	2	コピー	1	Brantas River Basin D0		維持管理				
3	Plan of Operational Cost of Sukodono Pond in Kabupaten Malan		A4	2	コピー	1	Brantas River Basin D0		維持管理				
4	Plan of Operational Cost of Tegaren Pond in Kabupaten Trenggalek		A4	2	コピー	1	Brantas River Basin D0		維持管理				
5	Anggaran Dasar dan Anggaran Rumah Tangga HIPPA Sido Makumur		A4	15	コピー	1	Brantas River Basin D0		維持管理				
6	English translation of Ditto above		A4	15	コピー	6	JICA 予備調査団作成		維持管理				
7	Berita Acara Pembentukan dan Kesepakatan Peraturan Gabungan HIPPA "Tirto Margo Mulyo"		A4	17	コピー	1	Brantas River Basin D0		維持管理				
8	English translation of Ditto above		A4	15	コピー	15	JICA 予備調査団作成		維持管理				
9	PEDOMAN: Pembentukan dan Pembinaan Himpunan Penduduk Pemakai Air Minum(HIPPAM) DI JAWA TIMUR		A4	5	コピー	1	Brantas River Basin D0		維持管理				
10	Operational Guide for budget year of 2003		A4	4	コピー	1	Brantas River Basin D0		財政				
11	Water Management Institution		A4	5	コピー	1	Brantas River Basin D0		組織				
12	Government Regulation of The Republic of Indonesia Number: 82 of 2001 Water Quality Management and Water Pollution Control		A5	52	オリジナル	1	Ministry of Environment Republic		法律				
13	Decree of State Minister for The Environment Number: 2 of 2000 Guidelines for Amdal Document Evaluation		A4	28	コピー	1	State Minister for the Environment		法律				
14	Decree of Head of Environmental Impact Management Agency Number: 08 of 2000 Community Involvement and Information Openness in the Process of Environmental Impacts Assessment		A4	22	コピー	1	Environmental Impact Management Agency (Bapedal)		法律				
15	Decree of Head of Environmental Impact Management Agency Number: 09 of 2000 Guidelines for Preparation of Environmental Impacts Assessment Study		A4	24	コピー	1	Ministry of Environment		法律				
16	Decree of State Minister for The Environment Number: 17 of 2001 Types of Business and/or Activity Plans that are Required to be Completed with The Environmental Impact Assessment		A4	24	コピー	1	Ministry of Environment		法律				

東ジャワ農村水供給小規模貯水池建設計画予備調査

17	Government Regulation Number: 27/1999 Concerning Environmental Impact Assessment		A4	41	コピー	1	Environmental Impact Management Agency (Bapedal)		法律				
18	Decree of State Minister for The Environment of The Republic Number: 40 of 2000 Guidelines for Work System of Evaluator Committee for Environmental Impact Assessment		A4	33	コピー	1	State Minister for the Environment		法律				
19	Decree of State Minister for The Environment of The Republic Number: 41 of 2000 Guidelines for Establishment of Regencial/Municipal Evaluator committee for Environmental Impact Assessment		A4	12	コピー	1	State Minister for the Environment		法律				
20	Decree of State Minister for he Environment of The Republic Number: 42 of 2000 Membership Composition of Central Evaluator Committee and Technical Team for Environmental Impact Assessment		A4	9	コピー	1	State Minister for the Environment		法律				
21	A new approach for the EIA process in Indonesia: The implementation of guidelines regarding public involvement in Indonesia's EIA MAY, 2002 Edition: 18th		A4	4	コピー	1	Ministry of Environment		法律				
22	Law of Water Resources		A4	52	コピー	1	オリジナル		法律				
23	Persyaratan Kualitas Air Minum dan Air Bersih(Water Quality Standard) of East Jawa Province		A4	4	コピー	1	East Jawa Province		法律				
24	Well inventory by district in East Jawa Province		A4	4	コピー	1	PPAT		地下水				
25	Hydrogeological Maps		A2	4	ファイル	1	PPAT		地下水				
26	Environmental Study Identification Study and Detailed Design of Small Ponds		A4	121	コピー	1	Brantas River Basin DO		環境				
27	State of the Environment in Indonesia 2002		A4	172	オリジナル	1	Ministry of Environment		環境				
28	RENCANA TATA TANAM GLOBAL(RTTG)		A4	7	コピー	1	Pemerintah Kabupaten Nganjuk DINAS PENGARIAN DAERAH		灌漑計画				
29	PEDOMAN UMUM: Program Pengembangan Kecamatan (PPK) Tahun Anggaran 1999/2000		A4	5	オリジナル	1	District Singosari Government		地方開発 計画				
30	English Translation of Ditto above		A4	15	コピー	1	JICA 予備調査団作成		地方開発 計画				
31	Laporan Hasil Pelaksanaan Prasarana dan Ekonomi Program Pengembangan Kecamatan(PPK) Fase I		A4	22	コピー	1	Pemerintah Kabupaten Malang		地方開発 計画				
32	Program Pengembangan Kecamatan Fase II Tahun 2004、Kabupaten Malang		A4	31	コピー	1	Pemerintah Kabupaten Malang		地方開発 計画				
33	Academic Paper Program Pembangunan Bidang Permukiman Tahun 2005, 2006-2010		A4	5	コピー	1	Dinas Permukiman Propinsi Jawa Timur		東ジャワ 州給水開 発計画				

東ジャワ農村水供給小規模貯水池建設計画予備調査

34	Informasi Produk Pengaturan Departmen Permukiman dan Prasarana Wilayah, Datam Pelaksanaan, Otonomi Daerah		A4	12	コピー	1	Dinas Permukiman Propinsi Jawa Timur		東ジャワ州給水開発計画ガイドライン				
35	Bupati Makang, Trenggalek, Nganjuk		A4	4	コピー	1	Brantas River Basin D0		地方給水計画への協力同意書				
36	Data Pemeriksaan Fisika dan Kimia Air, Sidoarjo Water Treatment Plant		A4	10	コピー	1	Sidoarjo Water Treatment Plant		水道施設原水水質例				
37	Laporan Hasil Pengujian Air Minum		A4	10	コピー	1	Sidoarjo Water Treatment Plant		水道施設浄水水質例				
38	Water Quality Analysis		A4	2	コピー	1	Sidoarjo Water Treatment Plant		浄水場水質分析記録				
39	Water Treatment Plant Layout		A4	4	コピー	1	Sidoarjo Water Treatment Plant		浄水場全体図				
40	Performance Record of Sidoarjo Water Treatment Plant		A4	1	コピー	1	Sidoarjo Water Treatment Plant		浄水生産原価例				
41													
42													
43													
44													
45													
46													
47													