

### 資料3 各地域の現状と課題

#### 3 - 1 西ヌサトゥンガラ州

##### 3 - 1 - 1 水道給水の現況

###### (1) ロンボク島

1999年3月のDesign Report, 「Research for Project Finding of Small Scale Water Supply System in Rural Areas」; CIPTA KARYA & JICA、によれば、水道給水の現況は、以下のとおりである。

	西ロンボク	中央ロンボク	東ロンボク	ロンボク島合計
総人口	883,343	744,670	953,505	2,581,518
給水人口	138,725	64,535	64,905	268,165
給水率	15.78%	8.77%	6.8%	10.4%

###### (2) スンバワ島

SSIMP(OECF)のSumbawa Water Resources Development Study pp S-10によると農村部での給水率は、1994年時点で約10.8%と見積もっている。

###### (3) 今回の予備調査におけるヒアリング結果

今回の予備調査において、西ヌサトゥンガラ州の31村を訪問し、人口、村へのアクセス道路条件、水源、水道給水の現況と水道施設の要望等について調査を行った。調査結果の概要を以下に述べる。

###### 1) 人口

村落の人口は、最も少ない村で200人、最も多い村で1万人、平均的に見て4,500人/村程度となっている。また、1家族当たりの人数は、3、4人程度のものである。

###### 2) アクセス道路

主要道路から村落までのアクセス道路は、2、3の村を除き、比較的整備されており、建設重機や資材運搬車両の走行が可能である。ただし、水源までの通路については、人力運搬によらざるを得ない村が多い。

###### 3) 水源

主要水源を湧水に求めている村は10、浅井戸に求めている村は14、湧水と浅井戸に求めている村は6、不十分ながらも既に水道施設のある村が1である。

#### 4) 水道給水の現況と要望

訪問した村全部が水道施設の導入、整備・拡充を望んでいる。水道施設の導入を10年も待ち続けている村（Labulia、Labuan Lalar、Piong）もあった。

かつて、UNICEFやA u s A I D等の援助機関によって水道施設を導入した村（Duman、Ranggagata、Tete Batu 他5村）もいくつか見られたが、導入後数年で施設が破損したまま放置されている状態であった。以前に水道施設の恩恵を受けていた村ほど水道施設の新規導入・再開を望んでいる。なかには、村独自で、応急手段として、水源と村の間にPVC配管を敷設し水を利用しているところも見られた（Labuan Kenangga）。

乾期になると浅井戸の水量が低下するので、水位の回復を待って水を汲む行列が、井戸の前に夜遅くまで続いてしまうという村もある（Rembitan）。給水車による給水を受けている村も2村（Setangor、Rembitan）見られた。

浅井戸を水源としている村では、共同井戸を設置している村が多く見られる。また、既設水道施設のほとんどは、共同配水タンクからの給水であり、各戸給水をしている村は、1村（Tanjung Luar）だけであった。

#### 5) 支払い可能水道料金

本予備調査では、ほとんどの村で、村長あるいは助役から聞き取り調査を行ったものであり、村人の直接の声が反映されているか否かはよく分からないが、次のような回答が得られている。

支払い可能水道料金

水道料金の範囲	村数
1,000RP / 月以下	7村
1,000 ~ 5,000RP / 月	9村
5,000 ~ 10,000RP / 月	10村
10,000RP / 月以上	1村

#### 6) 水道施設導入後の運転管理体制

全部の村で、適切な指導・訓練をしてくれれば施設の運転管理体制を作っていくことは可能であると断言している。既設の共同井戸の設置、運営・管理は村人が行っているため、水道施設の運転、維持・管理についても同様な組織で行えると述べた村もある。

しかし、給水施設を導入しても壊れたまま施設を放置しており、施設が機能していない村も少なからず見られた。維持管理の重要性を強く感じさせられた。

### 7) 水伝播性病気(下痢、赤痢)

調査した全部の村で、下痢、赤痢、それぞれについて、数人から数10人の患者が雨期に発生しているとのことである。

調査の詳細については、添付の「NTB村落聞き取り調査結果」を参照のこと。

## 3 - 1 - 2 水道給水の課題

西ヌサトゥンガラ州における今回の村落調査結果を踏まえると、おおよそ次のような課題が挙げられる。

### 水源の水量と水質の確認

地下水を水源とする村を除けば、各村とも、いくつかの湧水水源があり、現状でも供用に差し支えない水量と水質を有しているように思える。しかしながら、水道給水施設を導入すれば、使用水量は現状より格段に増加することが予想される。また、今回の調査では、水質試験を行っていない。適切な試験により、既存の湧水水源の水量と水質を確認しておくことは必要である。

地下水を水源とする村については、既設浅井戸の水質確認とともに、試掘井戸設置時に、地下水の水量、水質の確認を行う必要がある。

### 給水システムと給水範囲

UNICEFやAusAID等の援助機関がかつて導入した水道給水施設が破損したまま放置されていたり、うまく機能していない村が少なくないという現状から考えて、いかにして維持管理の容易な給水システムを計画するかということが課題となる。

特別要望の高い場合は別にして、各戸給水というよりは共同水栓による給水システム、また、スペアパーツの入手やメンテナンス技術習得に難のある機械・電気製品の使用を極力避けるため、重力式給水方式をできるだけ取り入れた施設を計画することが課題となる。

### 生活環境

水道給水施設導入後の生活環境の変化、例えば生活污水・排水量の増大等を考慮すると、特に水源水質の確保を主眼にした施設の管理・運営計画を策定することが生活環境に関する課題の1つとしてあげられる。

### 給水施設の管理・運営

上述したように、給水施設を導入しても壊れたまま施設を放置しており、施設が機能していない村も少なからず見られている。給水施設がこのような状況になっている明確な理由は分からないが、維持管理の知識・技術の欠如、維持管理に必要な費用の不足、維持管理体制の欠如等が原因と考えられる。

したがって、これらの問題点を解決するためには、継続的に支払いが可能となる、適正で

無理のない水道料金の設定、維持管理の知識・技術の定期的な支援・供与、さらには、料金徴収から施設の定期点検と破損箇所の早期発見・修理、管理・運営を実行していく組織の設置が重要である。

また、州政府内に、地方給水専門家を配置し、定期的な巡回点検、指導を行うとともに、各村の水道給水施設維持管理経験の交流の場を企画・調整すること等も課題のひとつとして考えられる。

#### 他援助機関との調整

UNICEFやAUSAID等の援助機関による給水施設が、一部の地域に導入されている村もあるので、本格調査を進める際には、関係する援助機関との調整を図る必要がある。

### 3 - 2 東ヌサトゥンガラ州

#### 3 - 2 - 1 飲料水確保の現状

東ヌサトゥンガラ州では飲料水の水源として、主に湧水、井戸、雨水及び河川が使われている。そのうち湧水と井戸は、今回調査した 30 村落のうちおよそ 3 分の 2 の村落で、日常飲料水の主な水源として使われている。30 村落における飲料水の主な水源は以下のとおりであった(複数回答を認めた)。

飲料水の水源	村落数
井戸	19
湧水	19
雨水	6
河川	3
バナナの木からの水	3
P D A M の水道	4
P D A M の給水車	2

今回調査した 30 村落のうち井戸を全く持たない村落は 8 村落のみである。残りの 22 村落にはどんな形であれ井戸があり、その大半は飲料水の主要な水源となっている。井戸は手掘りのものが多く、深さおよそ 30 m 程度までのものが多い。これらの井戸は乾期に涸れる井戸、涸れないまでも水量が極端に少量になる井戸が多く、また海岸近くの村落の井戸では、海水の浸入が見られる所が多い。

機械掘りの深井戸は 4 村落にあったが、実際に 1 年中水道用に稼働しているものは、1 村落(ドルレア(Ndorurea, Ende))の深井戸だけであり、県の水道公社(P D A M)が管理運営している。もう 1 つの村落の深井戸は灌漑用のもので、P 2 A T が管理運営しており、灌漑にまわし

た後の余剰水量を水道用に運用しているのみで、雨期には稼働しない。残り2村落の深井戸は設置されたものの電源の不備、維持管理のまずさから全く稼働していない。

東ヌサトゥンガラ州の湧水は豊富な水量を示す所が多く、村人の貴重な水源となっている。今回調査した30村落では湧水を持たない村落は4村落のみであり、残りの26村落は規模の大小はあるが湧水地を持っている。またその半分に当たる13の村落では、一時的にであれ湧水を水源にしてパイプを敷設し、水道のように村落内に水を供給していた。しかしながら、主にパイプの保守管理がうまくいかず、現在まで継続して使用しているのは、およそその半分の6村落にしか過ぎない。湧水の数が多いが、乾期に完全に涸れるものや水量が極端に減るものも多い。一方、湧水で水は確保できるものの、居住する村落、部落から湧水地までの距離が非常に大きく、水汲み作業が大変な重労働になっている場合が多い。遠い所では、水汲みに4 km以上通う村落もあり、若年者、女性の労働量軽減の見地からも、水道の必要性は逼迫している。

雨水を飲料水として利用するため、雨水貯留用のタンクを備えている村落は多く、今回調査した30村落のうちでもおよそ半分の村落が備えていた。しかしながら雨水貯留用のタンクを利用できるのは、1年のうちせいぜい雨期の3か月間程度のみであり、飲料水確保の抜本的な解決にはなっていない。

河川の水を飲料水として直接用いるには、一般に水質の問題がある。今回の調査で飲料水の主な水源として河川を上げた村落でも、1村落を除いて“河川水は他に手段がない時にのみ飲む水”としていた。上流で家畜の放牧が行われていて、河川が家畜の水浴びに使われているケースもあり、衛生上の観点から簡易浄水装置等を備えるのでなければ、水源を河川に求めるのは難しいものと思われる。

なお、1998年政府統計によれば、東ヌサトゥンガラ州の電気と水道の普及率は以下のように推移している。

	電気普及率 (%)			水道普及率 (%)		
	1992	1995	1998	1992	1995	1998
都市部	85.6	83.3	86.3	58.4	60.7	67.6
地方部	9.1	13.7	27.4	15.0	10.4	12.0
東ヌサトゥンガラ州全体	17.4	22.6	34.6	19.7	16.9	18.8

上の表では数字に若干の揺れが見られるが、電気の普及率が地方部でも確実に上昇しているのに対し、水道の普及率は都市部で若干の上昇が見られるものの地方部では1992年のレベルから大きな進歩が見られない。州全体の水道普及率をみても同様で、いまだ20%のレベルにも到達していない。

### 3 - 2 - 2 既設井戸のデータ

N T Tにおける既設井戸のデータは、P 2 A Tが西ティモールとスンバ島で自ら掘削した井戸について一部まとめ、井戸台帳となっている。なお、アロー島、フローレス島の各県では井戸台帳は作成されていない。収録されている井戸データの数は、各々の県で以下のとおりである。

県	井戸の種類	登録された井戸の総数	深さ (m)	井戸径 (in.)	空井戸又は小水量井戸	塩水井戸	貧水質井戸	故障井戸
Kupang	機械掘り	148	30 - 94	4 - 6	43	3	22	6
	手工具掘り	399	18 - 43	3	-	-	-	-
	手掘り	55	6.5 - 9	31	-	-	1	-
Kupang (Pulau Rote)	機械掘り	21	40 - 92	6 - 8	7	-	6	-
Kupang (Pulau Sabu)	機械掘り	17	50 - 71	6	8	-	2	-
Belu	機械掘り	93	17 - 120	4 - 10	25	1	23	5
	手工具掘り	78	18 - 38	3	-	-	-	-
Timor Tengah Utara	機械掘り	68	46 - 106	4 - 8	33	1	8	-
Timor Tengah Selatan	機械掘り	16	31 - 100	6	12	-	4	-
Sumba Barat	機械掘り	33	62 - 105	6 - 8	17	1	7	-
Sumba Timur	機械掘り	19	35 - 97	6 - 10	13	-	-	-

上表からわかるように、機械掘りの深井戸の場合、登録井戸の25から75%が空井戸あるいは水量が実用に供せないほど小さい井戸となっている。空井戸の割合は西ティモールのT T S、T T U及びスンバ島で高く、50%を超えている。また、塩水井戸も含め、水質に問題がある井戸も多く、機械掘りの場合東スンバを除き、15から30%に上がっている。

井戸台帳には以下のデータがまとめられている。

#### (1) 機械掘りの井戸及び手工具掘りの井戸

井戸番号、コード / 村落、Sub-district、District / 井戸の深さ / ケーシングのタイ

プ、深さ / ストレーナーのタイプ、深さ / 井戸の水位 / 連続揚水時の揚水量 / Unit  
Discharge Rate / 透水量係数 / 井戸掘削日

(2) 手掘り井戸

井戸番号、コード / 村落、Sub-district、District / 井戸の深さ / ケーソンの直径と深  
さ / フィルター付きケーソンの深さ / 井戸の水位 / 連続揚水時の揚水量 / Unit  
Discharge Rate / 透水量係数 / 井戸掘削日

#### 資料4 環境予備調査結果

今回の村落調査においては、給水施設の導入による生活環境改善への期待が見られこそすれ、自然環境悪化に対する懸念はどの村からも出てこなかった。

また、現地再委託の見積り取得先として、居住・地域開発省紹介のコンサルタント、PT. Ratu Utama Patria Teknik も環境影響評価は必要ないとの考えであった。

実際、本予備調査で想定しているような地方給水施設においては、簡単な取水設備や配水塔構造物及びポンプ、配管施設があるのみで、施設そのものの周辺自然環境に与える影響はほとんど考えられない。

しかしながら、給水施設が導入された場合、水の使用量は従来に比べて格段に増加し、それに伴い、トイレや台所等の生活排水も増加することが予想される。したがって、もし、周辺環境の問題を取り上げるとすれば、生活排水の増加と周辺環境の問題はあげられるが、このような生活環境の変化に基づく問題は、生活衛生教育のテーマとして取り上げる方が適切と考えられる。

資料5 物価・賃金調査

5. 物価、賃金調査

事務所備品、労働賃金、工事用資機材について複数経路から得た情報を基に整理し、Table 1 からTable 3に示す。

Table 1 Wages of Manpower

	Item	Unit	Price US\$	Price ( RP. ) Rp	Remarks
1. Officer(Govern't Sector)					(1) 1US\$=9000Rp
1)	Engineer	Month	1,050	9,450,000	(2) Wages includes tax and insurance.
2)	Asst. Engineer	Month	890	8,010,000	
3)	Junior Engineer	Month	510	4,590,000	(3) Wages are based on 25 working days per month.
4)	Secretary	Month	270	2,430,000	
5)	Asst. Secretary	Month	230	2,070,000	
6)	Junior Secretary	Month	210	1,890,000	
7)	Technician	Month	220	1,980,000	
8)	Asst. Technician	Month	200	1,800,000	
9)	Junior Technician	Month	160	1,440,000	
10)	Interpreter	Month	510	4,590,000	
11)	Driver	Month	200	1,800,000	
2. Civilian(Non-govern't Sector)					
12)	Engineer	Month	1,100	9,900,000	
13)	Asst. Engineer	Month	500	4,500,000	
14)	Office Clerk	Month	80	720,000	
15)	Technician	Month	370	3,330,000	
16)	Junior Technician	Month	210	1,890,000	
17)	Draftman	Month	440	3,960,000	
18)	Secretary	Month	230	2,070,000	
19)	Typist(Bahasa Indonesia)	Month	140	1,260,000	
20)	Typist(English)	Month	190	1,710,000	
21)	Interpreter(English-Indonesia)	Month	400	3,600,000	
22)	Interpreter(Japanese-Indonesia)	Month	400	3,600,000	
23)	Driver (Heavy vehicle)	Month	170	1,530,000	
24)	Driver (Sedan)	Month	110	990,000	
25)	Foreman	Month	190	1,710,000	
26)	Electrician	Month	110	990,000	
27)	Carpenter	Month	110	990,000	
28)	Painter	Month	110	990,000	
29)	Plasterer	Month	110	990,000	
30)	Steel Bender	Month	110	990,000	
31)	Mason	Month	110	990,000	
32)	Welder	Month	190	1,710,000	
33)	Earthworker	Month	80	720,000	
34)	Watcher	Month	80	720,000	

Table 2 Unit Price of Office Supplies

No.	Description	Unit	Unit Price		Remarks
			(US\$)	Rp	
1	Jeep Rental	month	1,260.00	11,340,000	ex.Pajero 4WD
2	Sedan Rental	month	600.00	5,400,000	ex.Toyota Corona
3	Tire for Jeep	pc.	80.00	720,000	
4	Tire for Sedan	pc.	60.00	540,000	
5	Fuel, Gasoline	litre	0.12	1,080	
6	Fuel, Diesel Oil	litre	0.08	720	
7	Lubricant, Engine Oil	litre	1.70	15,300	
8	Lubricant, Machine Oil	litre	1.70	15,300	
9	Lubricant, Gear Oil	litre	1.70	15,300	
10	Lubricant, Grease	litre	2.10	18,900	
11	Telephone call to Tokyo	min	1.40	12,600	
12	Fax to Tokyo	min	1.70	15,300	
13	DHL to Tokyo	kg	32.00	288,000	
14	Colour Film	roll	3.50	31,500	
15	Photo Development + Print	roll	5.60	50,400	36 exp.
16	Photocopy, A4	sheet	0.02	180	36 exp.
17	Photocopy, B4	sheet	0.02	180	
18	Photocopy, A3	sheet	0.05	450	
19	Office Rental	m2/month	26.10	234,900	in Jakarta, main area
20	Office Desk	pc.	44.00	396,000	
21	Office Chair	pc.	27.20	244,800	
22	Bookshelf	pc.	69.00	621,000	
23	Electricity	kwh	0.04	360	
24					
25	Nail	kg	1.10	9,900	
26	Arc Welding Rod				
27	Oxygen Gas	cylinder	3.00	27,000	7m <sup>3</sup>
28	Acetylene Gas	cylinder	10.60	95,400	7m <sup>3</sup>
29	Brick	pc.	0.02	180	
30					
31					

Table 3-1 Unit Price of Material in NTT

UNIT PRICE OF MATERIAL

KABUPATEN KUPANG, TIMOR TENGAH SELATAN, TIMOR TENGAH UTARA, BELU

NU.	DISCRIPTION	UNIT	UNIT PRICE 1996/1997	UNIT PRICE 1999/2000	INCREASE %
1	Stone				
	- Solid Rocks	M3	17,500	51,200.00	293%
	- Split Rocks	M3	20,500	60,000.00	293%
2	Gravel				
	- Gravel 5/7	M3	20,000	45,000.00	225%
	- Gravel 3/5	M3	22,500	50,600.00	225%
	- Gravel 2/3	M3	33,000	74,200.00	225%
	- Gravel 1/1.5	M3	40,000	90,000.00	225%
	- Gravel 1/2 Split	M3	45,000	101,200.00	225%
3	Concrete Brick				
	- Clas I	pc	600	1,200.00	200%
	- Clas II	pc	400	800.00	200%
4	Brick				
	- Clas I	pc	200	400.00	200%
	- Clas II	pc	150	300.00	200%
	Lime				
5	Not construction material	M3	75,000	40,000.00	53%
	Lime Stone	M3	75,000	40,000.00	53%
6	Portland Cement				
	Portland Cement Kupang	Zak	9,750	16,500.00	169%
	Portland Cement Gresik	Zak	13,500	22,800.00	169%
	Portland Cement Tonasa	Zak	13,500	22,800.00	169%
	White cement	Zak	23,000	38,900.00	169%
7	Sand				
	- Sand Fill	M3	20,500	15,000.00	73%
	- Sand (washed)	M3	25,000	18,200.00	73%
	- Concrete sand	M3	27,500	20,100.00	73%
8	Roof Material				
	- Concrete Roof Tile	pc	1,100	2,750.00	250%
	- Palm Fiber	pc	1,000	1,500.00	150%
9	Roof of Zinc				
	- BJLS 0.20	Sheet	8,500	20,600.00	242%
	- BJLS 0.30	Sheet	11,500	28,000.00	243%
10	Zinc Plate				
	-BJLS 0.20	Sheet	7,500	12,500.00	167%
	-BJLS 0.30	Sheet	12,000	20,000.00	167%

Table 3-2 Unit Price of Material in NTT

## UNIT PRICE OF MATERIAL

KABUPATEN KUPANG, TIMOR TENGAH SELATAN, TIMOR TENGAH UTARA, BELU

NU.	DISCRIPTION	UNIT	UNIT PRICE 1996/1997	UNIT PRICE 1999/2000	INCREASE %
11	Wood Class I				
	- Board/ Plank	M3	650,000	1,750,000.00	269%
	- Beam	M3	600,000	1,615,300.00	269%
12	Wood Class II				
	- Board / Plank	M3	350,000	700,000.00	200%
	- Beam	M3	300,000	600,000.00	200%
13	"Meranti" Wood				
	- Board / Plank	M3	400,000	700,000.00	175%
	- Beam	M3	300,000	700,000.00	233%
14	"Kruing" Wood Plank	M3	350,000	700,000.00	200%
15	Bamboo				
	-Large	Stick	3,000	6,000.00	200%
	-Medium	Stick	2,500	5,000.00	200%
	-Small	Stick	1,800	3,600.00	200%
16	Ventilation (Roster)	pc	800	2,000.00	250%
17	Concrete Pipe				
	- 10cm - 1m	pc	4,000	14,000.00	350%
	- 15cm - 1m	pc	4,000	14,000.00	350%
	- 20cm - 1m	pc	8,000	28,000.00	350%
	- 25cm - 1m	pc	5,500	19,250.00	350%
	- 30cm - 1m	pc	10,000	35,000.00	350%
18	Floor Tile				
	- Pc Tile 20×20cm	pc	450	600.00	133%
	- Color Tile 20×20cm	pc	650	800.00	123%
	- Wavel Tile 20×20cm	pc	450	600.00	133%
	- Cl Wafel Tile 10×10cm	pc	700	900.00	129%
	- Teraso 10×20cm	pc	750	1,500.00	200%
	- Porcelain 20×20cm	pc	1,750	3,500.00	200%
	- Local white porcelain 11×11cm	pc	250	500.00	200%
	- Local color porcelain 11×11cm	pc	250	500.00	200%
	- Local white tile 15×15cm	pc	400	800.00	200%
19	Mozaik Porcelain 10×10cm	sheet	1,300	2,600.00	200%
20	Vinyl	sheet	950	3,325.00	350%
21	Steel bar	kg		3,500.00	
	- 12mm L = 4m	stick	3,000		
	- 12mm L = 6m	stick	5,000		
	- 12mm L = 8m	stick	6,500		
	- 10mm L = 12m	stick	8,000		

Table 3-3 Unit Price of Material in NTT

UNIT PRICE OF MATERIAL

KABUPATEN KUPANG, TIMOR TENGAH SELATAN, TIMOR TENGAH UTARA, BELU

NU.	DISCRIPTION	UNIT	UNIT PRICE 1996/1997	UNIT PRICE 1999/2000	INCREASE %
	- 12mm L = 12m	stick	11,000		
	- 16mm L = 12m	stick	19,500		
	- 19mm L = 12m	stick	28,500		
22	Steel Plate				
	- 3"× 8" tebal 1.2mm	stick	53,000	185,500.00	350%
	- 4"× 8" tebal 0.8mm	stick	47,500	166,250.00	350%
	- 4"× 8" tebal 1.5mm	stick	60,000	210,000.00	350%
	- 4"× 8" tebal 2mm	stick	73,500	257,250.00	350%
	- 4"× 8" tebal 3mm	stick	105,000	367,500.00	350%
23	Steel	kg.		2,500.00	
	- 30×30×3	stick	14,000		
	- 40×40×4	stick	17,500		
	- 50×50×5	stick	26,500		
	- 60×60×6	stick	28,500		
24	Wire				
	-Wire for steel bar	kg.	3,750	7,500.00	200%
	-Wire mesh	M2	5,750	11,500.00	200%
	-Harmonica wire	M2	6,500	13,000.00	200%
	-Wire entanglement	rol	19,000	1,750/m	
25	Plywood 4'×8' ( t=3 mm)	Sheet	15,000	30,000.00	200%
26	Plywood 4'×8' ( t=4 mm)	Sheet	20,000	40,000.00	200%
27	Teakwood				
	- 4'×8'	Sheet	22,500	50,000.00	222%
	- 3'×6'	Sheet	17,000	37,700.00	222%
28	GSP Pipe L = 6m				
	- 1/2"	stick	13,500	87,500.00	648%
	- 3/4"	stick	17,500	116,500.00	666%
	- 1"	stick	20,000	172,750.00	864%
	- 1.5"	stick	30,000	275,850.00	920%
	- 2"	stick	40,500	370,500.00	915%
29	PVC Pipe				
	- 1/2"(4m)	stick	3,500	6,700.00	191%
	- 3/4"(4m)	stick	4,000	10,000.00	250%
	- 1"(4m)	stick	6,500	15,750.00	242%
	- 1.5"(6m)	stick	9,000	46,250.00	514%
	- 2"(6m)	stick	12,500	72,700.00	582%
30	Plain Glass				
	- 3mm thick	M2	17,500	27,500.00	157%
	- 5mm thick	M2	25,500	32,500.00	127%

Table 3-4 Unit Price of Material in NTT

UNIT PRICE OF MATERIAL

KABUPATEN KUPANG, TIMOR TENGAH SELATAN, TIMOR TENGAH UTARA, BELU

NU.	DISCRIPTION	UNIT	UNIT PRICE 1996/1997	UNIT PRICE 1999/2000	INCREASE %
31	Cable				
	- NYM 2×1.5	M	1,250	3,000.00	240%
	- NYM 3×2.5	M	1,900	4,000.00	211%
	- NGA 1.5	M	600	1,500.00	250%
32	Double Electric Switch	pc	7,500	17,500.00	233%
33	Lamp				
	- Fluorescent lamp 1×10W	pc	5,600	7,100.00	127%
	- Fluorescent lamp 1×20W	pc	8,000	10,100.00	126%
	- Fluorescent lamp 2×40W	pc	15,000	19,000.00	127%
	- Fluorescent lamp Type ball 20W	pc	22,500	28,600.00	127%
	- Fluorescent lamp Type ball 40W	pc	27,500	35,000.00	127%
	- Incandescent lamp 20W	pc	1,000	1,200.00	120%
35	Fuse for electric circuit				
	-2 phase	pc	9,500	14,250.00	150%
	-1 phase	pc	7,500	11,250.00	150%
36	Electric socket	pc	2,000	17,500.00	875%
37	Wall Paint	kg	2,750	7,000.00	255%
	-Brand name Matek	kg	3,500	20,000.00	571%
	-Plamur				
38	Residue	lt	2,500	5,000.00	200%
39	Asphalt				
	- Hot asphalt	kg	1,000	1,000.00	100%
	- Cold asphalt	kg	900	900.00	100%
40	Linseed oil	kg	2,500	20,000.00	800%
41	Varnish	kg	6,000	21,100.00	352%
42	Teak Oil	kg	6,500	22,900.00	352%
43	Ocher	kg	11,500	40,500.00	352%
44	Base Paint for Wood	kg	4,000	20,000.00	500%
45	Antirust Paint	kg	3,500	20,000.00	571%
46	Wood / Iron Paint				
	Base Paint	kg	3,500	12,300.00	351%
	Brand name Glotex	kg	2,500	8,800.00	352%
	Brand name Emco	kg	8,500	30,000.00	353%

Table 3-5 Unit Price of Material in NTT

UNIT PRICE OF MATERIAL

KABUPATEN KUPANG, TIMOR TENGAH SELATAN, TIMOR TENGAH UTARA, BELU

NU.	DISCRIPTION	UNIT	UNIT PRICE 1996/1997	UNIT PRICE 1999/2000	INCREASE %
47	Hanger/key				
	- Key (planted) (Union)	pc	15,000	30,000.00	200%
	- Key (planted) (Yale)	pc	30,000	60,000.00	200%
	- Hook	pc	2,000	10,000.00	500%
	- Butterfly hinge	pc	2,000	7,500.00	375%
	- Latch	pc	1,500	7,500.00	500%
	- Espagnolet	pail	8,000	50,000.00	625%
	- Key	pc	40,000	80,000.00	200%
	- Jalousi Frame	pc	25,000	50,000.00	200%
48	Sanitary				
	- Water closet white (local)	pc	375,000	750,000.00	200%
	- Water closet (squat type) white (local)	pc	60,000	120,000.00	200%
	- Water closet (squat type) color (local)	pc	70,000	140,000.00	200%
	- White sink (local)	pc	105,000	210,000.00	200%
	- color sink (local)	pc	50,000	100,000.00	200%
	- Kitchen sink	pc	100,000	200,000.00	200%
	- Whit uranaice (local)	pc	75,000	150,000.00	200%
	- Color uranaice (local)	pc	200,000	400,000.00	200%
	- Fiber water tub 0.80×1.80	pc	250,000	500,000.00	200%
	- Fiber water tub 0.70×1.70	pc	250,000	500,000.00	200%
49	Nail				
	- Nail 1-4	kg	3,000	10,000.00	333%
	- Screw	doz	4,000	13,300.00	333%
	- Zinc Nail	kg	7,500	25,000.00	333%
	- Zinc Bolt	pc	200	600.00	300%
50	Finishing material				
	- Sand paper	sheet	750	2,800.00	373%
	- Glazier's putty	kg	4,000	15,000.00	375%
	- Methylated Spirit	lt	2,500	9,300.00	372%

Table 3-6 Unit Price of Material in NTT

UNIT PRICE OF LABOR WAGES

KABUPATEN KUPANG, TIMOR TENGAH SELATAN, TIMOR TENGAH UTARA, BELU

NU.	DISCRIPTION	UNIT	UNIT PRICE 1996/1997	UNIT PRICE 1999/2000	INCREASING %
1	Forceman	days	7,000	10,000.00	143%
2	Unskilled Worker	days	5,000	5,500.00	110%
3	Worker Leader	days	7,000	10,000.00	143%
4	Electrician	days	6,000	7,000.00	117%
5	Carpenter	days	6,500	7,000.00	108%
6	Painter	days	5,500	7,000.00	127%
7	Glaze Plasterer	days	6,000	7,000.00	117%
8	Mason	days	6,000	7,000.00	117%
9	Iron Worker	days	6,000	7,000.00	117%
10	Digger Worker	days	5,000	5,500.00	110%
11	Watcher	days	5,000	5,500.00	110%

Data Resources :

Dinas PU (Public Work) Tingkat I Proponsi NTT ( Basic Price 1996/1997 )

Market Prices in Kupang, 1999/2000

資料6 主要面会者リスト

6. 主要面会者のリスト

No.	Name	Title	Organisation
1	河野典厚氏	2等書記官	在インドネシア日本国大使館
2	秋山純一氏	Assistant Resident Representative	国際協力事業団、インドネシア事務所
3	佐々木昭彦氏	Assistant Resident Representative	国際協力事業団、インドネシア事務所
4	Mr. Yutaka Kodama	JICA Expert	Directorate General of Urban Development , Ministry of Settlement and Regional Development
5	Mr. Budihardjo H.	Head of Bureau	Bureau for International Cooperation, Ministry of Settlement and Regional Development
6	Drs. Sugimin Pranoto	Director of Eastern Rural Implementation	Directorate General of Rural Development, Ministry of Settlement and Regional Development
7	Mr. Darminto		Bureau for International Cooperation, Ministry of Settlement and Regional Development
8	Ir. Purnama, MT	Chief	Sub-directorate of Water Supply & Sanitation Development, Ministry of Settlement and Regional Development
9	Mr. Supriyono		Sub-directorate of Water Supply & Sanitation Development, Ministry of Settlement and Regional Development
10	Ir. J. Wahyu Kusumosusanto, MUM	Head	Sub-division for International Relations, Bureau for Planning and Legislation, State Ministry of Public Works
11	Mr. Sigid Hamamraja, DP	Assistant Analyst	Water Resouces Maintenance Policy, State Ministry of Public Works
12	Dr. Ir. Sujana Royat	Bureau Chief	Bureau for Uban Development, Human Settlements, Public Housing and Social Planning, National Development Planning Agency (BAPPENAS)
13	Mr. Dyah Budi P.		Sub-directorate of Foreign Aid, Directorate General of Urban Development, Ministry of Settlement and Regional Development
14	Ir. Nyoman Shuida	Section Head	Irrigation Section, BAPPEDA Nusa Tenggara Timur
15	Mr. O.M. Boeky	Head of Sub-district	Sub-district Amarasi

16	Mr. Julius Kore	Head of Sub-sub-district	Sub-sub-district, Buraen
17		Head of Desa	Desa Buraen
18	Drs. Hendrik Banamtuan	Division Head	Infrastructure Division, BAPPEDA Timor Tengah Selatan
19	Ir. Thobias Wohangara	Division Head	Data and Recording Division, BAPPEDA Timor Tengah Selatan
20	Drs. Petronea Horo	Secretary	BAPPEDA Timor Tengah Selatan
21		Head of Desa	Desa Tetaf
22	Ir. A.P. Korenguru	Division Head	Infrastructure Division, BAPPEDA Timor Tengah Utara
23	Ir. Verix Anunut	Division Head	Social and Culture Division, BAPPEDA Timor Tengah Utara
24		Head of Desa	Desa Eban
25		Head of Desa	Desa Nunmafo
26		Head of Desa	Desa Ainiut
27	Mr. Joachim Lopez	Head	BAPPEDA Melaka Tengah
28	Mr Jos Nahak Ulu		BAPPEDA Melaka Tengah
29	Mr. Beneyos Mau	Secretary to Desa Head	Desa Keleana
30	Tarsisius Trisno	Head of Desa	Meken Detung/Kewapante/Sikka
31		Head of Desa	Kokowahor/Kewapante/Sikka
32	Yohanes	Head of Desa	Bantala/Tanjung Bunga/East Flores
33	Paulus Tede Kohon	Sekretary of Desa	Sinar Hading/Tanjung Bunga/East Flores
34	Yohanes Sojen Koten	Head os Desa	Ile Padung/Tanjung Bunga/East Flores
35	Ibrahim Abubakar	Head of Desa	Watuneso/Wolowaru/Ende
36	Y.N. Venisanggu	Head of Desa	Wonda/Wolowaru/Ende
37	Ismail Anababa	Head of Desa	Borokanda/South Ende/Ende

38		Head of Desa	Bheramari/Nangapanda/Ende
39	Domi A Wasad	Head of Desa	Nggorea/Nangapanda/Ende
40	Mdm. Siti Hawa Yusuf	Head of Desa	Ndorurea/Nangapanda/Ende
41	Bernadus Bae	Head of Desa	Ndetundora I/South Ende/Ende
42	Y Thomas Garpung	Head of Desa	Hepang/Lela/Sikka
43	Fulgensius Magnus	Head of Desa	Bloro/Nita/Sikka
44	G Erasmus	Head of Desa	Watuliwung/Kewapante/Sikka
45	Mr. Slamet Riyadi	Div. Head of Data and Recording	BAPPEDA BELU - Atambua
46	Mr. KS Isliko	Vice BAPPEDA	BAPPEDA Kupang
47	Mr. Hartono	Asst. Proj. Mngr. of West Timor	P2AT Kupang - West Timor
48	Mr. Sujono	Staff of P2AT Timor	P2AT Kupang - West Timor
49	Mr. Sammy Tokoh	Asst. Proj. Mngr. of Flores	P2AT Maumere - Flores
50	Mr. Asdin Julaidi	Staff of P2AT Flores	P2AT Maumere - Flores
51	Mr. MD Parera Drs	Head of Infrastructure	BAPPEDA SIKKA - MAUMERE
52	H. M. Nur Nasution, M. Sc.	Head of DPU	Dinas Pekerjaan Umum Propinsi Nusa Tenggara Barat (DPUP-NTB)
53	Mr. Jalal	Head of Irrigation	Sub-Dinas Pengairan DPUP NTB
54	Mr. Fauzi	Chief of Irrigation	Sub-Dinas Pengairan DPUP NTB
55	Mr. Syakardin		Sub-Dinas Pengairan DPUP NTB
56	Mr. Jumiri		P3P-NTB
57	Mr. Musyadat		Proyek Pengembangan dan Konservasi Sumber Air (PKSA Lombok)
58	Ir. Ketut Karihartha		Proyek Pengembangan dan Konservasi Sumber Air (PKSA Lombok)
59	Mr. Made Drestanegara	Head of Infra. & Settlement	Proyek Peningkatan Prasarana Pemukiman DPUP-NTB

60	Mr. Surana	Chief of Planning	Technic & Planning Section of Water Resources DPUP-NTB
61	Mr. Komaruddin	Geohydrologist	P2AT-NTB
62		Head of Desa	Kuranji/Labu Api/Lombok Barat
63		Head of Desa	Bajur/Labu Api/Lombok Barat
64		Head of Desa	Bagik Polak/Labu Api/Lombok Barat
65		Head of Desa	Semnung/Narmada/Lombok Barat
66		Head of Desa	Duman/Narmada/Lombok Barat
67		Head of Desa	Peresak/Narmada/Lombok Barat
68		Head of Desa	Pagutan/Batukliang/Lombok Tengah
69		Head of Desa	Jelantik/Jonggat/Lombok Tengah
70		Head of Desa	Labulia/Jonggat/Lombok Tengah
71		Head of Desa	Ranggagata/Praya Barat/Lombok Tengah
72		Head of Desa	Setangor/Praya Barat/Lombok Tengah
73		Head of Desa	Rembitan/Pujut/Lombok Tengah
74		Head of Desa	Tete Batu/Sikur/Lombok Timur
75		Head of Desa	Bagik Papan/Pringgabaya/Lombok Timur
76		Head of Desa	Selaparan/Pringgabaya/Lombok Timur
77		Head of Desa	Batu Nampar/Keruak/Lombok Timur
78		Head of Desa	Tanjung Luar/Keruak/Lombok Timur
79		Head of Desa	Labuan Mapin/Alas/Sumbawa
80		Head of Desa	Labuan Lalar/Taliwang/Sumbawa
81		Head of Desa	Sekongkang Bawah/Jereweh/Sumbawa

82		Head of Desa	Sekongkang Atas/Jereweh/Sumbawa
83	Mr. M. Jafar Sanapiah, S.Sos.	Head of Kecamatan	Kantor Kecamatan Sekogkang
84		Head of Desa	Poto/Moyo Hilir/Sumbawa
85		Head of Desa	Tatebal/Ropang/Sumbawa
86		Head of Desa	Piong/Sanggar/Bima
87		Head of Desa	Labuan Kenangga/Sanggar/Bima
88		Head of Desa	Kawuwu/Wawo/Bima
89		Head of Desa	Ranggo/Hu'u/Dompu
90		Head of Desa	Lambu/Hu'u/Dompu
91		Head of Desa	Hodo/Dompu
92		village people	Kwangko/Kempo/Dompu
93		Head of Desa	Konte/Kempo/Dompu
94	Mr. Hasan	Manager	Bima Irrigation Project Office
95	Mr. Syamusdin	Director	PDAM Bima Office
96	Ir. Sigid Santoso	Assistant Manager	Dompu Irrigation Project Office
97	Mr. H.B. Thamrin Rayes		BAPPEDA Dompu
98	Ir. Sugiono	Manager	Dompu Irrigation Project Office
99	Mr. Mohammad	Director	PDAM Dompu Office
100	Ir. Hetomo		Sumbawa Irrigation Project Office
101	Mr. Nurhidayat	Head	BAPPEDA Sumbawa
102	Ir. M. Dian		Sumbawa Irrigation Project Office
103	Drs. Abdul Maula		DPU Cipta Karya Sumbawa

104	Mr. Ir. Piter Djami Rebo	Head	Dinas Pekerjaan Umum Propinsi Nusa Tenggara Timur (DPUP-NTT)
105	Drs. Parthu	Director	PDAM; Menang-Mataram
106	Drs. H. Abdurrahim	President Director	PDAM; Lombok Barat
107	Ir. Nanang Samodra K. A.	Chairman	BAPPEDA-NTB
108	Drs. H. Ismail Mansyur	Sekretaris	BAPPEDA-NTB
109	Ir. I. Nengah Sumastra		Bidang Fisik dan Prasarana; BAPPEDA-NTB
110	Ir. H. Djubaidin Abidin		Kabid Statistik dan Pelaporan; BAPPEDA=NTB
111	Dr. H. Mas Brwan Singagerda	Head	Kanwil Dep. Kes. Prov. NTB (Health Office)
112	Dr. H. Husin Fahmi, Mph		Kanwil Dep. Kes. Prov. NTB (Health Office)
113	Mr. Husin Abdullah		Yayasan Sosial Cinta Lingkungan
114	Mr. I.S. Noyama	Coordinator	Hazama Corporation Jakarta Representative Office
115	Mr. J.P. Hakim MLA	Senior Assistant Representative	Hazama Corporation Jakarta Representative Office
116	石山敏明氏	部長 (インドネシア担当)	大成建設国際事業本部営業部
117	堀江安弘氏	次長	大成建設国際事業本部営業部
118	勝濱良博氏		日本工営_コンサルタント国際事業本部ジャカルタ事務所
119	SATO Shuichi	Team Leader	日本工営_コンサルタント国際事業本部 SSIMP-III Main Office(Sumbawa NTB)
120	口岩康行氏	所長	東亜建設工業ジャカルタ事務所
121	Ir. Thomas BAKKER	Chief Construction Engineer	東亜建設工業ジャカルタ事務所
122	Ir. Agus Slamet	General Manager	Thamrin Delapan Consultants
123	Dr. Teguh Rusyanto		Finance Division, Thamrin Delapan Consultants
124	Mr. Erlangga Pribadi	Operational Manager	Thamrin & Consultants

125	Mr. Bambang Pujantiyo S.		Directorate for Transportation Technology; Agency for the Assessment and Application of Technology
126	Dr. Teguh Rahardjo		Planning Bureau; Agency for the Assessment and Application of Technology
127	Dr. Ir. Te d d y W. Sudinda, M.Eng	Deputy Manager	Information, Energy, Material & Environmental Technology; Agency for the Assessment and Application of Technology
128	Ir. Tristanto Yuwono	Director	PT. Ratu Utama Patria Teknik
129	Ir. Deetje Bachrum	Director	PT. Ratu Utama Patria Teknik
130	Ir. Huntari Tantonno	Director	PT. Ratu Utama Patria Teknik
131	Ir. Irma Magdalena. S.	Engineer	PT. Ratu Utama Patria Teknik
132	SAHLAN	Marketing Manager	SEMERUH INDAH Transportation Service

## 資料7 質問票及びその回答

### 7 . 質問票及びその回答

次ページ以降に質問票、「The Study on Rural Water Supply Project in Nusa Tenggara Barat and Nusa Tenggara Timur, Indonesia ( Questionnaire by the Preliminary Study Team )」を示す。また、その回答については、収集資料リスト中のNo.51、54、55を参照のこと。

No. 51 質問票についての回答

No. 54 同上特に、質問項目2 . 3の(3)についての回答

No. 55 同上特に、質問項目2 . 4についての回答

## The Study on Rural Water Supply Project in Nusa Tenggara Barat and Nusa Tenggara Timur, Indonesia (Questionnaire by the Preliminary Study Team)

The Preliminary Study Team shall be furnished with the following general and specific information on the project, in order to clarify the contents of the project, (to decide whether JICA can extend the technical co-operation in the project,) and to decide the scope of the co-operation.

Please answer in detail, as much as possible, in writing to the following questions:

### 1. Confirmation of the request from the Government of Indonesia

#### 1-1 Background of the project

- (1) The relationship between the rural water supply project and the national and the regional development plan.
- (2) The relationship between the rural water supply project and the water supply improvement plan by the waterworks office of the both provinces.
- (3) The relationship between the rural water supply project and other water supply project aided by other foreign governments or NGO.
- (4) Other current and future national and local development plans affecting the study area
- (5) Past study projects on water resources and supply in the study area, regardless whether they were conducted under JICA or not.

#### 1-2 Outline of the project (As Indonesian government requested)

##### (1) Title

“The Study on Rural Water Supply Project in Nusa Tenggara Barat and Nusa Tenggara Timur”. Is it OK?

##### (2) Target area

“East and West Nusa Tenggara Provinces”. Is it OK?

##### (3) Target population

##### (4) Target time frame

##### (5) Overall goal

(6) Objectives

To establish a water supply plan for the East and West Nusa Tenggara with water resources of spring water and groundwater.

(7) Output expected

(8) Expected cost of project implementation

1-3 Counterpart organisation or agency of the project

Is the following correct?

Ministry of Settlement and Regional Development

Please provide the organisation chart of the above counterpart organisations.

What is the departments of the central and state government responsible for the public water supply and their relationship with the above counterpart?

2. Information to be collected for the preliminary study

2-1 Natural conditions in the study area

(1) Topographic maps ; scale 1/500,000, 1/200,000, 1/100,000, 1/50,000 and 1/25,000

(2) Geological maps; scale 1/500,000, 1/200,000, 1/100,000, 1/50,000 and 1/25,000

(3) Other geological data

(4) Hydro-geological maps 1/500,000 ? 1/200,000?, or 1/100,000

(5) Hydrological data such as volume of river flow for each river in the study area

(6) Other hydrological and hydro-geological data

(7) Data of water springs and wells

(8) Data of geophysical prospecting and logging

Geophysical investigations, hydrological and hydro-geological studies in the study area.

(9) Soil classification map

(10) Aerial photograph, 1/500,000, 1/200,000, 1/100,000, 1/50,000 and 1/25,000

(10) Satellite image, 1/500,000, 1/100,000,

(11) Land utility maps and vegetation maps

(12) Meteorological data in the study area, such as precipitation, temperature, wind, evaporation, sunlight hours

Locations of monitoring stations shall be indicated on a map.

(13) Earthquake data

(14) Administrative area map

## 2-2 Information on groundwater development situation

- (1) Water spring data and location map
  - Water quality
  - Volume of water available
- (2) Well data and location map
  - Water quality
  - Volume of water available
- (3) Any data or report regarding water quality problems of wells and springs
  - Salt water intrusion.
  - Pollution from mining activities, etc.
- (4) Data management situation (Well/Spring database)
- (5) Operation and maintenance situation of wells and springs
- (6) Past project information related to water supply and water resources development
  - (a) Project name, co-operation country and co-operation organisation
  - (b) Content of project
  - (c) Execution organisation of and project cost
  - (d) Loaned project or Grant project

## 2-3 Information on water supply

- (1) Actual condition of water supply (diffusion, water supply source, and data of volume of production, water quality, access road and transportation condition, and water service charge, situation of transportation of water, and community participation situations)
- (2) Current water supply and maintenance system and number of beneficiaries in the study area including the maps showing the area covered by each treatment plant, if there is.
- (3) Laws, regulations and guidelines related to water or water supply
- (4) Water right and other rights in connection with well, spring and water supply facilities.
- (5) National standard of water quality
  - Both raw water and treated water
- (6) Water consumption per person or family
- (7) Water consumption in industrial and domestic use
- (8) Related regulation and various standard
  - (a) Design standard of civil work

- (b) Design standard of electrical work
  - (c) Specification of pipe ( material and dimension)
  - (d) Specification of pressure control system
- (9) Information and data concerning amount of water demand in the study area in the future
- (a) Current amount of water demand (ton/day)
  - (b) Amount of water demand (ton/day) in the future
  - (c) Unit of water supply (litre per person per day)
- (10) Problems of the existing water supply system
- (a) Quantity
  - (b) Pressure
  - (c) Quality
  - (d) Maintenance
    - Leaking
    - Power failure
    - Man power
- (11) List of well and waterworks contractors
- (12) List of local surveyor and soil investigation contractor
- (13) List of engineering consultants specialised in waterworks

#### 2-4 Information related to environmental issues

- (1) Legislation related to environmental policies and standards
- (a) Responsible ministry or agency and its organisation chart
  - (b) Laws and guidelines
- (2) Laws / guidelines related to environmental impact assessment (EIA)
- (a) Type / size of activities for EIA
  - (b) Procedure
- (3) Present situation of the area regarding for environmental issues
- (a) Socio-economic environment
    - History of epidemic disease including water-borne diseases (for the last five years)
  - (b) Natural environment
    - Location of particular area officially protected such as national and natural parks
    - Location of environmentally vulnerable area
    - Species of precious animals and plants
    - Distribution of important historical spots, landscape and

scenery

(4) Consulting firm in the field of environment

(a) List of registered firms

2.5 Information on district / village life

- District / village name in the study area
- Population distribution (community distribution)
- Infrastructure
  - Electricity, Gas, Potable Water,
  - Telecommunication, Sewage
- Access road condition
  - Width, Paved or not?, Can be used all year round?

2.6 Others

- (1) Any custom restriction on possible construction materials?  
Pump, Pipe, Generator, Battery, Steel bar, cement, etc.
- (2) Any restrictions on the possible construction materials for inland transportation?
- (3) Have you a plan to dispatch counterparts to JICA training course in Japan through Feasibility Study of the project?
- (4) Do you expect to have seminar · workshop as a way of technical transfer through Feasibility Study of the project?
- (5) Do you provide JICA Feasibility Study Mission (12 to 15 members) with office space, desks & chairs, other furniture, telephones, copy machine, at Mataram in West Nusa Tenggara and at Kupang in East Nusa Tenggara?

No. 51

30/June/00

by Mrs. Kushniati

**The Study on Rural Water Supply Project in Nusa Tenggara Barat and Nusa Tenggara Timur, Indonesia**  
(Questionnaire by the Preliminary Study Team)

The Preliminary Study Team shall be furnished with the following general and specific information on the project, in order to clarify the contents of the project, (to decide whether JICA can extend the technical co-operation in the project) and to decide the scope of the co-operation.

Please answer in detail, as much as possible, in writing to the following questions.

1. Confirmation of the request from the Government of Indonesia.

1.1 Background of the project

- (1) The relationship between the rural water supply project and the national and the regional development plan.
  - to achieve the target of national and regional water supply demand
- (2) The relationship between the rural water supply project and the water supply improvement plan by the waterworks office of both provinces
  - to support and increase service level of water supply improvement plan in both provinces
- (3) The relationship between the rural water supply project and other water supply project aided by other foreign government or NGO.
  - to support the water supply project aided by other government or NGO, however the location shall not be overlapped whereas the system used is acceptable by the community and local government.
- (4) Other current and future national and local development plans affecting the study area
  - P3DT
- (5) Past study projects on water resources and supply in the study area, regardless whether they were conducted by JICA or not.
  - please contact/get information from BAPPEDA, local government level I / II

1.2 Outline of the project (as Indonesian Government requested)

- (1) Title :  
"The Study on Rural Water Supply Project in Nusa Tenggara Barat and Nusa Tenggara timur, is it OK ?"
  - OK

- (2) Target Area :  
 “East and West Nusa Tenggara provinces”. Is it OK ?  
 ■ OK
- (3) Target population  
 NTT : 139 desas, approx. 592,880 pop.  
 NTB : 272 desas, approx. 1,160,164 pop.
- (4) Target time frame :  
 ■ 24 months
- (5) Overall goal :  
 ■ to increase rural community health  
 ■ to increase economy growth  
 ■ to increase living standard
- (6) Objectives :  
 To establish water supply plan for the East and West Nusa Tenggara, in which spring and groundwater become the priority of raw water resources.
- (7) Output expected :  
 ■ to provide sustainable and affordable water supply facilities, especially those using simple operation and maintenance in the area of the project.
- (8) Expected cost of project implementation.  
 ■ In accordance with the result of feasibility technical and financial study

1.3 Counterpart organisation or agency of the project :

- The Ministry of Settlement and Regional Development
- The Ministry of home Affair
- Ministry of Health
- Related Local government Institutions (BAPPEDA, Dinas PU, PDAM)

Please provide the organisation chart of the above counterpart organisations.

What is the Department of Central and State Government responsible for the public water supply and their relationship with the above counterpart.

.....

2. Information to be collected for the Preliminary Study

2.1 Natural Conditions in the study area

- Please contact the Directorate of Geology in Bandung for these following data :

- (1) Topographic maps : scale 1/500,000; 1/200,000; 1/100,000; 1/50,000; 1/25,000
- (2) Geological Maps : scale 1/500,000; 1/100,000; 1/50,000; 1/25,000.
- (3) Other geological data
- (4) Hydro-geological maps, 1/500,000; 1/200,000; 1/100,000
- (5) Hydro-geological data such as volume of river flow for each river in the study area
- (6) Other hydrological and hydro-geological data
- (7) Data of spring and wells water
- (8) Data of geophysical prospecting and logging  
Geophysical investigation, hydrological and hydro-geological study in the study area
- (9) Soil Classification map
- (10) Aerial photograph, 1/500,000; 1/200,000; 1/100,000; 1/50,000; 1/25,000
- (11) Satellite image, 1/500,000; 1/100,000
- (12) Land utility maps and vegetation maps
- (13) Meteorological data in the study area, such as precipitation, temperature, wind, evaporation, sunlight hours.  
Locations of monitoring stations shall be indicated on a map.
- (14) Earthquake data
- (15) Administrative area map

## 2.2 Information on groundwater development situation

- Please contact PKSA (water resources conservation project) in each province for these following data :

- (1) Water spring data and location map  
Water quality  
Volume of water available
- (2) Well data and location map  
Water quality  
Volume of water available
- (3) Any data or report regarding water quality problems of wells and springs  
Salt water intrusion  
Pollution from mining activities, etc.
- (4) Data management situation (well/spring database)
- (5) Operation and maintenance situation of wells and springs
- (6) Past project information related to water supply and water resources development
  - a) Project name, co-operation country and co-operation organisation
  - b) Content of project
  - c) Execution organisation and project cost
  - d) Loaned project or grant project

## 2.3. Information on water supply

- Please contact local government and PDAM of each province for these following data :

- (1) Actual condition of water supply (diffusion, water supply source, and data of production volume, water quality, access road and transportation condition, water service charge, situation of water transportation and community participation.
- (2) Current water and maintenance system and number of beneficiaries in the study area including the maps showing the area covered by each treatment plant, if there is.
- (3) Laws, regulation and guidance related to the water supply
- (4) Water rights and other rights in connection with wells, spring and water supply facilities
- (5) National standard of water quality, raw water and treated water.
- (6) Water consumption per person per family
- (7) Water consumption in industrial and domestic use
- (8) Related regulation and various standard
  - a) design standard of civil works
  - b) design standard of electrical works
  - c) specification of pipes (material and dimension)
  - d) specification of pressure control system
- (9) Information and data concerning amount of water demand in the study area in the future
  - a) current amount of water demand (ton / day)
  - b) amount of water demand (ton/day) in the future
  - c) Unit of water supply ( litre/person/day)
- (10) Problem of the existing water supply system
  - a) quantity
  - b) pressure
  - c) quality
  - d) maintenance
  - e) leaking
  - f) power failure
  - g) manpower
- (11) List of wells and waterworks contractors
- (12) List of local surveyors and soil investigation contractors
- (13) List of engineering consultants specialised in waterworks

#### 2.4. Information related to environmental issues

- Please contact BAPPEDALDA for these following data :
- (1) Legislation related to environmental policies and standard
  - a) responsible ministry or agency in each organisation chart
  - b) laws and guideline
- (2) Laws / guidelines related to environmental impact assessment (EIA)
  - a) Type / size of activities for EIA

- b) procedur
- (3) Present situation of the area regarding environmental issues
  - a) Socio-economic environment
    - i.e. History of epidemic disease including waterborne diseases (for the last five years)
  - b) Natural environment
    - location of particular area officially protected such as national and natural parks
    - location of environmentally vulnerable area
    - species precious animals and plants
    - distribution of important historical spots, landscape and scenery
- (4) Consulting Firms in the field of environment
  - a) list of registered firms

#### 2.5. Information on district / village life

- Please contact BAPPEDA / BPS (Statistical Office) in each Kabupaten for these following data :
  - a) District / village name in the study area
  - b) Population distribution (community distribution)
  - c) Infrastructure (electricity, gas, potable water, telecommunication, sewage)
  - d) Access roads condition (Width, paved or not ? can be used all years round)

#### 3. Others

- Please contact related local government office (BAPPEDA, Mayor/BUPATI) for the following data :
  - (1) Any customs restriction on possible construction materials ?  
Pumps, pipes, generators, batteries, steel bars, cement etc.
  - (2) Any restriction for possible construction material for inland
  - (3) Transportation ?
  - (4) Have you a plan to dispatch counterpart to JICA Training Course in Japan through Feasibility Study of the project ?
  - (5) Do you expect to have seminar waterworks as a way of technical transfer through feasibility study of the project ?
  - (6) Do you provide JICA Feasibility Study Mission (12 to 15 members) with transportation, vehicles, office space, desk and chair, other furniture, telephone, copy machines at Mataram, in west Nusa Tenggara and at Kupang in East Nusa Tenggara?

NO. 54



PERATURAN MENTERI KESEHATAN  
REPUBLIK INDONESIA  
NOMOR : 416/MENKES/PER/IX/1990

TENTANG



SYARAT-SYARAT DAN PENGAWASAN  
KUALITAS AIR

Pasal 14

Peraturan Menteri ini berlaku sejak tanggal ditetapkan.

Agar setiap orang mengetahuinya, memerintahkan pengundangan Peraturan Menteri ini dengan penempatannya dalam Berita Negara Republik Indonesia

Ditetapkan di : Jakarta  
 Pada tanggal : 3 September 1990  
 MENTERI KESEHATAN  
 REPUBLIK INDONESIA,

Dr. ADHYATMA MPH.-

Lampiran I  
 PERATURAN MENTERI KESEHATAN RI  
 NOMOR : 416/MENKES/PER/IX/1990  
 TANGGAL: 3 SEPTEMBER 1990

DAFTAR PERSYARATAN KUALITAS AIR MINUM

No.	Parameter	Satuan	Kadar Maksimum yang diperbolehkan.	Keterangan
A. FISIKA				
1.	Bau	-	-	Tidak berbau.
2.	Jumlah zat padat terlarut (TDS)	mg/L	1000	--
3.	Kekeruhan	Skala NTU	5	--
4.	Rasa	--	--	Tidak terasa
5.	Suhu	- 0	Suhu udara b 3-C	
6.	Warna	Skala TCU	15	
B. KIMIA				
a. Kimia Anorganik				
1.	Air raksa	mg/L	0.001	
2.	Aluminium	mg/L	0.2	
3.	Arsan	mg/L	0.05	
4.	Balium	mg/L	1.0	
5.	B e s i	mg/L	0.3	
6.	Flourida	mg/L	1,5	
7.	Kadmium	mg/L	0.005	
8.	Kesadanan (CaCO <sub>3</sub> )	mg/L	500	
9.	Klorida	mg/L	250	
10.	Kronium, valensi 6	mg/L	0.05	
11.	Mangan	mg/L	0,1	
12.	Natrium	mg/L	200	
13.	Nitrat, sebagai N	mg/L	10	
14.	Nitrit sebagai N	mg/L	1,0	
15.	Perak	mg/L	0,05	

16.	pH	---	6,5-8,5	Merupakan batas minimum dan maksimum
17.	Salenium	mg/L	0,01	
18.	Seng	mg/L	5,0	
19.	Sianida	mg/L	0,1	
20.	Sulfat	mg/L	400	
21.	Sulfida (sebagai H <sub>2</sub> S)	mg/L	0,05	
22.	Tembaga	mg/L	1,0	
23.	Timbal	mg/L	0,05	
	b. Kimia Organik			
1.	Aldrin dan dieldrin	mg/L	0.0007	
2.	Benzene	mg/L	0.01	
3.	Benzo (a) pyrene	mg/L	0.00001	
4.	Chlorodane (total isomer)	mg/L	0.0003	
5.	Chloroform	mg/L	0.03	
6.	2,4-D	mg/L	0.10	
7.	DDT	mg/L	0.03	
8.	Detergen	mg/L	0.5	
9.	1,2-Dichloroethene	mg/L	0.01	
10.	1,1-Dichloroethene	mg/L	0.0003	
11.	Heptachlor dan heptachlor epoxide	mg/L	0.003	
12.	Hexachlorobenzene	mg/L	0.00001	
13.	Gamma-HCH (Lindane)	mg/L	0.004	
14.	Methoxychlor	mg/L	0.03	
15.	Pentachlorophenol	mg/L	0.01	
16.	Pestisida total	mg/L	0.10	
17.	2,4,6-trichlorophenol	mg/L	0.01	
18.	Zat organik (KMnO <sub>4</sub> )	mg/L	10	
	C. MICRO BIOROGIK			
1.	Koliform Tinja	Jumlah per 100 ml.	0	
2.	Total koliform	Jumlah per 100 ml.	0	
			95% dari	

				sampel yang diperiksa selama setahun. Kadang kadang boleh ada 3 per 100 ml sampel air, tetapi tidak berturut-turut.
1.	D. Radio Aktivitas Aktivitas Alpha (Gross Alpha activity).	Bg/L	0,1	
2.	Aktivitas Beta (Gross Beta activity)	Bg/L	1,0	

Keterangan :

mg = miligram

ml = mililiter

L = Liter

Bg = Beguerel

NTU = Nepnelometrik Turbidity Units

TCL = True Colour Units

Logam berat merupakan logam terlarut.

Ditetapkan di Jakarta  
 Pada tanggal 13 September 1990  
 MENTERI KESEHATAN REPUBLIK INDONESIA.

Dr. ADHYATMA. MPH.

Lampiran II:  
 PERATURAN MENTERI KESEHATAN RI  
 NOMOR : 416/MENKES/PER/IX/1990  
 TANGGAL : 3 SEPTEMBER 1990.

DAFTAR PERSYARATAN KUALITAS AIR BERSIH

No.	Parameter	Satuan	Kadar Maksimum yang diperbolehkan	Keterangan
1.	A. FISIKA			
	Bau	--	--	Tidak berbau.
2.	Jumlah zat padar terlarut (TDS)	mg/L	1.500	
3.	Kekeruhan	Skala NTU	25	
4.	Rasa	--	--	Tidak berasa
5.	Suhu	0-C	Suhu udara ± 3°C	
6.	Warna	Skala TCU	50	
	B. KIMIA			
	a. Kimia Anorganik			
1.	Air Raksa	mg/L	0.001	
2.	Arsen	mg/L	0,05	
3.	Besi	mg/L	1.0	
4.	Flourida	mg/L	1.5	
5.	Kadmium	mg/L	0.005	
6.	Kesadahan Ca CO <sub>3</sub>	mg/L	500	
7.	Khlorida	mg/L	600	
8.	Kromium. valens - 6	mg/L	0.05	
9.	Mangan	mg/L	0.5	
10.	Natrat. sebagai N	mg/L	10	
11.	Nitrit. sebagai N	mg/L	1,0	
12.	pH	--	6,5 - 9.0	merupakan batas minimum dan maksimum. khusus air hujan pH minimum 5,5

13.	Selenium	mg/L	0,01	
14.	Seng	mg/L	15	
15.	Sianida	mg/L	0,1	
16.	Sulfat	mg/L	400	
17.	Timbal	mg/l	0.05	
	b. Kimia Organik			
1.	Aldrin dan Dieldrin	mg/l	0.0007	
2.	Benzene	mg/L	0.01	
3.	Benzo (a) pyrene	mg/L	0.00001	
4.	Chlordane (total isomer)	mg/L	0.007	
5.	Chloroform	mg/L	0.03	
6.	2.4 - D	mg/L	0.10	
7.	DDT	mg/L	0.03	
8.	Detergen	mg/L	0.5	
9.	1.2 Dichloroethane	mg L	0.01	
10.	1.1 Dichloroethene	mg L	0.0003	
11.	Heptachlor dan heptachlor epoxide	mg/L	0.003	
12.	Hexachlorbenzene	mg/L	0.00001	
13.	Gamma-HCH (Lindane)	mg/L	0.004	
14.	Methoxychlor	mg/L	0.10	
15.	Pentachlorophenol	mg/L	0.01	
16.	Pestisida Total	mg/L	0.10	
17.	3.4.6 - Trichlore phenol	mg/L	0.01	
18.	Zat Organik (KMnO <sub>4</sub> )	mg/L	10	
	d. Mikrobiologik			
	Togal Kaliform (MPN)	Jumlah per 100 ml	50	Bukan air perpipaan
		Jumlah per 100 ml.	10	Air perpipaan.

	d. Radioaktivitas Aktivitas Alpha (Gross Alpha Activity)	Bg/L	0,1	
2.	Aktivitas Beta (Gross Beta Activity)	Bg/L	1,0	

Diterapkan di Jakarta  
 Pada tanggal : 3 September 1990  
 MENTERI KESEHATAN REPUBLIK INDONESIA

ttd.

Dr. ADHYATMA MPH.

Lampiran III  
 PERATURAN MENTERI KESEHATAN RI  
 NOMOR : 416/MENKES/PER/IX/1990  
 TANGGAL : 3 SEPTEMBER 1990

DAFTAR PERSYARATAN AIR KOLAM RENANG

No.	Parameter	Satuan	Kadar yang diperbolehkan		Keterangan
			Minimum	Maksimum	
	A.				FISIKA
1.	Bau	---	---	---	Bebas dari bau yang mengganggu.
2.	Benda Terapung	--	--	--	Bebas dari Benda terapung.
3.	Kejernihan	---	---	---	Piringan Sesuai yang diletakan pada dasar kolam yang terdalam dapat dilihat jelas dari tepi kolam pada jarak lurus 1 m.
	B. KIMIAWI				
1.	Aluminium	mg/L	--	0,2	
2.	Kerasaan ( $\text{CaSO}_3$ )	mg/L	50	500	
3.	Oksigen Terabsorpsi ( $\text{O}_2$ )	mg/L	--	0,1	Dalam waktu 4 jam pada suhu udara.
4.	pH	--	6,5	8,5	
5.	Sisa Chlor	mg/L	0,2	0,5	
6.	Tembaga sebagai Cu	mg/L	--	1,5	

C. MIKROBIOLOGIK					
1.	Koliform total	Jumlah per 100 ml	---	0	ml.
2.	Jumlah Kuman	Jumlah koloni, 1-ml.	---	200	

Catatan:

Sumber air kolam renang adalah air bersih yang memenuhi persyaratan sesuai Surat Keputusan Menteri Kesehatan ini.

Ditetapkan di Jakarta  
Pada tanggal 3 September 1990  
MENTERI KESEHATAN REPUBLIK INDONESIA.

ttd.

Dr. ADHYATMA. MPH.

Lampiran IV  
PERATURAN MENTERI KESEHATAN RI  
NOMOR : 416/MENKES/PER/IX/1990  
TANGGAL : 3 SEPTEMBER 1990

DAFTAR PERSYARATAN KUALITAS AIR PEMANDIAN UMUM

No.	Parameter	Satuan	Kadar yang diperbolehkan		Keterangan
			Minimum	Maksimum	
					FISIKA
1.	Bau	---	---	---	Tidak berbau
2.	Kejernihan	---	---	---	Piringan Secchi garis tengah 150 mm pada kedalaman 1,25 m tampak jelas.
3.	Minyak	---	---	---	Tidak berbau minyak dan tidak nampak lapisan film minyak.
4.	Warna	Skala-TCU	---	100	
					KIMIA
1.	Deterjen	mg L	---	1.0	
2.	Kebutuhan Oksigen biokimia (BOD)	mg L	---	5.0	sebagai O <sub>2</sub>
3.	Oksigen terlarut (O <sub>2</sub> )	mg L	4.0	---	
4.	pH	---	6.5	8.5	
					C. MIKROBIOLOGIK
1.	Koliform total	Jumlah per 100 ml.	---	200	

D. RADIO AKTIVITAS				
1.	Aktivitas Alpha (Gross Alpha Activity)	Bg/L	--	0.1
2.	Aktivitas Beta (Gross Beta Activity)	Bg/L	--	1.0

Ditetapkan di Jakarta  
 Pada tanggal 3 September 1990  
 MENTERI KESEHATAN REPUBLIK INDONESIA.

ttd.

Dr. ADHYATMA. MPH.

Diperbanyak Oleh :  
 SUB DINAS PKL DIKES DATI I NTB  
 Kerja sama dengan  
 NTB ESWS MATARAM

**JAWABAN PERTANYAAN (QUESTIONER) DALAM RANGKA MEMENUHI  
PERMINTAAN DARI JICA YANG ADA KAITANNYA DENGAN BAPPEDA/  
BAPEDALDA YANG MELIPUTI BIDANG FISPR, DAN SOSBUD DAN  
SUBDIN CIPTA KARYA DINAS PU PROPINSI NTB.**

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- 2.4 Data (informasi) yang berkaitan dengan masalah-masalah lingkungan hidup :
- 2.4.1. Legislation (perundang-undangan) yang berkaitan dengan kebijaksanaan-kebijaksanaan dan standar lingkungan hidup :
- a) Tanggung jawab Bapedal (Pusat) dan Bapedalda (Propinsi, Kab/Kota).
  - b) Perundang-undangan :
    - (1) Undang-undang No.5 Tahun 1990 tentang Konservasi Sumberdaya Alam Hayati dan Ekosistemnya.
    - (2) Undang-undang No.3 Tahun 1992 tentang Jaminan Sosial Tenaga Kerja.
    - (3) Undang-undang No.5 Tahun 1992 tentang Benda-benda Cagar Budaya.
    - (4) Undang-undang No.10 Tahun 1992 tentang Perkembangan Kependudukan dan Pembangunan Keluarga Sejahtera.
    - (5) Undang-undang No.12 Tahun 1992 tentang Sistem Budidaya Tanaman.
    - (6) Undang-undang No.24 Tahun 1992 tentang Penataan Ruang.
    - (7) Undang-undang No.5 Tahun 1994 tentang Pengesahan Konvensi PBB Tentang Keanekaragaman Hayati.
    - (8) Undang-undang No.23 Tahun 1997 tentang Pengelolaan Lingkungan Hidup.
    - (9) Undang-undang No.22 Tahun 1999 tentang Pemerintahan Daerah.
    - (10) Undang-undang No.25 Tahun 1999 tentang Perimbangan Keuangan Antara Pemerintah Pusat dan Daerah.
    - (11) Undang-undang No.41 Tahun 1999 tentang Kehutanan.
    - (12) Peraturan Pemerintah No.33 Tahun 1970 tentang Perencanaan Hutan.
    - (13) Peraturan Pemerintah No.28 Tahun 1985 tentang Perlindungan Hutan.
    - (14) Peraturan Pemerintah No.20 Tahun 1990 tentang Pengendalian Pencemaran Air.
    - (15) Peraturan Pemerintah No.30 Tahun 1990 tentang Pengenaan, Pemungutan dan Pembagian Iuran Hasil Hutan.
    - (16) Peraturan Pemerintah No.35 Tahun 1990 tentang Sungai.
    - (17) Peraturan Pemerintah No.13 Tahun 1994 tentang Perburuan Satwa Buru.
    - (18) Peraturan Pemerintah No.19 Tahun 1994 tentang Pengelolaan Limbah Berbahaya dan Beracun.
    - (19) Peraturan Pemerintah No.62 Tahun 1998 tentang Penyerahan Sebagian Urusan Pemerintahan di Bidang Kehutanan Kepada Daerah.
    - (20) Peraturan Pemerintah No.6 Tahun 1999 tentang Hak Pengusahaan Hutan dan Hak Pemungutan Hasil Hutan pada Hutan Produksi.
    - (21) Peraturan Pemerintah No.27 Tahun 1999 tentang Analisis Mengenai Dampak Lingkungan Hidup.
    - (22) Peraturan Pemerintah No.7 Tahun 1999 tentang Pengawetan Jenis Tumbuhan dan Satwa.

- (23) Peraturan Pemerintah No.8 Tahun 1999 tentang Pemanfaatan Jenis Tumbuhan dan Satwa Liar.
- (24) Peraturan Pemerintah No.18 Tahun 1999 tentang Pengelolaan Limbah Bahan Berbahaya dan Beracun.
- (25) Peraturan Pemerintah No.19 Tahun 1999 tentang Pengendalian Pencemaran dan/atau Perusakan Laut.
- (26) Peraturan Pemerintah No.41 Tahun 1999 tentang Pengendalian Pencemaran Udara.
- (27) Keputusan Presiden RI No.66 Tahun 1971 tentang Peningkatan Prasarana Pengusahaan Hutan.
- (28) Keputusan Presiden RI No.32 Tahun 1990 tentang Pengelolaan Kawasan Lindung.
- (29) Keputusan Presiden RI No.4 Tahun 1993 tentang Satwa dan Bunga Nasional.
- (30) Keputusan Presiden RI No.196 Tahun 1998 tentang Badan Pengendalian Dampak Lingkungan (BAPEDAL).
- (31) Keputusan Menteri Pertanian No.54/Kpts/Um/2/1972 tentang Pohon-pohon di Dalam Kawasan Hutan yang Dilindungi.
- (32) Keputusan Menteri Pertanian No.327/Kpts/Um/5/1978 tentang Penetapan Jenis-jenis Binatang Liar yang Dilindungi.
- (33) Keputusan Menteri Pertanian No.66/Kpts/Um/1979 tentang Kriteria Satwa yang Dilindungi Menurut Ordonansi Perlindungan Binatang Liar yang Dilindungi.
- (34) Keputusan Menteri Pertanian No.757/Kpts/Um/12/1979 tentang Penetapan Tambahan Jenis-jenis Binatang Liar yang Dilindungi, Disamping Jenis-jenis Binatang Liar Yang Telah Dilindungi.
- (35) Keputusan Menteri Pertanian No.837/Kpts/Um/11/1980 tentang Kriteria dan Tata Cara Penetapan Hutan Lindung.
- (36) Keputusan Menteri Pertanian No.683/Kpts/Um/8/1981 tentang Kriteria dan tata Cara Penetapan Hutan Produksi.
- (37) Keputusan Menteri Kehutanan No.353/Kpts-II/1986 tentang Penetapan Radius/Jarak Larangan Penebangan Pohon dari Mata Air, Tepi Jurang, Waduk/Danau, Sungai, Anak Sungai Dalam Kawasan Hutan, Hutan Cadangan dan Hutan Lainnya.
- (38) Keputusan Menteri Negara Lingkungan Hidup No.02/MENKLH/6/1988 tentang Pedoman Baku Mutu Lingkungan.
- (39) Keputusan Menteri Kehutanan No.485/Kpts-II/1989 tentang Silvikultur Pengelolaan Hutan Alam Produksi di Indonesia.
- (40) Keputusan Menteri Kehutanan No.261/Kpts-II/1990 tentang Penambahan Lampiran Keputusan Menteri Pertanian No.54/Kpts/Um/2/1972 tentang Pohon-pohon di Kawasan Hutan Yang Dilindungi.
- (41) Keputusan Menteri Kehutanan No.252 /Kpts-II/1993 jo Keputusan Menteri Kehutanan No.576/Kpts-II/1993 tentang Kriteria dan Indikator Pengelolaan Hutan Produksi Alam Indonesia Secara Lestari.
- (42) Keputusan Menteri Kehutanan No.253/Kpts-II/1993 tentang Pedoman Perlindungan Hutan di Areal HPH/HTI.
- (43) Keputusan Menteri Negara Lingkungan Hidup No.Kep-35/MENKLH/10/93 tentang Ambang Batas Emisi Gas Buang Kendaraan Bermotor.

- (44) Keputusan Menteri Negara Lingkungan Hidup No.Kep-14/MENLH/3/94 tentang Pedoman Umum Penyusunan Analisis Mengenai Dampak Lingkungan.
- (45) Keputusan Menteri Negara Lingkungan Hidup No.Kep-42/MENLH/11/94 tentang Pedoman Umum Pelaksanaan Audit Lingkungan.
- (46) Keputusan Kepala BAPEDAL No.Kep-056 Tahun 1994 tentang Pedoman Mengenai Ukuran Dampak Penting.
- (47) Keputusan Menteri Pariwisata Pos dan Telekomunikasi No.KM-94/Um.001/MPPT-94 tentang Pedoman Teknis Penyusunan Analisis Mengenai Dampak Lingkungan Bidang Pariwisata.
- (48) Keputusan Menteri Kehutanan No.260/Kpts-II/1995 tentang Petunjuk Usaha Pencegahan dan Pemadaman Kebakaran Hutan.
- (49) Keputusan Menteri Kehutanan No.276/Kpts-II/1995 tentang Kewajiban Pemegang HPH/HPHTI Memasang Stasiun Pengamat Arus Sungai (SPAS).
- (50) Keputusan Menteri Kehutanan No.464/Kpts-II/1995 tentang Pengelolaan Hutan Lindung.
- (51) Keputusan Menteri Negara Lingkungan Hidup No.Kep-13/MENKLH/3/95 tentang Baku Mutu Emisi Tidak Bergerak.
- (52) Keputusan Menteri Negara Lingkungan Hidup No.Kep-51/MENKLH/10/1995 tentang Baku Mutu Limbah Cair Bagi Kegiatan Industri.
- (53) Keputusan Menteri Negara Lingkungan Hidup No.Kep-39/MENLH/8/1996 tentang Jenis Usaha Atau Kegiatan Yang Wajib Dilengkapi Dengan Analisis Dampak Lingkungan.
- (54) Keputusan Kepala BAPEDAL No.Kep-299/11 Tahun 1996 tentang Pedoman Teknis Kajian Aspek Sosial Dalam Penyusunan AMDAL.
- (55) Keputusan Menteri Kehutanan No.523/Kpts-II/1997 tentang Pembinaan Masyarakat Desa Hutan Oleh Pemegang HPH dan HPHTI.
- (56) Keputusan Menteri Kehutanan dan Perkebunan No.602/Kpts-II/1998 jo No.622/Kpts-II/1999 tentang Analisis Mengenai Dampak Lingkungan, Upaya Pengelolaan Lingkungan dan Upaya Pemantauan Lingkungan Pembangunan Kehutanan dan Perkebunan.
- (57) Keputusan Menteri Kehutanan dan Perkebunan No.312/Kpts-II/1999 tentang Tata Cara Pemberian Hak Pengusahaan Hutan Melalui Permohonan.
- (58) Keputusan Menteri Kehutanan dan Perkebunan No.317/Kpts-II/1999 tentang Hak Pemungutan Hasil Hutan Masyarakat Hukum Adat Pada Area Hutan Produksi.
- (59) Keputusan Menteri Kehutanan dan Perkebunan No.614/Kpts-II/1999 tentang Pedoman Hak Pengusahaan Hutan Tanaman Campuran.
- (60) Peraturan Daerah Propinsi Dati I NTB No.9 Tahun 1989 tentang Pembangunan Kawasan Pariwisata di Propinsi NTB.

2.4.2. Hukum (peraturan perundang-undangan)/pedoman yang berkaitan dengan pengaruh assessment lingkungan :

- a) Jenis/ukuran kegiatan-kegiatan untuk pengaruh assessment lingkungan hidup :

### Metode analisis dan Peralatan Kualitas Udara

Parameter	Analisis	Satuan	Metode	Peralatan
Suhu	-	°C	Sekunder	Thermometer
Penyinaran matahari	-	%	Sekunder	-
Arah & kec. Angin	-	knots/jam	Sekunder	Penakar hujan
Curah Hujan	-	mm/bln	Sekunder	Penakar hujan
CO	Kalium Iodida	ppm	Pengukuran	Spektrophotometer
SO <sub>2</sub>	Pararosaniline	ppm	Pengukuran	Spektrophotometer
NO <sub>x</sub>	Griets Saltmann	ppm	Pengukuran	Spektrophotometer
Debu	Gravimetri	mg/cm <sup>3</sup>	Pengukuran	Hi. Vol. Sampler
NH <sub>3</sub>	Nessler	ppm	Pengukuran	Spektrophotometer
Pb	Gravimetri	ppm	Pengukuran	Gas Detector Lamotte
CO <sub>2</sub>	Barit	ppm	Pengukuran	CO <sub>2</sub> Analyzer
HC	Gas chromatography	ppm	Pengukuran	Flame ionization
Kebisingan	-	dBA	Pengukuran	Noise Level meter

### Metode Analisis dan Pengukuran Kualitas Air

No.	Komponen/Parameter	Satuan	Metode	Peralatan
	<b>Kualitas Air</b>			
1	Temperatur	°C	Pengukuran	Termometer raksa
2	Warna	Unit	Spektrofotometrik	Spektrofotometer
3	Turbidity	mg/l	Turbidimetrik	Peralatan titrasi
4	Bau		Organoleptik	-
5	Dissolved Solid	mg/l	Gravimetrik	- Penyaringan millipore - Timbangan analitik
6	Suspended Solid	mg/l	Gravimetrik	- Penyaringan millipore - Timbangan analitik
7	Conductivity	mikro mhos/cm	Conductivitas sel elektroda Pt	SCT meter YS I Model 33
8	pH		Potensiometrik elektroda Hidrogen	pH meter
9	Alkalinity	mg/l	Volumetry	Peralatan titrasi
10	Acidity	mg/l	Volumetry	Peralatan titrasi
11	Calcium (Ca)	mg/l	Titration EDTA	Peralatan titrasi
12	Magnesium (Mg)	mg/l	Titration EDTA	Peralatan titrasi
13	Mangan (Mn)	mg/l	Spektrokopi	AAS
14	Iron (Fe <sup>2+</sup> /Fe <sup>3+</sup> )	mg/l	Spektrokopi	AAS
15	Copper (Cu)	mg/l	Spektrokopi	AAS
16	Zinc (Zn)	mg/l	Spektrokopi	AAS
17	Chrome (Cr)	mg/l	Spektrokopi	AAS
18	Cadmium (Cd)	mg/l	Spektrokopi	AAS
19	Nickel (Ni)	mg/l	Spektrokopi	AAS
20	Chloride (Cl)	mg/l	Argentometri	
21	Sulphate (SO <sub>4</sub> )	mg/l	Turbidimetrik	Peralatan titrasi
22	Phosphor (P)	mg/l	Spectrophotometri	Spektrophotometer
23	Amoniak (NH <sub>3</sub> - N)	mg/l	Spectrophotometri	Spektrophotometer
24	Nitrat (NO <sub>3</sub> - N)	mg/l	Spectrophotometri	Spektrophotometer

25	Nitrit (NO <sub>2</sub> - N)	mg/l	Spectrophotometri	Spectrophotometer
26	N-Organic	mg/l	Kjeldahl, Nessler	Spectrophotometer
27	Dissolved Oxygen (DO)	mg/l	Metode Winkler	Titrasi
28	Biochemical Oxygen Demand (BOD)	mg/l	Metode Winkler	Botol BOD
29	Chemical Oxygen Demand (COD)	mg/l	Reflux with K <sub>2</sub> CrO <sub>7</sub> 220° 2 hour	
30	Boron (B)	mg/l	Spektrokopi	AAS
31	Total (Hg)	mg/l	Spektrokopi	AAS
32	Aluminium	mg/l	Spektrokopi	AAS
33	Lead (Pb)	mg/l	Spektrokopi	AAS
34	Oil and Grease	mg/l	Titration	Spectrophotometer
35	Arsenicum (As)	mg/l	Spectrophotometri Serapan atom	AAS
36	Cobalt (Co)	mg/l	Spektrokopi Serapan atom	AAS

### Metode Analisa Parameter Komponen Biologis

Komponen/Parameter	Satuan	Metode	Peralatan
Biota Perairan			
- Plankton	Individu/l	Shannon-Wiener	Plankton-net
- Benthos	Individu/m <sup>2</sup>	Shannon-Wiener	Pengeruk Ekmand
- Nekton		Pengamatan langsung/ Data sekunder	Nara sumber

### Kategori Kondisi Kualitas Air Berdasarkan Hasil Analisa Biota Perairan

KATEGORI	INDEKS SHANNON & WIENER	DO (mg/l)	BOD (mg/l)	NH <sub>3</sub> -N (mg/l)
Belum tercemar	≥ 2	> 6,5	< 3	< 0,5
Tercemar ringan	1,6 - 2,0	4,5 - 6,5	3 - 4,9	0,5 - 0,9
Tercemar sedang	1,0 - 1,5	2,0 - 4,5	5 - 15	1,0 - 3,0
Tercemar berat	< 1	< 2	> 15	> 3,0

#### b) Prosedur

Melalui instansi Bapedalda Propinsi NTB.

#### 2.4.3. Situasi Lokasi saat ini yang berkaitan dengan masalah-masalah lingkungan hidup

##### a) Lingkungan sosial-ekonomi

i. Sejarah wabah penyakit termasuk penyakit-penyakit yang disebabkan mengkonsumsi air yang tidak sehat (selama lima tahun terakhir) Tidak ada.

##### b) Lingkungan hidup yang alami (yang asri)

i. Lokasi (daerah) yang diutamakan harus mendapat perlindungan:  
- Cagar alam Pedauh – Sumbawa.

- Taman Nasional Gunung Rinjani.
  - Taman Buru Tambora Selatan.
  - Taman Buru Pulau Moyo
  - Taman Wisata Suranadi – Lombok Barat.
  - Taman Laut Pulau Moyo – Sumbawa
  - Cagar alam Gunung Tambora Selatan.
  - Cagar Alam Toffo Kota Lambu – Bima
  - Suaka Margasatwa Gunung Tambora Selatan
  - Taman Wisata Danau Taliwang – Sumbawa
  - Taman Wisata Ranget – Lombok Barat
  - Taman Wisata Batu Lante – Sumbawa
  - Taman Wisata Toffo Kota Lambu – Bima
  - Taman Wisata Sebagian Hutan Lindung Rinjani RTK I – Lombok Barat
  - Taman Wisata Bangko-bangko – Lombok Barat.
  - Taman Laut Gili Air, Gili Meno dan Gili Trawangan – Lombok Barat
  - Taman Wisata Pulau Satonda – Dompu
  - Suaka Margasatwa Lunyuk – Sumbawa.
- ii. Lokasi (daerah) lingkungan hidup yang rawan (lemah).  
Tidak ada.
- iii. Jenis (spesies) dari hewan dan tanaman langka yang dilindungi :

Golongan	Spesies
1. Hewan Menyusui (mamalia)	1. Rusa Timor ( <i>Cervus timorensis</i> ) 2. Kijang ( <i>Muntiacus muntjak</i> ) 3. Kancil ( <i>Tragulus javanicus</i> ) 4. Kucing hutan ( <i>Felix bengalensis</i> ) 5. Trenggiling ( <i>Manis javanica</i> ) 6. Jelarang ( <i>Ratufa bicolor</i> ) 7. Banteng/Sapi liar ( <i>Bos javanicus</i> ) 8. Landak ( <i>Hystrix brachyura</i> ) 9. Lumba-lumba ( <i>Dolphinadac, sp.</i> ) 10. Musang air ( <i>Cynogalc benetti</i> ) 11. Bajing terbang ( <i>Lomis hoisfieldii</i> ) 12. Ikan duyung ( <i>Dugong dugon</i> ) 13. Gajah ( <i>Elephas maximus</i> ) 14. Kuskus ( <i>Palanger, sp.</i> )
2. Burung (Aves)	1. Burung emas ( <i>Colocnas nicobarica</i> ) 2. Burung madu ( <i>Lichmera lombokia</i> ) 3. Burung bayan ( <i>Larius roratus</i> ) 4. Bangau tongtong ( <i>Leptotiles javanicus</i> ) 5. Koakiau ( <i>Philemen buccroides</i> ) 6. Itik liar ( <i>Cairina sconilata</i> ) 7. Burung gosong ( <i>Megapodius reinwardtii</i> ) 8. Burung raja udang ( <i>Halcyon sancta</i> ) 9. Burung raja udang ( <i>Alcedo caerulescus</i> ) 10. Burung raja udang ( <i>Halcyon copcosis</i> ) 11. Burung raja udang ( <i>Halcyon chloris</i> ) 12. Burung raja udang ( <i>Halcyon fulgidus</i> ) 13. Burung raja udang ( <i>Tanysepta galatea</i> )

	14. Gangsa laut ( <i>Pelicanidea, sp.</i> ) 15. Kuntul sedang ( <i>Egaretta intermedia</i> ) 16. Kuntul kerbau ( <i>Bubulcus ibis</i> ) 17. Kuntul karang ( <i>Egaretta sacra</i> ) 18. Ibis hitam ( <i>Plegadis feleinellus</i> ) 19. Ibis putih ( <i>Thereskiornis melano chepalus</i> ) 20. Bangau hitam ( <i>Ciconia episcopis</i> ) 21. Elang laut ( <i>Pondius haleaetus</i> ) 22. Gagajahan besar ( <i>Nomenius arguata</i> ) 23. Pecuk ular ( <i>Anhinga melanogaster</i> ) 24. Burung madu ( <i>Myzomela obscura</i> ) 25. Jantingan ( <i>Anthreptis rhodolaema</i> ) 26. Alap-alap tikus ( <i>Elanus hypoleucus</i> ) 27. Alap-alap kecil ( <i>Falio lengipennis</i> ) 28. Burung kipas ( <i>Ripidura javanica</i> ) 29. Burung lasiman ( <i>Griodius chinensi</i> ) 30. Dara mahkota ( <i>Gouro cristata</i> ) 31. Nuri merah ( <i>Lorius lorry</i> ) 32. N u r i ( <i>Tanygatus megalorhynchus</i> ) 33. Nuri bianglala ( <i>Trichoglossus haemotodus</i> ) 34. Beo nias ( <i>Gracula religiosa</i> ) 35. Dara laut ( <i>Laridae, sp.</i> ) 36. Kakatua raja ( <i>Proboseiger aterrimus</i> ) 37. Alap-alap sapi ( <i>Falco moluccensis</i> ) 38. Kasuari ( <i>Casuarianus casuarianus</i> ) 39. Jalak putih ( <i>Sturnus melanoptenus</i> )
3. Reptilia	1. Penyu belimbing ( <i>Dermochelys coriacea</i> ) 2. Penyu sisik ( <i>Ercmechelys imbriata</i> ) 3. Penyu ridel ( <i>Lepidochelys olivacea</i> ) 4. Sanca timor ( <i>Python timorensis</i> ) 5. Biawak abu-abu ( <i>Veranus nebulosus</i> ) 6. Buaya ( <i>Crocodylus, sp.</i> )
4. Biota laut	1. Kima raksasa ( <i>Tridacna gigas</i> ) 2. Kima selatan ( <i>Tridacna deresa</i> ) 3. Kima cina ( <i>Hippopus porcelnus</i> ) 4. Kima lubang ( <i>Tridacna croloa</i> ) 5. Kima sisik ( <i>Tridacna squamosa</i> ) 6. Kima besar ( <i>Tridacna maxima</i> ) 7. Kima telapak kuda ( <i>Hippopus hippopus</i> ) 8. Kepala kambing ( <i>Cassir cornula</i> ) 9. Susu bundar ( <i>Trochus niloticus</i> ) 10. Batu laga/siput hijau ( <i>Turbo marmoretus</i> ) 11. Nautilus berongga ( <i>Nautilus pompilus</i> ) 12. Triton terompet ( <i>Cheronia tritonis</i> ) 13. Akar bahar ( <i>Antiphates, sp.</i> ) 14. Ketam kelapa ( <i>Birgus latro</i> ) 15. Ketam telapak kuda ( <i>Tachypicus gigas</i> ) 16. M i m i ( <i>Tachypicus tridentatus</i> ).
5. Ikan (Pisces)	1. Arwana ( <i>Sclerophages formasus</i> ) 2. Wader goa ( <i>Puntius microps</i> ).

6. Jenis-jenis flora yang dilindungi	<ol style="list-style-type: none"> <li>1. Keruing (<i>Dipterocarpus, sp.</i>)</li> <li>2. Durian (<i>Durino zibethinus</i>)</li> <li>3. Enau (<i>Arenga pinnata</i>)</li> <li>4. Kayu manis (<i>Cinnamomun burmani</i>)</li> <li>5. Bayur (<i>Pterocarpus, sp.</i>)</li> <li>6. Ketimun (<i>Timoneus sericcus</i>)</li> <li>7. Jambu monyet (<i>Anacardium occidentale</i>)</li> <li>8. Kemiri (<i>Alcuritas moluccana</i>)</li> <li>9. Kayu kuning (<i>Cudrana, sp.</i>)</li> <li>10. Sepang (<i>Cacsalpinia sappan</i>)</li> <li>11. I p i l (<i>Intsia omboinensis</i>)</li> <li>12. Sawo kecil (<i>Manilkara kauki</i>)</li> <li>13. Sonokeling (<i>Dalbergia latifolia</i>)</li> <li>14. Benuang (<i>Duabanga moluccana</i>)</li> <li>15. Suren (<i>Toona sinensis</i>)</li> <li>16. Garu (<i>Exoecaria agallocha</i>)</li> <li>17. Kelicung (<i>Dyospyros malabarica</i>)</li> <li>18. Imba (<i>Aza diracatha indica</i>)</li> </ol>
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iv.