

## 7. Analysis on Input and Output of Farmer's Level

Table A-15 - Table A-29

**TABLE A-15-1 Annual Production Cost per Hectare Under Present Conditions at Bongo I**

Description	Unit Price (Rp.)	Paddy				Palawija					
		Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize	
		Q	V	Q	V	Q	V	Q	V	Q	V
<b>I Farm Inputs</b>											
(1) Seed (kg)											
- Paddy	2,200	35	77,000	35	77,000						
- Soybeans	5,500					50	275,000				
- Green Beans	7,000							35	245,000		
- Maize	2,300									35	80,500
(2) Fertilizers (Kg)											
- Urea	1,200	100	120,000	100	120,000	25	30,000	50	60,000	50	60,000
- TSP	1,950	60	117,000	60	117,000	25	48,750	50	97,500	0	0
- KCL	1,950	40	78,000	40	78,000	0	0	0	0	0	0
(3) Agro - Chemical (Ltr)											
- Insecticide	59,000	1	59,000	1	59,000	1	59,000	1	59,000	1	59,000
<b>Sub - Total</b>			451,000		451,000		412,750		461,500		199,500
<b>2 Labour (day)</b>											
(1) Man Power	12,500	83	1,037,500	83	1,037,500	35	437,500	35	437,500	35	437,500
(2) Draft Power	25,000	10	250,000	10	250,000	8	200,000	8	200,000	8	200,000
<b>Sub - Total</b>			1,287,500		1,287,500		637,500		637,500		637,500
<b>3 Misellaneous Cost</b> (Equipment, Tax, etc.)											
+ 10 % of (1 + 2)			173,850		173,850		105,025		109,900		83,700
<b>Total</b>			1,912,350		1,912,350		1,155,275		1,208,900		920,700
<b>C Cropping Intensity</b>		1	1,912,350	0.5	956,175	0.15	173,291	0.15	181,335	0.2	184,140
<b>Ground Total</b>	3,407,291										

**TABLE A-15-2 Annual Balance per Hectare Under Present Conditions at Bongo I**

Description	Unit Price (Rp./ton)	Paddy				Palawija					
		Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize	
		Q	V	Q	V	Q	V	Q	V	Q	V
<b>4 Yield Income</b>											
- Paddy	1,200,000	3.00	3,600,000	1.00	1,200,000						
- Soybeans	4,000,000					0.10	390,000				
- Green Beans	3,500,000							0.09	315,000		
- Maize	836,000									0.32	267,520
<b>Total Income</b>	5,772,520		3,600,000		1,200,000		390,000		315,000		267,520
<b>B Net Income</b>	2,365,229										
<b>B/C</b>	0.69										

TABLE A-16-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Bongo I

No.	Description	Unit Price (Rp.)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
1	Farm Inputs												
	(1) Seed (kg)												
	- Paddy	2,200	30	66,000	30	66,000							
	- Soybeans	5,500					45	247,500					
	- Green Beans	7,000							30	210,000			
	- Maize	2,300									30	69,000	
	(2) Fertilizers (Kg)												
	- Urea	1,200	300	360,000	300	360,000	50	60,000	75	90,000	250	300,000	
	- TSP	1,950	100	195,000	100	195,000	100	195,000	100	195,000	100	195,000	
	- KcL	1,950	75	146,250	75	146,250	50	97,500	50	97,500	75	146,250	
	(3) Agro-Chemicals (Ltr)	59,000	4	236,000	4	236,000	2	118,000	2	118,000	2	118,000	
	Sub-Total			1,003,250		1,003,250		718,000		710,500		828,250	
2	Labours Costs (day)												
	(1) Man Power	12,500	102	1,275,000	108	1,350,000	48	600,000	46	575,000	45	562,500	
	(2) Draft Power	25,000	15	375,000	15	375,000	8	200,000	8	200,000	8	200,000	
	Sub-Total			1,650,000		1,725,000		800,000		775,000		762,500	
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)			530,650		545,650		303,600		297,000		304,350	
4	Operation Cost Rp./ Hr.	1,731	49	84,031	49	85,377	26	44,540	23	40,148	31	53,146	
	<b>TOTAL</b>			3,267,931		3,359,277		1,866,140		1,822,648		1,948,246	
	<b>Cropping Intensity</b>		1.0	3,267,931	1.0	3,359,277	0.15	279,921	0.15	273,397	0.2	389,649	
	<b>GROUND TOTAL</b>			7,922,175		<b>O&amp;M Cost =</b> <b>Operation Cost</b> 192,740 + <b>+ Replacement Cost</b> 352,000 = <b>544,740</b>							

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-16-2 Annual Balance per Hectare with Irrigation Conditions at Bongo I

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	Yield Income												
	- Paddy	1,200,000	5.50	6,600,000	6.00	7,200,000							
	- Soybeans	4,000,000					0.23	900,000					
	- Green Beans	3,500,000							0.18	630,000			
	- Maize	836,000									0.90	752,400	
	<b>Total Income</b>	16,082,400		6,600,000		7,200,000		900,000		630,000		752,400	
B	<b>Net Income</b>	8,160,225											
	<b>B/C</b>	1.03											
	<b>O&amp;M/Net Income (%)</b>	6.68											

TABLE A-17-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Bongo I (Third Year)

No.	Description	Unit Price (Rp.)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
1	<b>Farm Inputs</b>												
	(1) Seed (kg)												
	- Paddy	2,200	32.5	71,500	32.5	71,500							
	- Soybeans	5,500					47.5	261,250					
	- Green Beans	7,000							32.5	227,500			
	- Maize	2,300									32.5	74,750	
	(2) Fertilizers (Kg)												
	- Urea	1,200	200	240,000	200	240,000	37.5	45,000	62.5	75,000	150	180,000	
	- TSP	1,950	80	156,000	80	156,000	62.5	121,875	75	146,250	50	97,500	
	- KeL	1,950	57.5	112,125	57.5	112,125	25	48,750	25	48,750	37.5	73,125	
	(3) Agro-Chemicals (Ltr)	59,000	2.5	147,500	2.5	147,500	1.5	88,500	1.5	88,500	1.5	88,500	
	<b>Sub-Total</b>			727,125		727,125		565,375		586,000		513,875	
2	<b>Labours Costs (day)</b>												
	(1) Man Power	12,500	92.5	1,156,250	95.5	1,193,750	41.5	518,750	40.5	506,250	40.0	500,000	
	(2) Draft Power	25,000	12.5	312,500	12.5	312,500	8.0	200,000	8.0	200,000	8.0	200,000	
	<b>Sub-Total</b>			1,468,750		1,506,250		718,750		706,250		700,000	
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)			530,650		545,650		303,600		297,000		304,350	
4	Operation Cost Rp./ Hr.	1,731	49	84,031	49	85,377	26	44,540	23	40,148	31	53,146	
C	<b>TOTAL</b>			2,810,556		2,864,402		1,632,265		1,629,398		1,571,371	
	<b>Cropping Intensity</b>		1.00	2,810,556	0.75	2,148,301	0.15	244,840	0.15	244,410	0.20	314,274	
	<b>GROUND TOTAL</b>			6,114,381		<b>O&amp;M Cost =</b> <b>Operation Cost</b> 171,396 + <b>+ Replacement Cost</b> 352,000 = <b>523,396</b>							

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-17-2 Annual Balance per Hectare with Irrigation Conditions at Bongo I (Third Year)

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	<b>Yield Income</b>												
	- Paddy	1,200,000	4.25	5,100,000	3.51	4,207,500							
	- Soybeans	4,000,000					0.16	645,000					
	- Green Beans	3,500,000							0.14	472,500			
	- Maize	836,000									0.61	509,960	
	<b>Total Income</b>	10,934,960		5,100,000		4,207,500		645,000		472,500		509,960	
B	<b>Net Income</b>	4,820,579											
	<b>B/C</b>	0.79											
	<b>O&amp;M/Net Income (%)</b>	10.86											

TABLE A-18-1 Annual Production Cost per Hectare Under Present Conditions at Bongo III

Description	Unit Price (Rp.)	Paddy				Palawija					
		Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize	
		Q	V	Q	V	Q	V	Q	V	Q	V
<b>1 Farm Inputs</b>											
(1) Seed (kg)											
- Paddy	2,200	35	77,000	35	77,000						
- Soybeans	5,500					50	275,000				
- Green Beans	7,000							35	245,000		
- Maize	2,300									35	80,500
(2) Fertilizers (Kg)											
- Urea	1,200	100	120,000	100	120,000	25	30,000	50	60,000	50	60,000
- TSP	1,950	60	117,000	60	117,000	25	48,750	50	97,500	0	0
- KCL	1,950	40	78,000	40	78,000	0	0	0	0	0	0
(3) Agro - Chemical (Ltr)											
- Insecticide	59,000	1	59,000	1	59,000	1	59,000	1	59,000	1	59,000
<b>Sub - Total</b>			451,000		451,000		412,750		461,500		199,500
<b>2 Labour (day)</b>											
(1) Man Power	12,500	83	1,037,500	83	1,037,500	35	437,500	35	437,500	35	437,500
(2) Draft Power	25,000	10	250,000	10	250,000	8	200,000	8	200,000	8	200,000
<b>Sub - Total</b>			1,287,500		1,287,500		637,500		637,500		637,500
<b>3 Misellaneous Cost</b> (Equipment, Tax, etc.)											
+ 10 % of ( 1 + 2 )			173,850		173,850		105,025		109,900		83,700
<b>Total</b>			1,912,350		1,912,350		1,155,275		1,208,900		920,700
<b>C Cropping Intensity</b>		1	1,912,350	0.5	956,175	0.15	173,291	0.15	181,335	0.2	184,140
<b>Ground Total</b>	3,407,291										

TABLE A-18-2 Annual Balance per Hectare Under Present Conditions at Bongo III

Description	Unit Price ( Rp./ton)	Paddy				Palawija					
		Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize	
		Q	V	Q	V	Q	V	Q	V	Q	V
<b>4 Yield Income</b>											
- Paddy	1,200,000	3.00	3,600,000	1.00	1,200,000						
- Soybeans	4,000,000					0.10	390,000				
- Green Beans	3,500,000							0.09	315,000		
- Maize	836,000									0.32	267,520
<b>Total Income</b>	5,772,520		3,600,000		1,200,000		390,000		315,000		267,520
<b>B Net Income</b>	2,365,229										
<b>B/C</b>	0.69										

TABLE A-19-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Bongo III

No.	Description	Unit Price ( Rp.)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
1	<b>Farm Inputs</b>												
	(1) Seed (kg)												
	- Paddy	2,200	30	66,000	30	66,000							
	- Soybeans	5,500					45	247,500					
	- Green Beans	7,000							30	210,000			
	- Maize	2,300									30	69,000	
	(2) Fertilizers (Kg)												
	- Urea	1,200	300	360,000	300	360,000	50	60,000	75	90,000	250	300,000	
	- TSP	1,950	100	195,000	100	195,000	100	195,000	100	195,000	100	195,000	
	- KcL	1,950	75	146,250	75	146,250	50	97,500	50	97,500	75	146,250	
	(3) Agro-Chemicals (Ltr)	59,000	4	236,000	4	236,000	2	118,000	2	118,000	2	118,000	
	<b>Sub-Total</b>			1,003,250		1,003,250		718,000		710,500		828,250	
2	<b>Labours Costs (day)</b>												
	(1) Man Power	12,500	102	1,275,000	108	1,350,000	48	600,000	46	575,000	45	562,500	
	(2) Draft Power	25,000	15	375,000	15	375,000	8	200,000	8	200,000	8	200,000	
	<b>Sub-Total</b>			1,650,000		1,725,000		800,000		775,000		762,500	
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)			530,650		545,650		303,600		297,000		304,350	
4	Operation Cost Rp./ Hr.	2,489	49	120,832	49	122,768	26	64,046	23	57,731	31	76,422	
C	<b>TOTAL</b>			3,304,732		3,396,668		1,885,646		1,840,231		1,971,522	
	<b>Cropping Intensity</b>		1.0	3,304,732	1.0	3,396,668	0.15	282,847	0.15	276,035	0.2	394,304	
	<b>GROUND TOTAL</b>			8,038,586		<b>O&amp;M Cost =</b> <b>Operation Cost</b> 277,151 + <b>+ Replacement Cost</b> 384,000 = <b>661,151</b>							

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-19-2 Annual Balance per Hectare with Irrigation Conditions at Bongo III

No.	Description	Unit Price ( Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	<b>Yield Income</b>												
	- Paddy	1,200,000	5.50	6,600,000	6.00	7,200,000							
	- Soybeans	4,000,000					0.23	900,000					
	- Green Beans	3,500,000							0.18	630,000			
	- Maize	836,000									0.90	752,400	
	<b>Total Income</b>	16,082,400		6,600,000		7,200,000		900,000		630,000		752,400	
B	<b>Net Income</b>	8,043,814											
	<b>B/C</b>	1.00											
	<b>O&amp;M/Net Income (%)</b>	8.22											

TABLE A-20-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Bongo III (Third Year)

No.	Description	Unit Price (Rp.)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
1	<b>Farm Inputs</b>												
	(1) Seed (kg)												
	- Paddy	2,200	32.5	71,500	32.5	71,500							
	- Soybeans	5,500					47.5	261,250					
	- Green Beans	7,000							32.5	227,500			
	- Maize	2,300									32.5	74,750	
	(2) Fertilizers (Kg)												
	- Urea	1,200	200	240,000	200	240,000	37.5	45,000	62.5	75,000	150	180,000	
	- TSP	1,950	80	156,000	80	156,000	62.5	121,875	75	146,250	50	97,500	
	- KcL	1,950	57.5	112,125	57.5	112,125	25	48,750	25	48,750	37.5	73,125	
	(3) Agro-Chemicals (Ltr)	59,000	2.5	147,500	2.5	147,500	1.5	88,500	1.5	88,500	1.5	88,500	
	<b>Sub-Total</b>			727,125		727,125		565,375		586,000		513,875	
2	<b>Labours Costs (day)</b>												
	(1) Man Power	12,500	92.5	1,156,250	95.5	1,193,750	41.5	518,750	40.5	506,250	40.0	500,000	
	(2) Draft Power	25,000	12.5	312,500	12.5	312,500	8.0	200,000	8.0	200,000	8.0	200,000	
	<b>Sub-Total</b>			1,468,750		1,506,250		718,750		706,250		700,000	
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)			530,650		545,650		303,600		297,000		304,350	
4	Operation Cost Rp./ Htr.	2,489	49	120,832	49	122,768	26	64,046	23	57,731	31	76,422	
	<b>TOTAL</b>			2,847,357		2,901,793		1,651,771		1,646,981		1,594,647	
	<b>Cropping Intensity</b>		1.00	2,847,357	0.75	2,176,345	0.15	247,766	0.15	247,047	0.20	318,929	
	<b>GROUND TOTAL</b>			6,221,444				O&M Cost = Operation Cost 246,459 + Replacement Cost 384,000 = 630,459					

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-20-2 Annual Balance per Hectare with Irrigation Conditions at Bongo III (Third Year)

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	<b>Yield Income</b>												
	- Paddy	1,200,000	4.25	5,100,000	3.51	4,207,500							
	- Soybeans	4,000,000					0.16	645,000					
	- Green Beans	3,500,000							0.14	472,500			
	- Maize	836,000									0.61	509,960	
	<b>Total Income</b>	10,934,960		5,100,000		4,207,500		645,000		472,500		509,960	
B	<b>Net Income</b>	4,713,516											
	<b>B/C</b>	0.76											
	<b>O&amp;M/Net Income (%)</b>	13.38											

**TABLE A-21-1 Annual Production Cost per Hectare Under Present Conditions at Ranometo**

Description	Unit Price (Rp.)	Paddy				Palawija					
		Wet Season		Semi-wet Season		Soybeans		Groundnuts		Maize	
		Q	V	Q	V	Q	V	Q	V	Q	V
<b>1 Farm Inputs</b>											
(1) Seed (kg)											
- Paddy	2,200	35	77,000								
- Soybeans	5,500										
- Groundnuts	7,750										
- Maize	2,300										
(2) Fertilizers (Kg)											
- Urea	1,200	100	120,000								
- TSP	1,950	60	117,000								
- KCL	1,950	40	78,000								
(3) Agro - Chemical (Ltr)											
- Insecticide	59,000	1	59,000								
<b>Sub - Total</b>			451,000								
<b>2 Labour (day)</b>											
(1) Man Power	12,500	83	1,037,500								
(2) Draft Power	25,000	10	250,000								
<b>Sub - Total</b>			1,287,500								
<b>3 Misellaneous Cost</b> (Equipment, Tax, etc.)											
+ 10% of (1 + 2)			173,850								
<b>Total</b>			1,912,350								
<b>C Cropping Intensity</b>		1	1,912,350								
<b>Ground Total</b>	1,912,350										

**TABLE A-21-2 Annual Balance per Hectare Under Present Conditions at Ranometo**

Description	Unit Price (Rp./ton)	Paddy				Palawija					
		Wet Season		Semi-wet Season		Soybeans		Green Beans		Maize	
		Q	V	Q	V	Q	V	Q	V	Q	V
<b>4 Yield Income</b>											
- Paddy	1,200,000	2.50	3,000,000								
- Soybeans	4,100,000										
- Groundnuts	4,400,000										
- Maize	891,000										
<b>Total Income</b>	3,000,000		3,000,000								
<b>B Net Income</b>	1,087,650										
<b>B/C</b>	0.57										



TABLE A-22-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Ranometo

No.	Description	Unit Price (Rp.)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Groundnuts		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
1	<b>Farm Inputs</b>												
	(1) Seed (kg)												
	- Paddy	2,200	30	66,000	30	66,000							
	- Soybeans	5,500					45	247,500					
	- Groundnuts	7,750							60	465,000			
	- Maize	2,300									30	69,000	
	(2) Fertilizers (Kg)												
	- Urea	1,200	300	360,000	300	360,000	50	60,000	50	60,000	250	300,000	
	- TSP	1,950	100	195,000	100	195,000	100	195,000	100	195,000	100	195,000	
	- KcL	1,950	75	146,250	75	146,250	50	97,500	50	97,500	75	146,250	
	(3) Agro-Chemicals (Ltr)	59,000	4	236,000	4	236,000	2	118,000	2	118,000	2	118,000	
	<b>Sub-Total</b>			1,003,250		1,003,250		718,000		935,500		828,250	
2	<b>Labours Costs (day)</b>												
	(1) Man Power	12,500	102	1,275,000	108	1,350,000	48	600,000	48	600,000	45	562,500	
	(2) Draft Power	25,000	15	375,000	15	375,000	8	200,000	8	200,000	8	200,000	
	<b>Sub-Total</b>			1,650,000		1,725,000		800,000		800,000		762,500	
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)			530,650		545,650		303,600		297,000		304,350	
4	Operation Cost Rp./ Hr.	1,315	hr	47,514	hr	59,054	hr	10,413	hr	16,990	hr	19,228	
	<b>TOTAL</b>			3,231,414		3,332,954		1,832,013		2,049,490		1,914,328	
	<b>Cropping Intensity</b>		1.0	3,231,414	1.0	3,332,954	0.15	274,802	0.15	307,424	0.2	382,866	
	<b>GROUND TOTAL</b>			7,946,126		O&M Cost = Operation Cost + Replacement Cost		114,525	+	416,667	=	531,191	

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-22-2 Annual Balance per Hectare with Irrigation Conditions at Ranometo

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Groundnuts		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	<b>Yield Income</b>												
	- Paddy	1,200,000	5.50	6,600,000	6.00	7,200,000							
	- Soybeans	4,100,000					0.23	922,500					
	- Groundnuts	4,400,000							0.23	990,000			
	- Maize	891,000									0.90	801,900	
	<b>Total Income</b>	16,514,400		6,600,000		7,200,000		922,500		990,000		801,900	
B	<b>Net Income</b>	8,568,274											
	<b>B/C</b>	1.08											
	<b>O&amp;M/Net Income (%)</b>	6.20											

TABLE A-23-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Ranometo (Third Year)

No.	Description	Unit Price (Rp.)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Groundnuts		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
1	<b>Farm Inputs</b>												
	(1) Seed (kg)												
	- Paddy	2,200	32.5	71,500	15	33,000							
	- Soybeans	5,500					47.5	261,250					
	- Groundnuts	7,750							62.5	484,375			
	- Maize	2,300									32.5	74,750	
	(2) Fertilizers (Kg)												
	- Urea	1,200	200	240,000	150	180,000	25	30,000	25	30,000	125	150,000	
	- TSP	1,950	80	156,000	50	97,500	50	97,500	50	97,500	50	97,500	
	- KcL	1,950	57.5	112,125	37.5	73,125	25	48,750	25	48,750	37.5	73,125	
	(3) Agro-Chemicals (Ltr)	59,000	2.5	147,500	2.0	118,000	1.0	59,000	1.0	59,000	1.0	59,000	
	<b>Sub-Total</b>			727,125		501,625		496,500		719,625		454,375	
2	<b>Labours Costs (day)</b>												
	(1) Man Power	12,500	92.5	1,156,250	54.0	675,000	24.0	300,000	24.0	300,000	22.5	281,250	
	(2) Draft Power	25,000	12.5	312,500	7.5	187,500	4.0	100,000	4.0	100,000	4.0	100,000	
	<b>Sub-Total</b>			1,468,750		862,500		400,000		400,000		381,250	
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)			530,650		545,650		303,600		297,000		304,350	
4	Operation Cost Rp./ Hr.	1,315	36	47,514	45	59,054	8	10,413	13	16,990	15	19,228	
	<b>TOTAL</b>			2,774,039		1,968,829		1,210,513		1,433,615		1,159,203	
	<b>Cropping Intensity</b>		1.00	2,774,039	0.50	984,415	0.08	90,788	0.08	107,521	0.10	115,920	
	<b>GROUND TOTAL</b>			4,489,351		O&M Cost = Operation Cost + Replacement Cost		81,020	+	416,667	=	497,686	

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-23-2 Annual Balance per Hectare with Irrigation Conditions at Ranometo (Third Year)

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Soybeans		Groundnuts		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	<b>Yield Income</b>												
	- Paddy	1,200,000	4.00	4,800,000	2.20	2,640,000							
	- Soybeans	4,100,000					0.08	330,563					
	- Groundnuts	4,400,000							0.08	346,500			
	- Maize	891,000									0.31	271,755	
	<b>Total Income</b>	8,388,818		4,800,000		2,640,000		330,563		346,500		271,755	
<b>B</b>	<b>Net Income</b>	3,899,467											
	<b>B/C</b>	0.87											
	<b>O&amp;M/Net Income (%)</b>	12.76											

TABLE A-24-1 Annual Production Cost per Hectare Under Present Conditions at Kalembukah

Description	Unit Price (Rp.)	Paddy				Palawija					
		Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize	
		Q	V	Q	V	Q	V	Q	V	Q	V
<b>1 Farm Inputs</b>											
(1) Seed (kg)											
- Paddy	2,200	35	77,000								
- Groundnuts	7,750				65	503,750					
- Green Beans	7,000						35	245,000			
- Maize	2,300								35	80,500	
(2) Fertilazers (Kg)											
- Urea	1,200	100	120,000		25	30,000	50	180,000	50	60,000	
- TSP	1,950	60	117,000		25	48,750	50	292,500	0	0	
- KCL	1,950	40	78,000		0	0	0	0	0	0	
(3) Agro - Chemical (Ltr)											
- Insecticide	59,000	1	59,000		1	59,000	1	59,000	1	59,000	
<b>Sub - Total</b>			451,000			641,500		776,500		199,500	
<b>2 Labour (day)</b>											
(1) Man Power	12,500	83	1,037,500		35	437,500	35	437,500	35	437,500	
(2) Draft Power	25,000	10	250,000		8	200,000	8	200,000	8	200,000	
<b>Sub - Total</b>			1,287,500			637,500		637,500		637,500	
<b>3 Miscellaneous Cost</b> (Equipment, Tax, etc.)											
+ 10% of (1 + 2)			173,850			127,900		141,400		83,700	
<b>Total</b>			1,912,350			1,406,900		1,555,400		920,700	
<b>C Cropping Intensity</b>		1	1,912,350			0.3	422,070	0.3	466,620	0.4	368,280
<b>Ground Total</b>	3,169,320										

TABLE A-24-2 Annual Balance per Hectare Under Present Conditions at Kalembukah

Description	Unit Price (Rp./ton)	Paddy				Palawija					
		Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize	
		Q	V	Q	V	Q	V	Q	V	Q	V
<b>4 Yield Income</b>											
- Paddy	1,200,000	2.00	2,400,000								
- Groundnuts	2,500,000				0.24	600,000					
- Green Beans	5,000,000						0.18	900,000			
- Maize	800,000								0.70	563,200	
<b>Total Income</b>	4,463,200		2,400,000			600,000		900,000		563,200	
<b>B Net Income</b>	1,293,880										
<b>B/C</b>	0.41										

**TABLE A-25-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Kalembukah**

No.	Description	Unit Price (Rp.)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
1	<b>Farm Inputs</b>												
	(1) Seed (kg)												
	- Paddy	2,200	30	66,000	30	66,000							
	- Groundnuts	7,750					60	465,000					
	- Green Beans	7,000							30	210,000			
	- Maize	2,300									30	69,000	
	(2) Fertilizers (Kg)												
	- Urea	1,200	300	360,000	300	360,000	50	60,000	75	90,000	250	300,000	
	- TSP	1,950	100	195,000	100	195,000	100	195,000	100	195,000	100	195,000	
	- KcL	1,950	75	146,250	75	146,250	50	97,500	50	97,500	75	146,250	
	(3) Agro-Chemicals (Ltr)	59,000	4	236,000	4	236,000	2	118,000	2	118,000	2	118,000	
	<b>Sub-Total</b>			1,003,250		1,003,250		935,500		710,500		828,250	
2	<b>Labours Costs (day)</b>												
	(1) Man Power	12,500	102	1,275,000	108	1,350,000	48	600,000	46	575,000	45	562,500	
	(2) Draft Power	25,000	15	375,000	15	375,000	8	200,000	8	200,000	8	200,000	
	<b>Sub-Total</b>			1,650,000		1,725,000		800,000		775,000		762,500	
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)			530,650		545,650		303,600		297,000		304,350	
4	Operation Cost Rp./ Hr.	1,864	hr	125,310	hr	75,082	hr	143,520	hr	136,270	hr	189,864	
	<b>TOTAL</b>			3,309,210		3,348,982		2,182,620		1,918,770		2,084,964	
	<b>Cropping Intensity</b>		1.0	3,309,210	1.0	3,348,982	0.15	327,393	0.15	287,816	0.2	416,993	
	<b>GROUND TOTAL</b>			8,557,060		<b>O&amp;M Cost =</b> <b>Operation Cost</b> 280,334 + <b>Replacement Cost</b> 866,667 = <b>1,147,000</b>							

\* O&M Cost: All operation cost and replacement cost of the system.

**TABLE A-25-2 Annual Balance per Hectare with Irrigation Conditions at Kalembukah**

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	<b>Yield Income</b>												
	- Paddy	1,200,000	5.50	6,600,000	6.00	7,200,000							
	- Groundnuts	2,500,000					0.23	562,500					
	- Green Beans	5,000,000							0.18	900,000			
	- Maize	800,000									0.90	720,000	
	<b>Total Income</b>	15,982,500		6,600,000		7,200,000		562,500		900,000		720,000	
B	<b>Net Income</b>	7,425,440											
	<b>B/C</b>	0.87											
	<b>O&amp;M/Net Income (%)</b>	15.45											

TABLE A-26-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Kalembukah (Third Year)

No.	Description	Unit Price (Rp.)	Paddy				Palawija					
			Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize	
			Q	V	Q	V	Q	V	Q	V	Q	V
1	<b>Farm Inputs</b>											
	(1) Seed (kg)											
	- Paddy	2,200	32.5	71,500	32.5	71,500						
	- Groundnuts	7,750					62.5	484,375				
	- Green Beans	7,000							32.5	227,500		
	- Maize	2,300									32.5	74,750
	(2) Fertilizers (Kg)											
	- Urca	1,200	200	240,000	200	240,000	37.5	45,000	62.5	75,000	150	180,000
	- TSP	1,950	80	156,000	80	156,000	62.5	121,875	75	146,250	50	97,500
	- KcL	1,950	57.5	112,125	57.5	112,125	25	48,750	25	48,750	37.5	73,125
	(3) Agro-Chemicals (Ltr)	59,000	2.5	147,500	2.5	147,500	1.5	88,500	1.5	88,500	1.5	88,500
	<b>Sub-Total</b>			727,125		727,125		788,500		586,000		513,875
2	<b>Labours Costs (day)</b>											
	(1) Man Power	12,500	92.5	1,156,250	54.0	675,000	41.5	518,750	40.5	506,250	40.0	500,000
	(2) Draft Power	25,000	12.5	312,500	7.5	187,500	8.0	200,000	8.0	200,000	8.0	200,000
	<b>Sub-Total</b>			1,468,750		862,500		718,750		706,250		700,000
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)			530,650		545,650		303,600		297,000		304,350
4	Operation Cost Rp./ Hr.	1,864	67	125,310	40	75,082	77	143,520	73	136,270	102	189,864
	<b>TOTAL</b>			2,851,835		2,210,357		1,954,370		1,725,520		1,708,089
	<b>Cropping Intensity</b>		1.00	2,851,835	0.50	1,105,179	0.23	449,505	0.23	396,870	0.30	512,427
	<b>GROUND TOTAL</b>			6,182,482		<b>O&amp;M Cost =</b> <b>Operation Cost</b> 284,162 + <b>+ Replacement Cost</b> 866,667 = <b>1,150,829</b>						

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-26-2 Annual Balance per Hectare with Irrigation Conditions at Kalembukah (Third Year)

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija					
			Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize	
			Q	V	Q	V	Q	V	Q	V	Q	V
5	<b>Yield Income</b>											
	- Paddy	1,200,000	3.75	4,500,000	2.06	2,475,000						
	- Groundnuts	2,500,000					0.26	661,250				
	- Green Beans	5,000,000						0.21	1,035,000			
	- Maize	800,000								0.94	751,200	
	<b>Total Income</b>	9,422,450		4,500,000		2,475,000		661,250		1,035,000		751,200
B	<b>Net Income</b>	3,239,968										
	<b>B/C</b>	0.52										
	<b>O&amp;M/Net Income (%)</b>	35.52										

TABLE A-27-1 Annual Production Cost per Hectare Under Present Conditions at Namangkewa

Description	Unit Price (Rp.)	Paddy				Palawija							
		Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize			
		Q	V	Q	V	Q	V	Q	V	Q	V		
<b>1 Farm Inputs</b>													
(1) Seed (kg)													
- Paddy	2,200												
- Groundnuts	7,750					65	503,750						
- Green Beans	7,000							35	245,000				
- Maize	2,300									35	80,500		
(2) Fertilizers (Kg)													
- Urea	1,200					35	30,000	150	180,000	50	60,000		
- TSP	1,950					20	48,750	150	292,500	0	0		
- KCL	1,950					0	0	0	0	0	0		
(3) Agro - Chemical (Ltr)													
- Insecticide	59,000					1	59,000	1	59,000	1	59,000		
<b>Sub - Total</b>							641,500		776,500		199,500		
<b>2 Labour (day)</b>													
(1) Man Power	12,500					35	437,500	35	437,500	35	437,500		
(2) Draft Power	25,000					8	200,000	8	200,000	8	200,000		
<b>Sub - Total</b>							637,500		637,500		637,500		
<b>3 Misellaneous Cost</b> (Equipment, Tax, etc.)													
+ 10 % of ( 1 + 2 )							127,900		141,400		83,700		
<b>Total</b>							1,406,900		1,555,400		920,700		
<b>C Cropping Intensity</b>						0.3	422,070	0.3	466,620	0.4	368,280		
<b>Ground Total</b>	1,256,970												

TABLE A-27-2 Annual Balance per Hectare Under Present Conditions at Namangkewa

Description	Unit Price (Rp./ton)	Paddy				Palawija							
		Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize			
		Q	V	Q	V	Q	V	Q	V	Q	V		
<b>4 Yield Income</b>													
- Paddy	1,200,000												
- Groundnuts	4,100,000					0.18	738,000						
- Green Beans	2,000,000							0.30	600,000				
- Maize	1,000,000									0.80	800,000		
<b>Total Income</b>	2,138,000						738,000		600,000		800,000		
<b>B Net Income</b>	881,030												
<b>B/C</b>	0.70												

TABLE A-28-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Namangkewa

No.	Description	Unit Price (Rp.)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
1	<b>Farm Inputs</b>												
	(1) Seed (kg)												
	- Paddy	2,200											
	- Groundnuts	7,750				60	465,000						
	- Green Beans	7,000						30	210,000				
	- Maize	2,300									30	69,000	
	(2) Fertilizers (Kg)												
	- Urea	1,200				50	60,000	75	90,000	250	300,000		
	- TSP	1,950				100	195,000	100	195,000	100	195,000		
	- KcL	1,950				50	97,500	50	97,500	75	146,250		
	(3) Agro-Chemicals (Ltr)	59,000				2	118,000	2	118,000	2	118,000		
	<b>Sub-Total</b>						935,500		710,500			828,250	
2	<b>Labours Costs (day)</b>												
	(1) Man Power	12,500				48	600,000	46	575,000	45	562,500		
	(2) Draft Power	25,000				8	200,000	8	200,000	8	200,000		
	<b>Sub-Total</b>						800,000		775,000			762,500	
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)						303,600		297,000			304,350	
4	Operation Cost Rp./ Hr.	668				hr	57,097	hr	51,124	hr	73,531		
	<b>TOTAL</b>						2,096,197		1,833,624			1,968,631	
	<b>Cropping Intensity</b>						0.6	1,257,718	0.6	1,100,174	0.8	1,574,904	
	<b>GROUND TOTAL</b>		4,666,130				O&M Cost = Operation Cost 123,757 + 733,333 = 857,090 + Replacement Cost						

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-28-2 Annual Balance per Hectare with Irrigation Conditions at Namangkewa

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	<b>Yield Income</b>												
	- Paddy	1,200,000											
	- Groundnuts	4,100,000				0.90	3,690,000						
	- Green Beans	2,000,000						0.72	1,440,000				
	- Maize	1,000,000									3.60	3,600,000	
	<b>Total Income</b>	8,730,000					3,690,000		1,440,000			3,600,000	
<b>B</b>	<b>Net Income</b>	4,063,870											
	<b>B/C</b>	0.87											
	<b>O&amp;M/Net Income (%)</b>	21.09											

TABLE A-29-1 Annual Crop Production Cost per Hectare with Irrigation Conditions at Namangkewa (Third Year)

No.	Description	Unit Price (Rp.)	Paddy				Palawija							
			Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize			
			Q	V	Q	V	Q	V	Q	V	Q	V		
1	<b>Farm Inputs</b>													
	(1) Seed (kg)													
	- Paddy	2,200												
	- Groundnuts	0				62.5	0							
	- Green Beans	7,000						32.5	227,500					
	- Maize	2,300								32.5	74,750			
	(2) Fertilizers (Kg)													
	- Urea	1,200				42.5	51,000	113	135,000	150	180,000			
	- TSP	1,950				60	117,000	125	243,750	50	97,500			
	- KeL	1,950				25	48,750	25	48,750	37.5	73,125			
	(3) Agro-Chemicals (Ltr)	59,000				1.5	88,500	1.5	88,500	1.5	88,500			
	<b>Sub-Total</b>						305,250		743,500		513,875			
2	<b>Labours Costs (day)</b>													
	(1) Man Power	12,500				41.5	518,750	40.5	506,250	40.0	500,000			
	(2) Draft Power	25,000				8.0	200,000	8.0	200,000	8.0	200,000			
	<b>Sub-Total</b>						718,750		706,250		700,000			
3	Miscellaneous Costs : (Equipment, Tax, etc.) = 20% of (1+2)						303,600		297,000		304,350			
4	Operation Cost Rp./ Hr.	668				hr	85	57,097	hr	77	51,124	hr	110	73,531
	<b>TOTAL</b>						1,384,697		1,797,874		1,591,756			
C	<b>Cropping Intensity</b>						0.45	623,114	0.45	809,043	0.60	955,053		
	<b>GROUND TOTAL</b>		3,120,543					O&M Cost = Operation Cost 92,818 + Replacement Cost 733,333 =			826,151			

\* O&M Cost: All operation cost and replacement cost of the system.

TABLE A-29-2 Annual Balance per Hectare with Irrigation Conditions at Namangkewa (Third Year)

No.	Description	Unit Price (Rp./ton)	Paddy				Palawija						
			Wet Season		Semi-wet Season		Groundnuts		Green Beans		Maize		
			Q	V	Q	V	Q	V	Q	V	Q	V	
5	<b>Yield Income</b>												
	- Paddy	1,200,000											
	- Groundnuts	4,100,000				0.47	1,937,250						
	- Green Beans	2,000,000						0.50	990,000				
	- Maize	1,000,000								1.95	1,950,000		
	<b>Total Income</b>	4,877,250					1,937,250		990,000		1,950,000		
B	<b>Net Income</b>	1,756,707											
	<b>B/C</b>	0.56											
	<b>O&amp;M/Net Income (%)</b>	47.03											



## 8. PCM Workshop

In order to (1) understand farmers' latest situation and their needs, (2) boost farmers' motivation on water management and operation & maintenance of facilities and (3) universally understand farmers' problems confronted in the target three Provinces, PCM workshop was held with assistance of DGWRD at Kotamobagu, North Sulawesi on 16<sup>th</sup> and 17<sup>th</sup> April 1999.

### (1) Participants

The participants in the PCM workshop are 26 men consisting of members of three Water Users' Associations (WUA), farmers in the project sites, government officials from three Kabupatens of Gorontalo, Minahasa and Bolaamong, and an official from DGWRD and consultants. The following table shows the outlines of the said WUA.

Name	Place	Established year	Members	Irrigation Area /Block	Remarks
KATEES	Torian, Kakas, Minahasa	1996	43	36ha, 18 blocks	Local people
TWB15	Bolaamong, Gongdow	1997	21	25ha, 12 blocks	Transmigrasy from Bari
TWG30	Bongo I, Gorontalo	1997	24	30ha, 15 blocks	Transmigrasy from Java

### (2) Program of Workshop

The program of the workshop carried out for 2 days is as follows.

- Introduction of basic information of each WUA
- Problem Analysis on farming activities (irrigation farming) of each WUA
- Further analysis on the above-mentioned problems concerning especially water management
- Counter measures to solve the major problems concerning water management

### (3) Results of Workshop

In the workshop, frank opinions were exchanged and Problem Analysis that visually represents the causes and effects of existing problem was done. Problem trees which were made in the workshop are as shown in the followings. The core problem was imbalance between input and output, and the major causes of the problem became clear were ①Yield is not enough, ②Production cost is high and ③Marketing problems (price fluctuation). Problems pertaining to the Water Users' Association were also made clear.

The followings are the problems concerning farming.

- Shortage of investment
- Shortage of farming materials
- Shortage of proper farming machines for newly introduced farming methods
- Shortage of adequate labor for newly expanded farmland

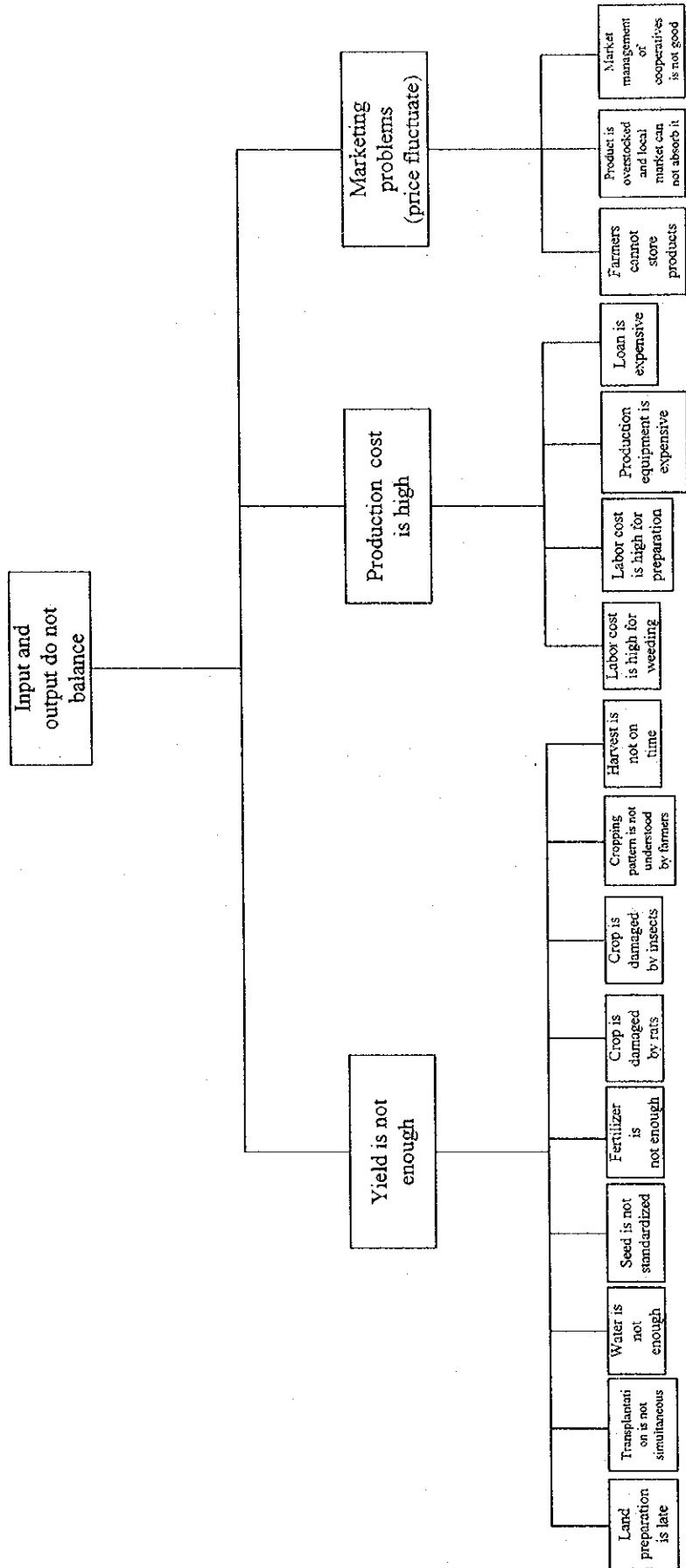
- Shortage of transportation
- Depreciation due to increase of product
- Dissatisfaction with technical assistance

In the latter half of the Problem Analysis, discussions were made especially on problems of water management. Shortage of on-farm irrigation water was the first problem which consisted of basic problems of supply shortage from water sources and problems other than them. The former includes capacity of well and pump and problems of operation (such as shortage of fuel for pump) and the latter includes improper locations of distribution box. As a result, it is necessary to secure the capacity of well and pump as ample as possible taking into consideration groundwater conditions, benefited area, cropping patterns, soil and geological conditions, etc. Moreover, the distribution design shall be carried out taking into consideration proper locations of distribution box which are adequate to geological and farming conditions.

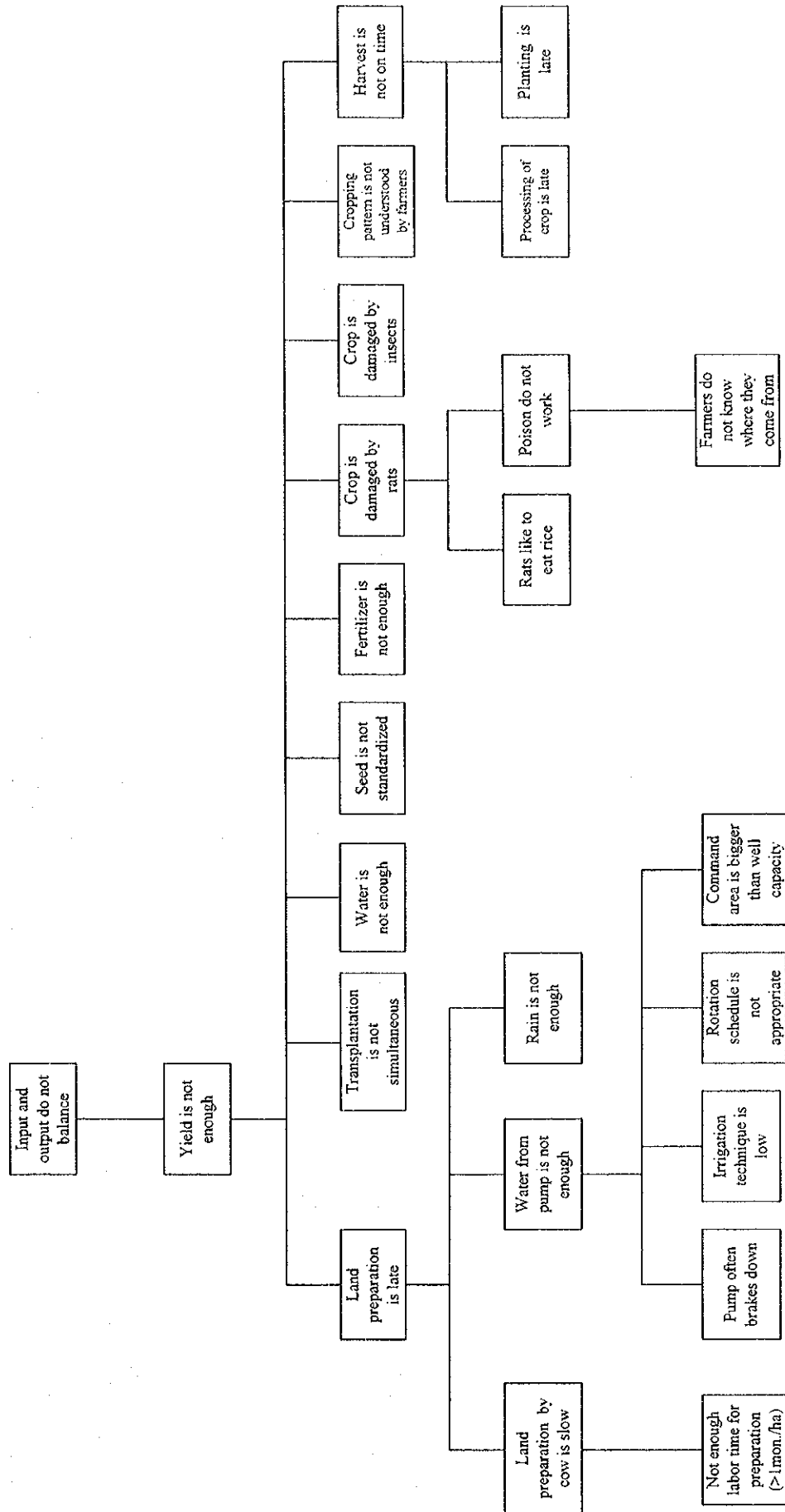
Additionally, various issues were discussed about management of WUA such as proper collection of irrigation service fee adequate to expenditures of WUA. As a result, the irrigation service fees shall be set up depending on conditions of each WUA, provided that the member farmers shall be clearly notified for what such irrigation service fees are used.

To secure sustainability of the Project, such information and outcomes obtained in the workshop shall be taken into consideration for forming the Project.

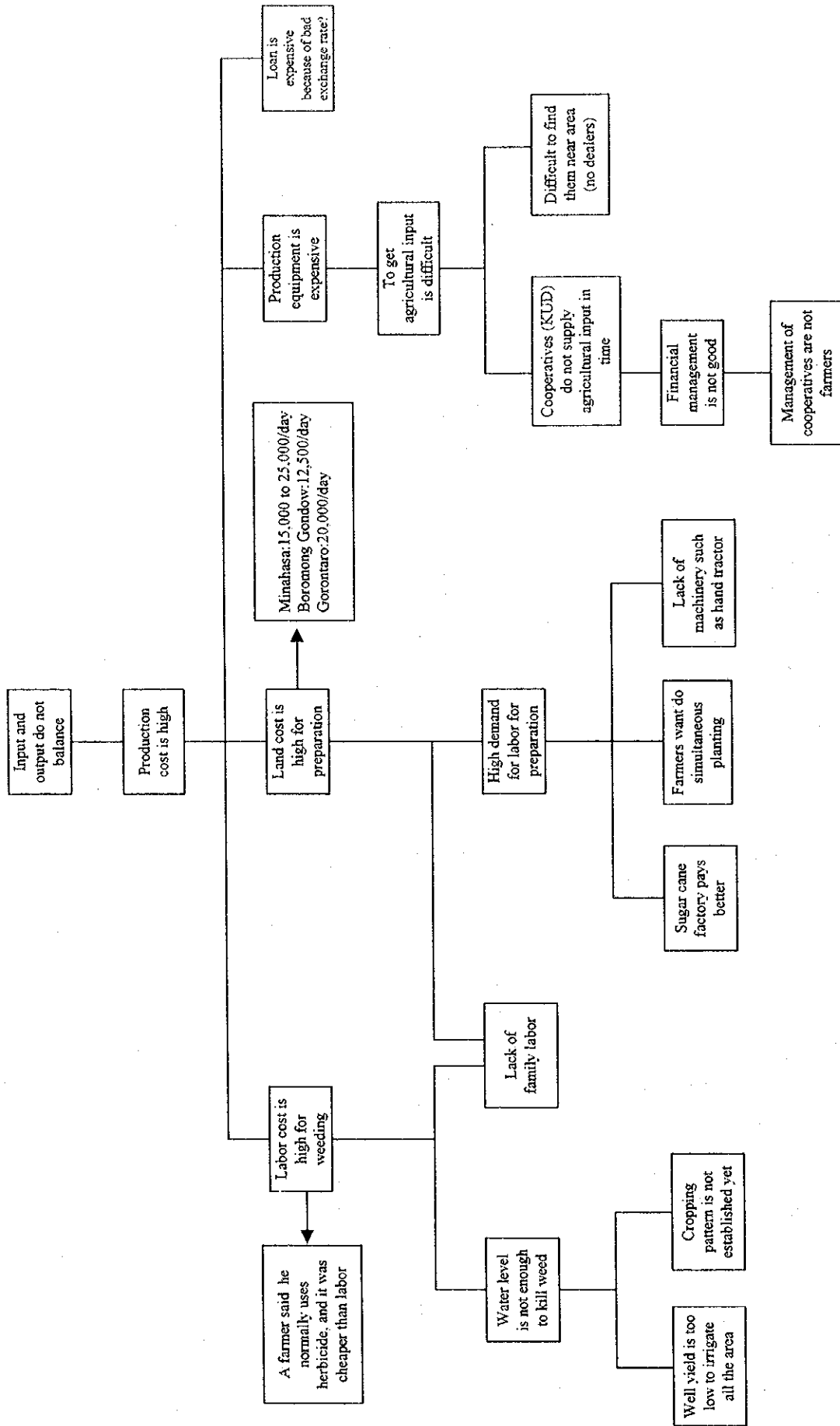
# Problems Tree (1) : Overall Framework of the Problems



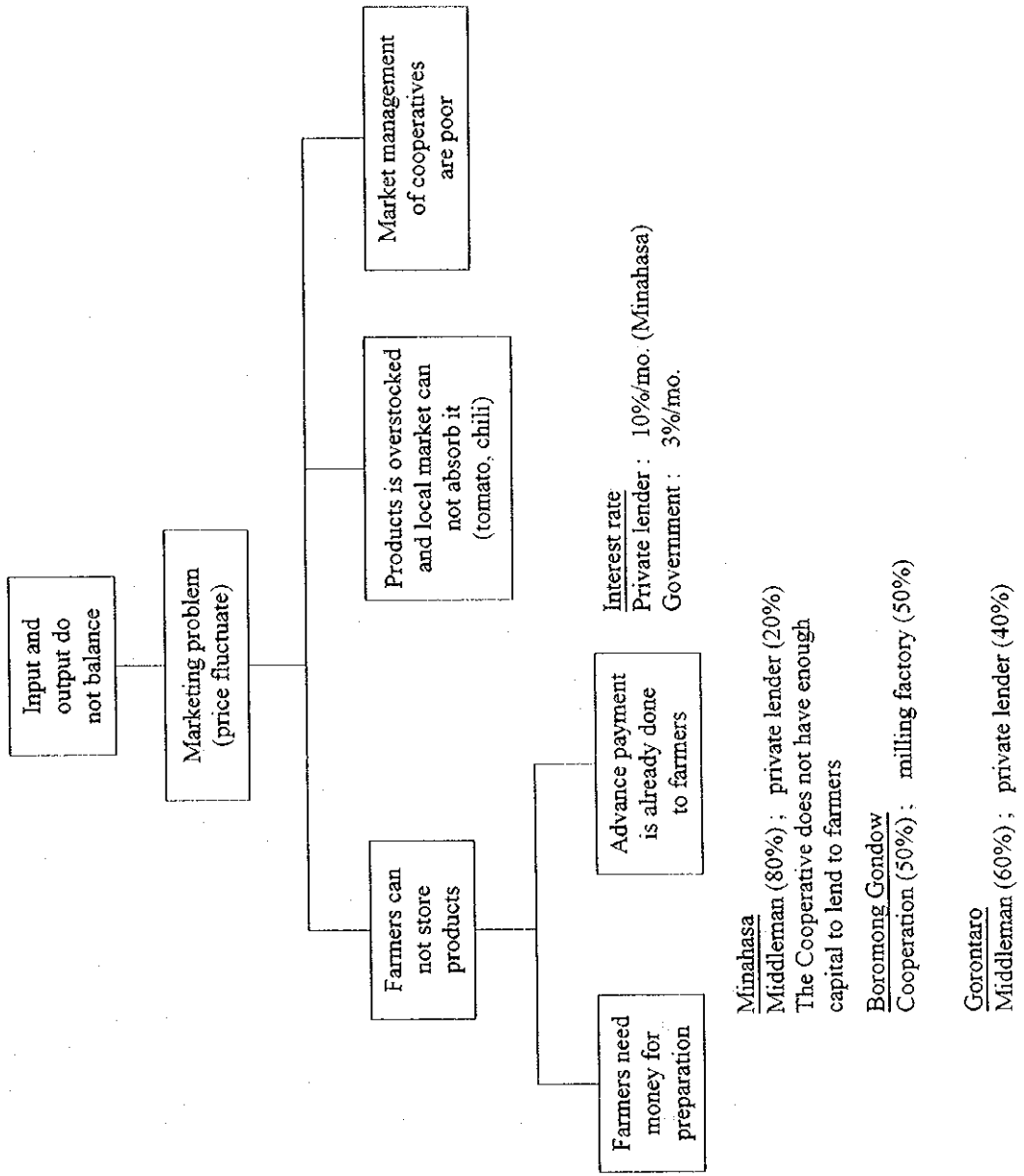
## Problems Tree (2) : Problems Relevant to Production



### Problems Tree (3) : Problems Relevant to Production Cost



**Problems Tree (4) : Problems Relevant to Marketing**

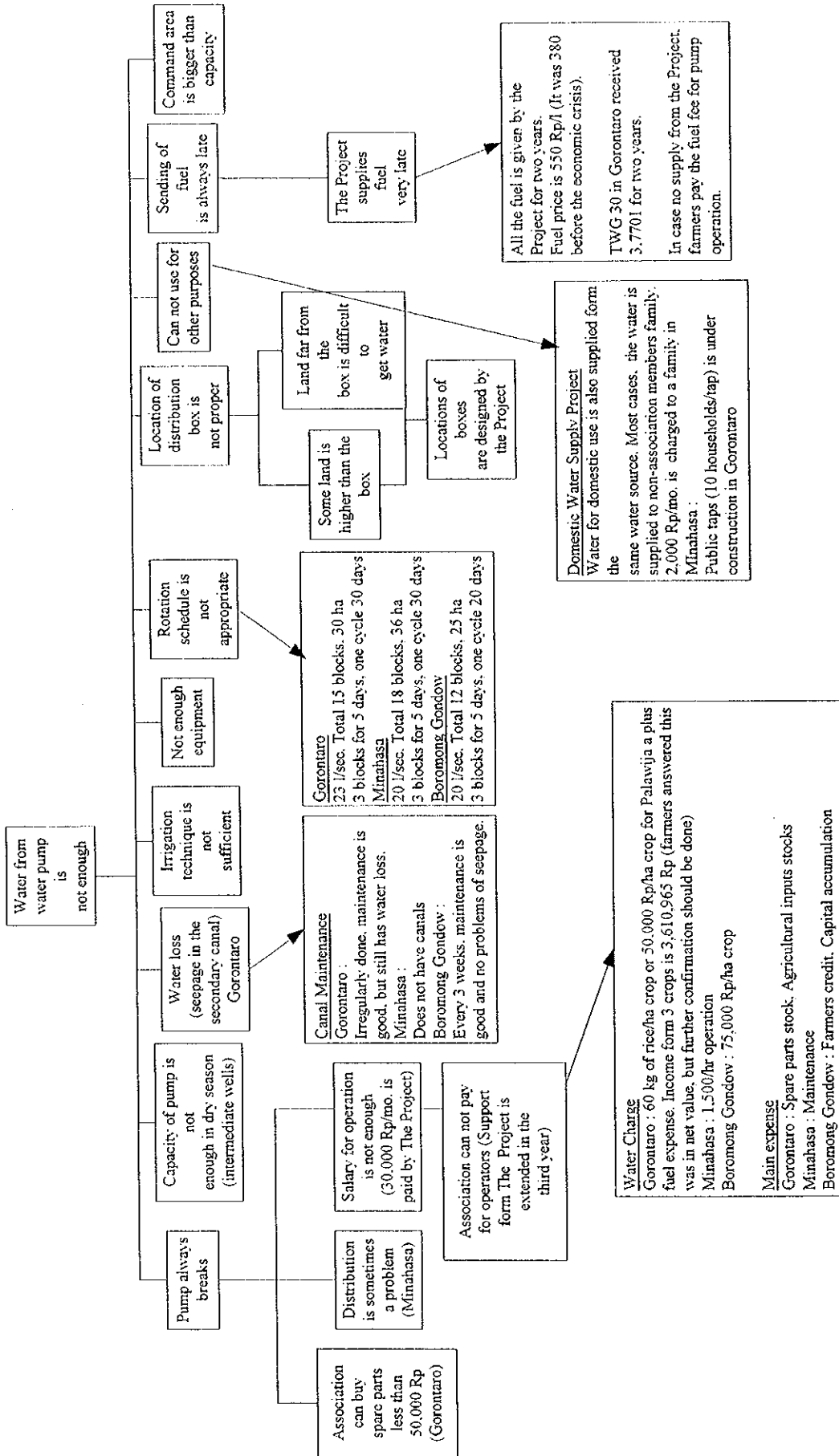


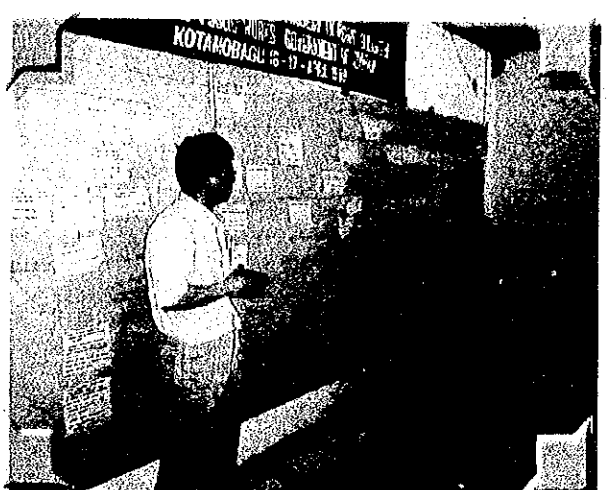
Minahasa  
 Middleman (80%) ; private lender (20%)  
 The Cooperative does not have enough capital to lend to farmers

Boromong Gondow  
 Cooperation (50%) ; milling factory (50%)

Gorontaro  
 Middleman (60%) ; private lender (40%)

**Problems Tree (5) :**  
**Problems Tree on Focused Issues : Water Supply and Management**  
 (under the problem of "Yield is not enough")



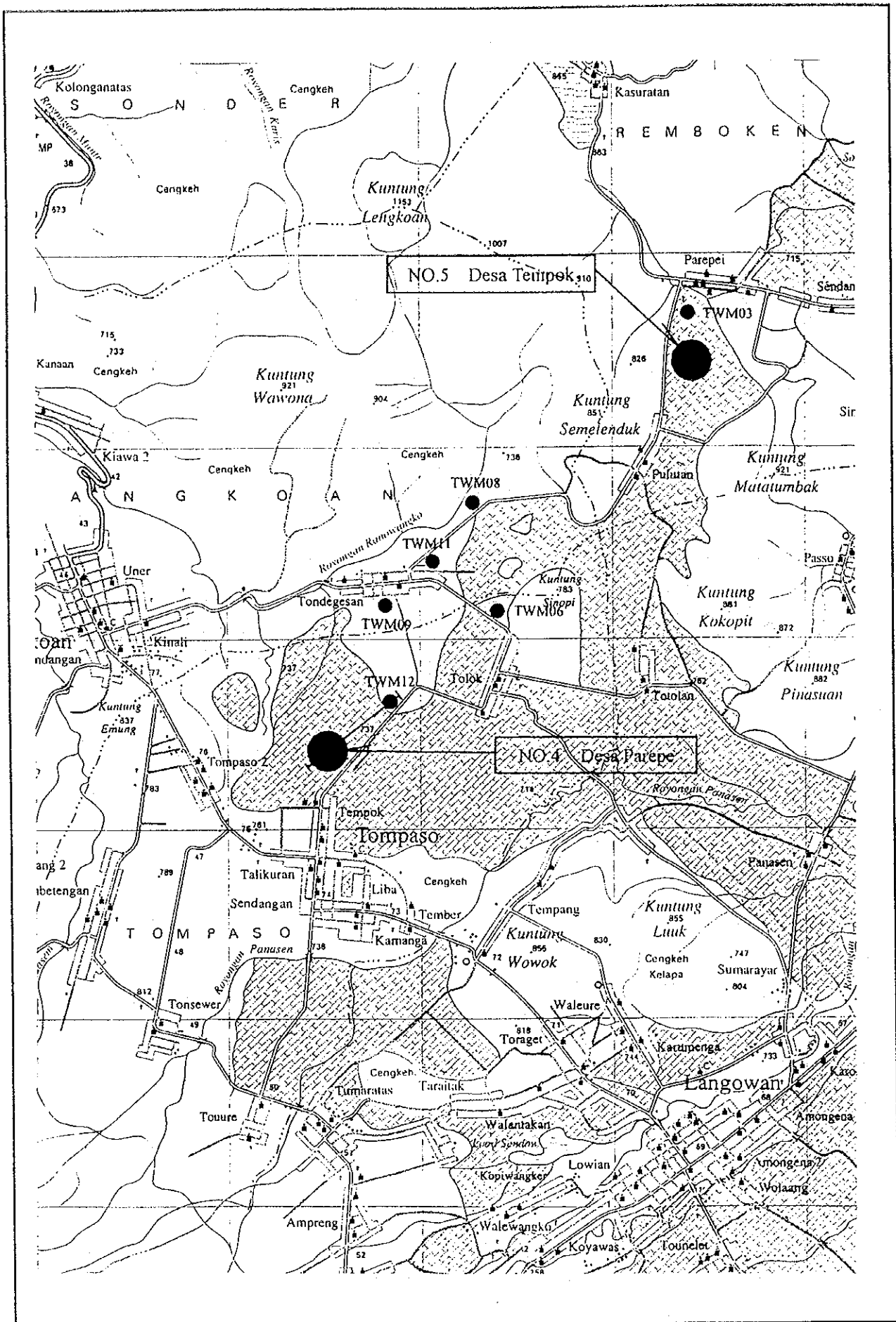


PCM Workshop



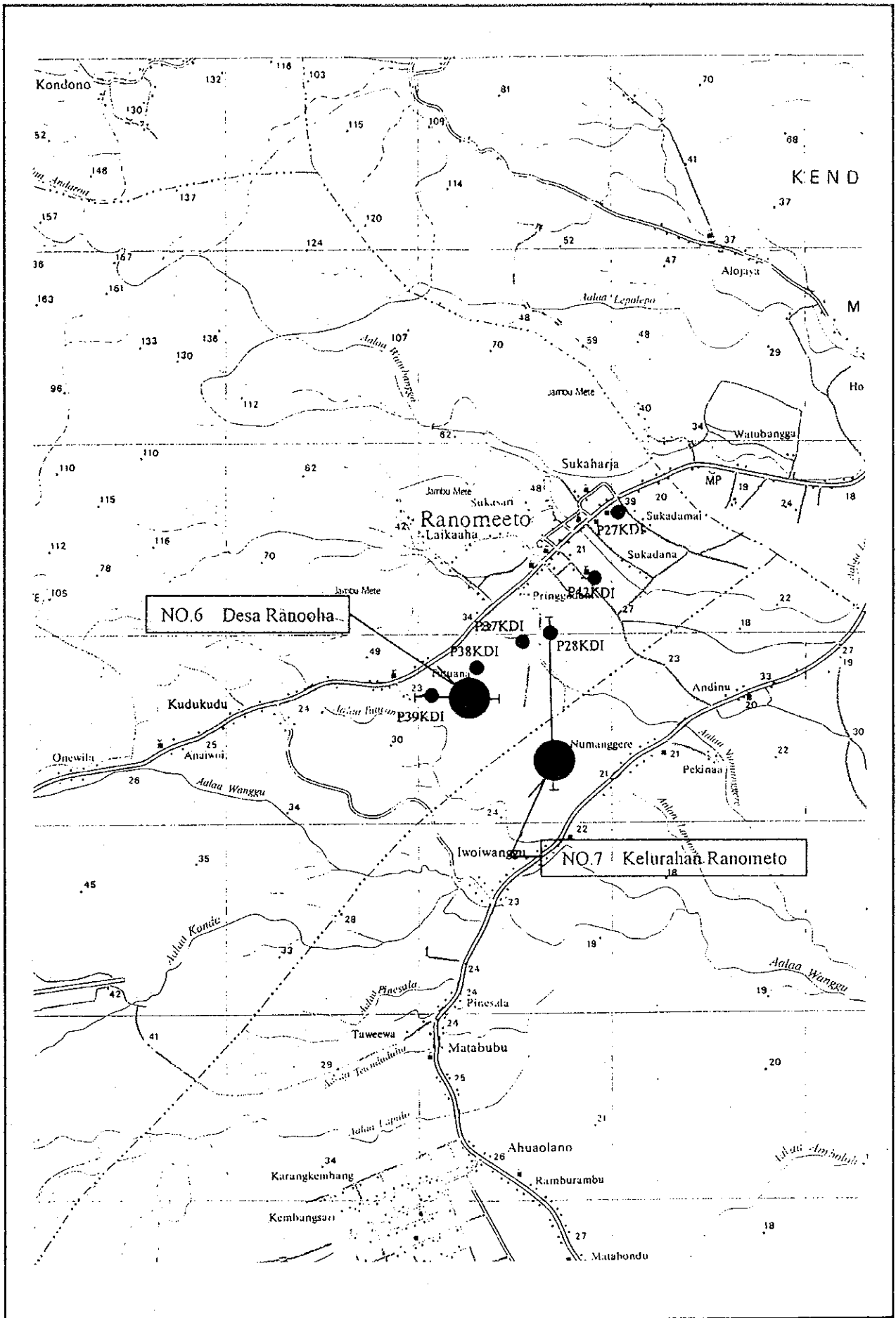






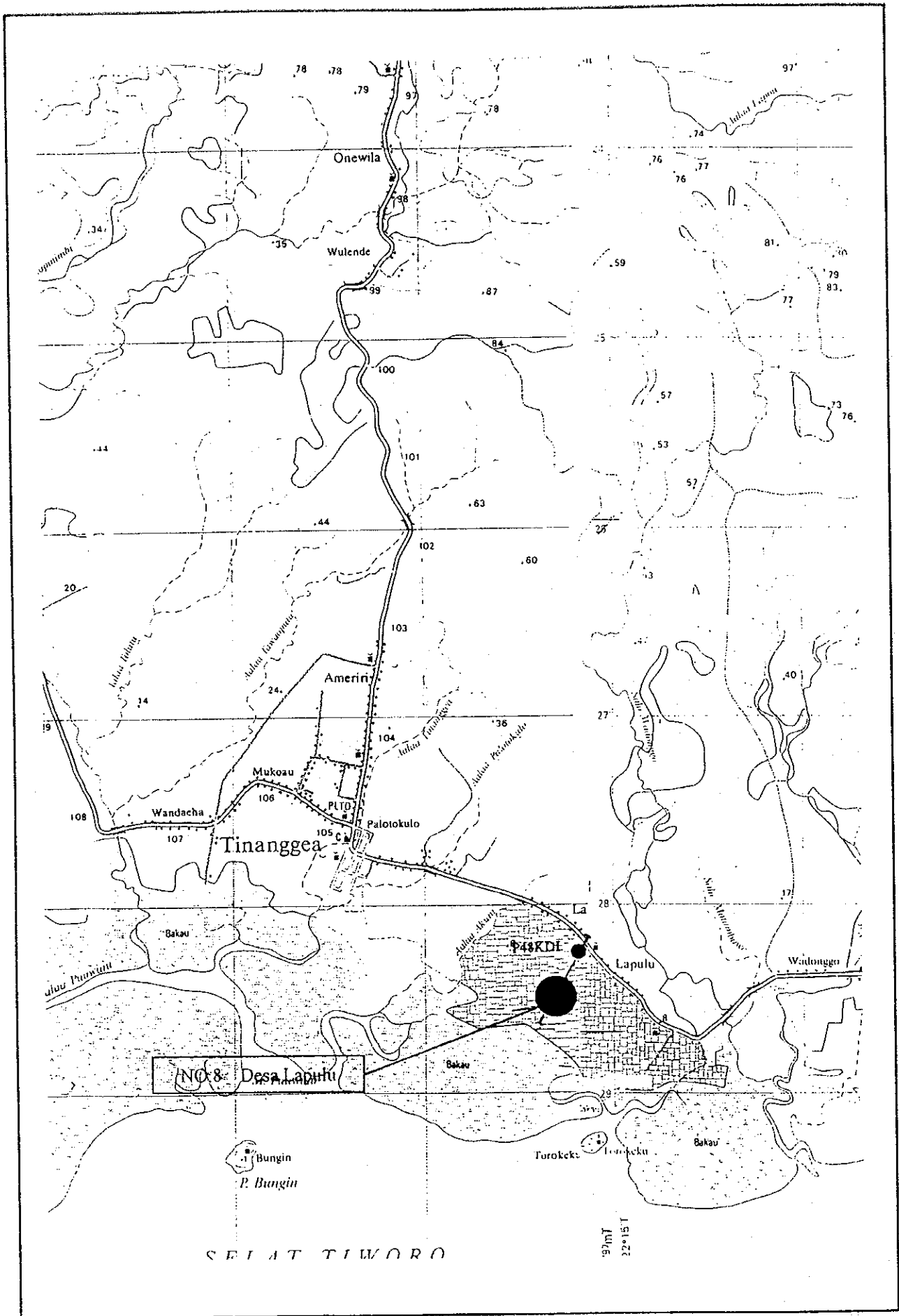
Location Map (2/12)

Scale = 1/50,000



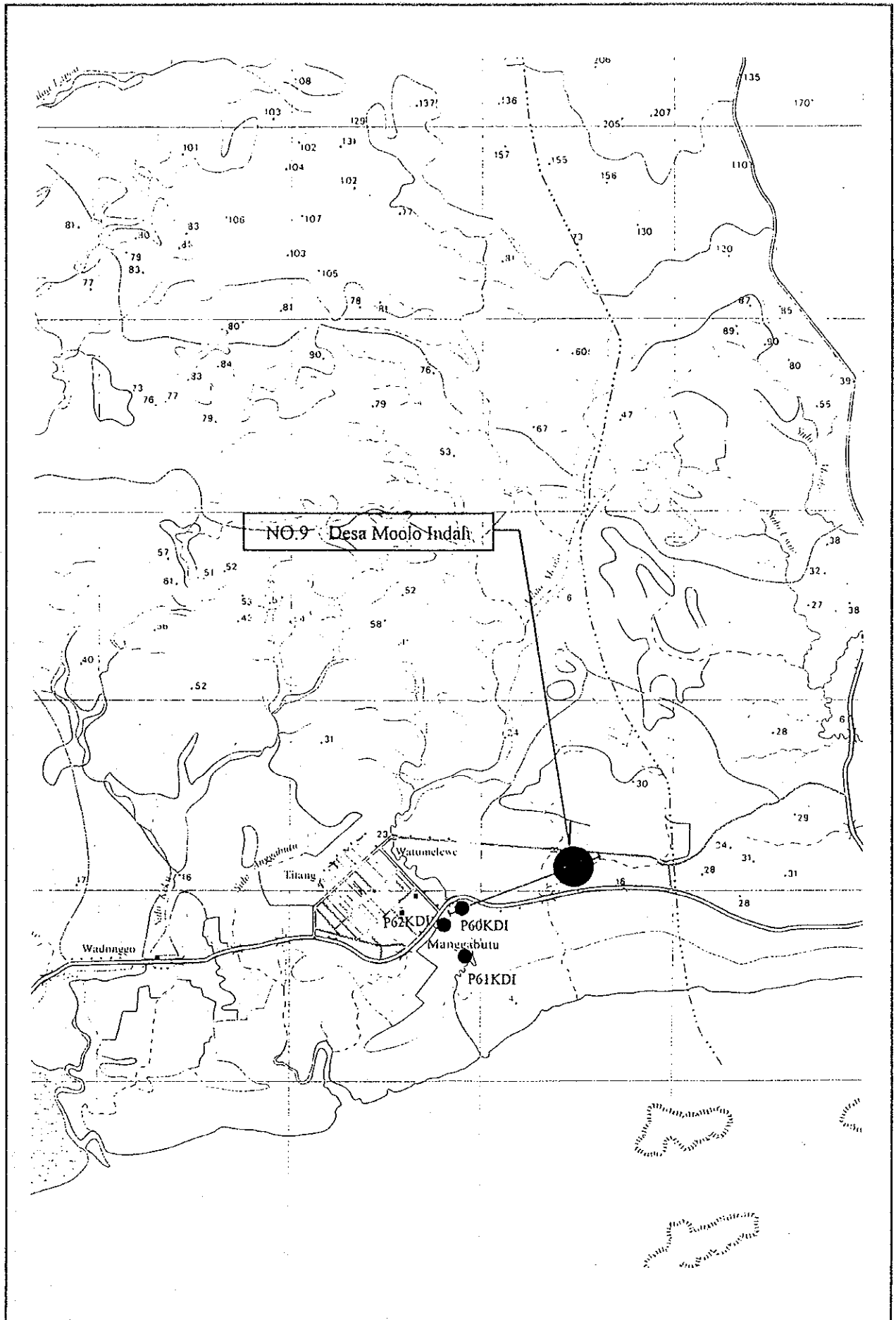
Location Map (3/12)

Scale = 1/50,000



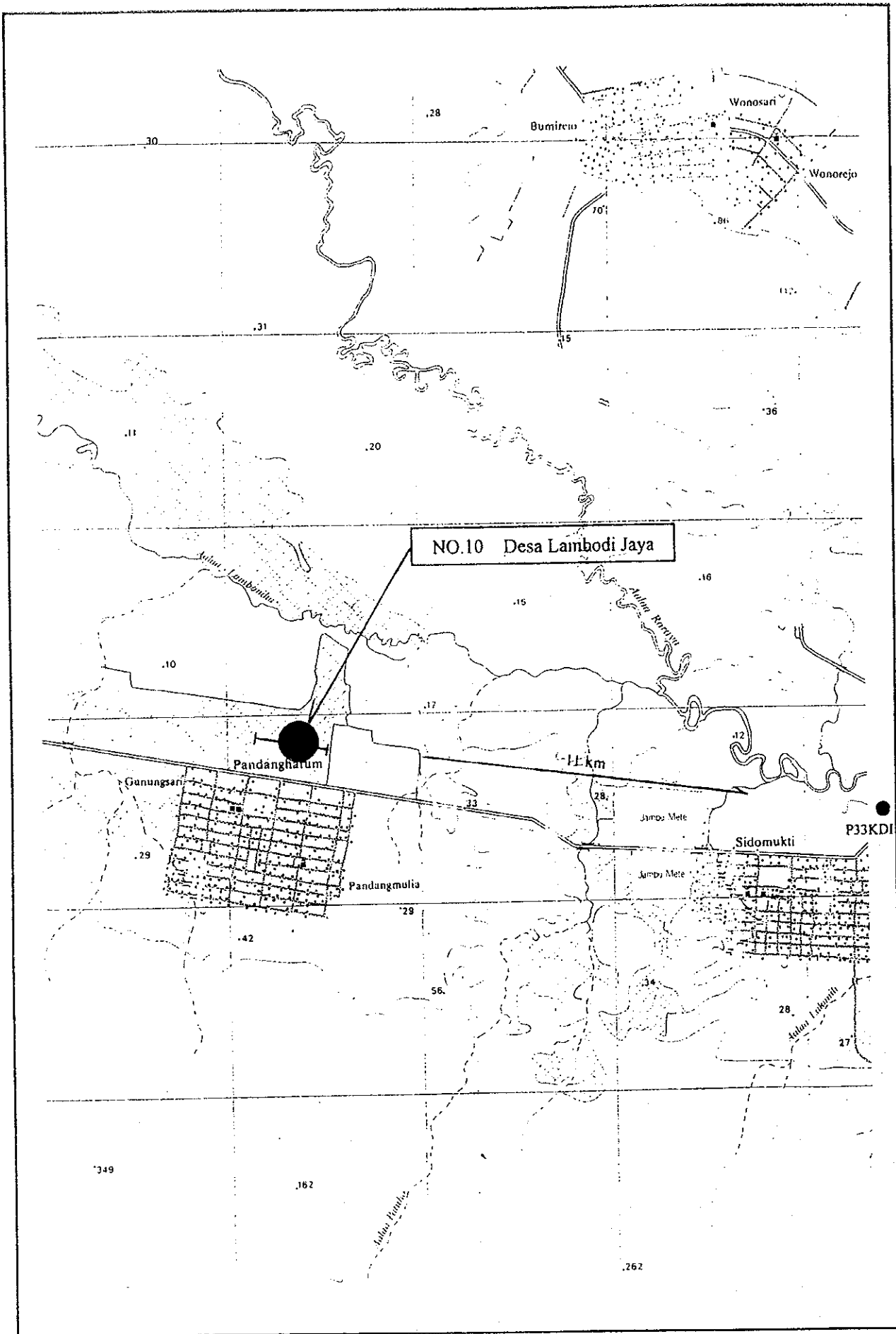
Location Map (4/12)

Scale = 1/50,000



**Location Map (5/12)**

Scale = 1/50,000

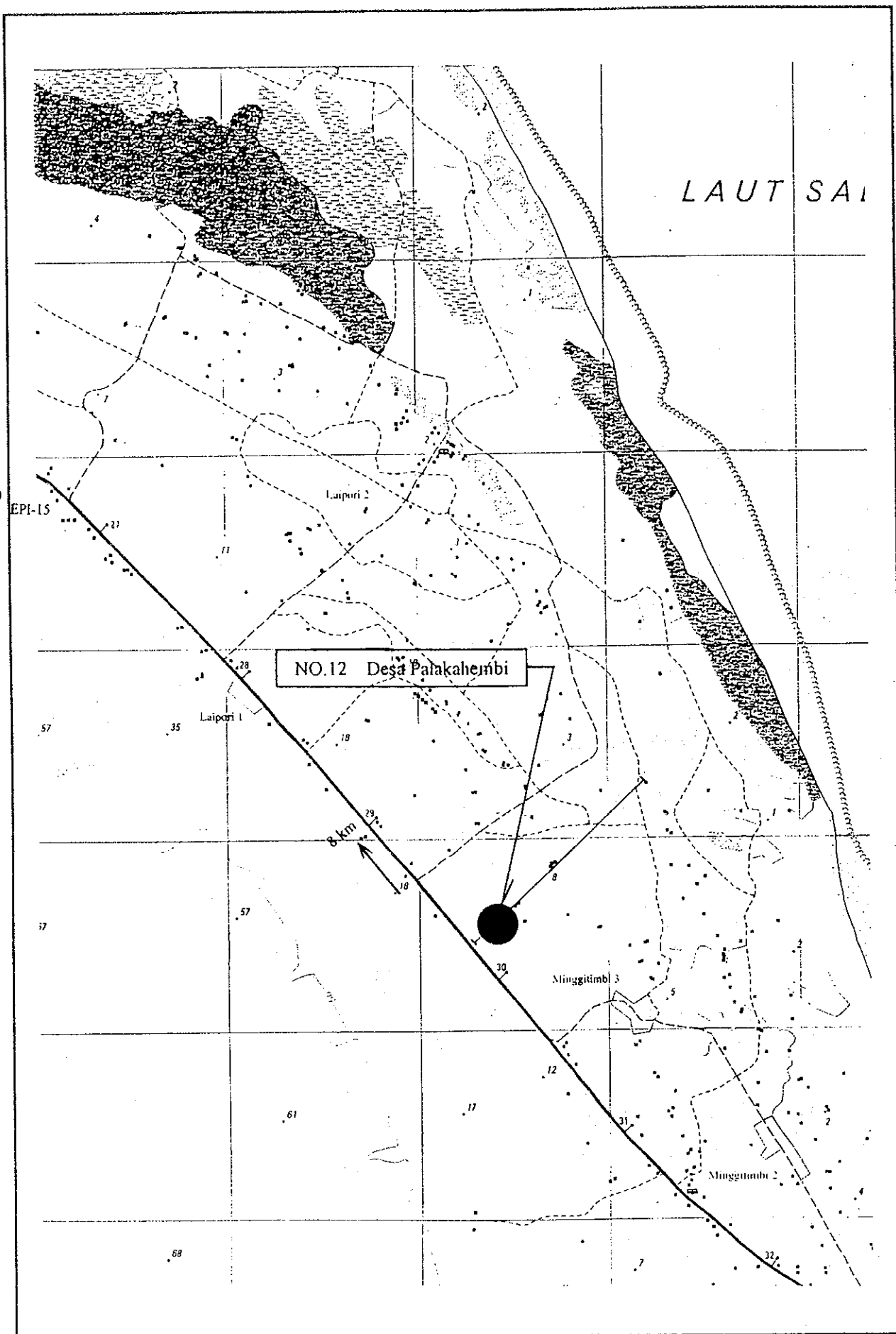


**Location Map (6/12)**

Scale = 1/50,000



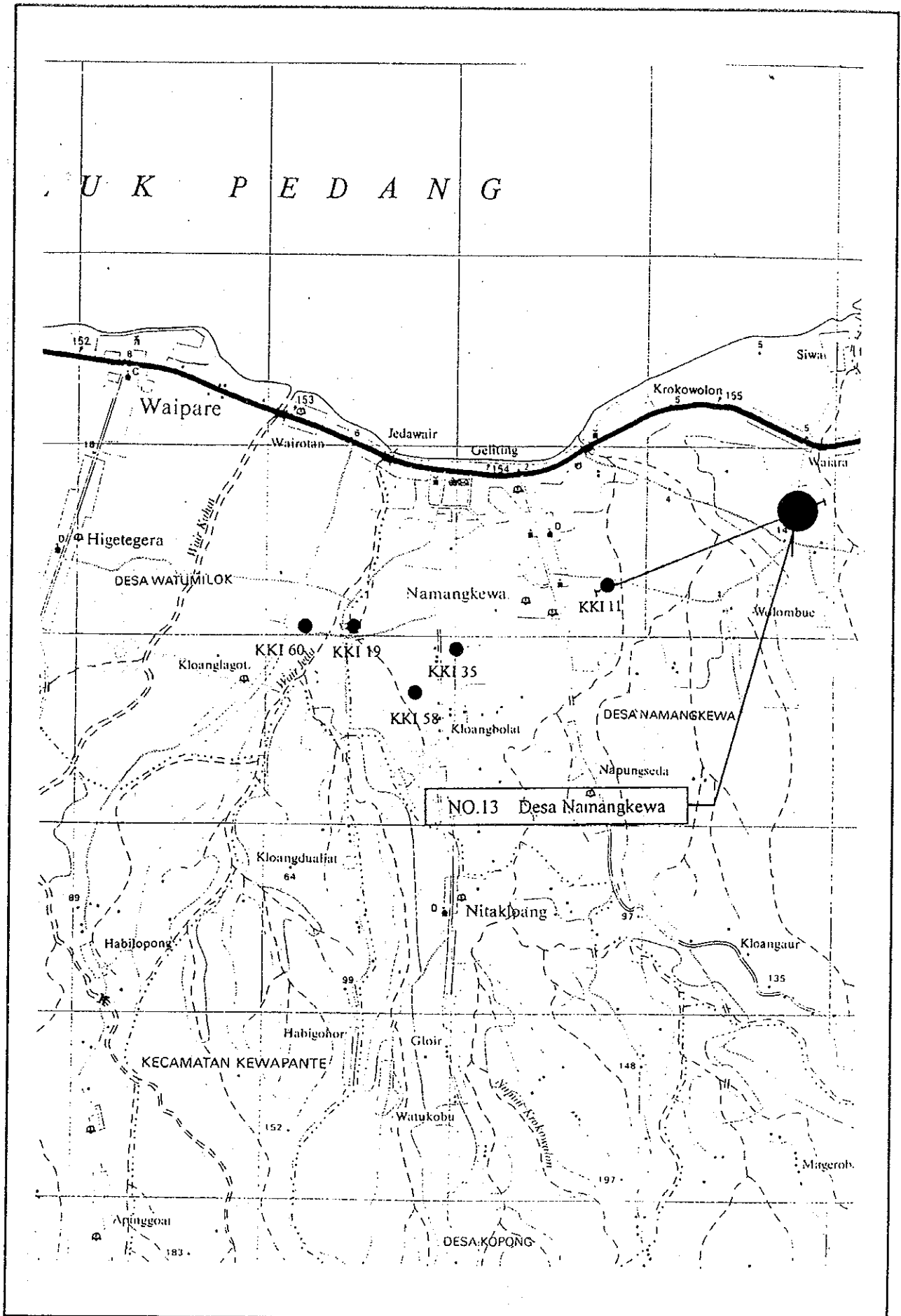




**Location Map (8/12)**

Scale = 1/25,000

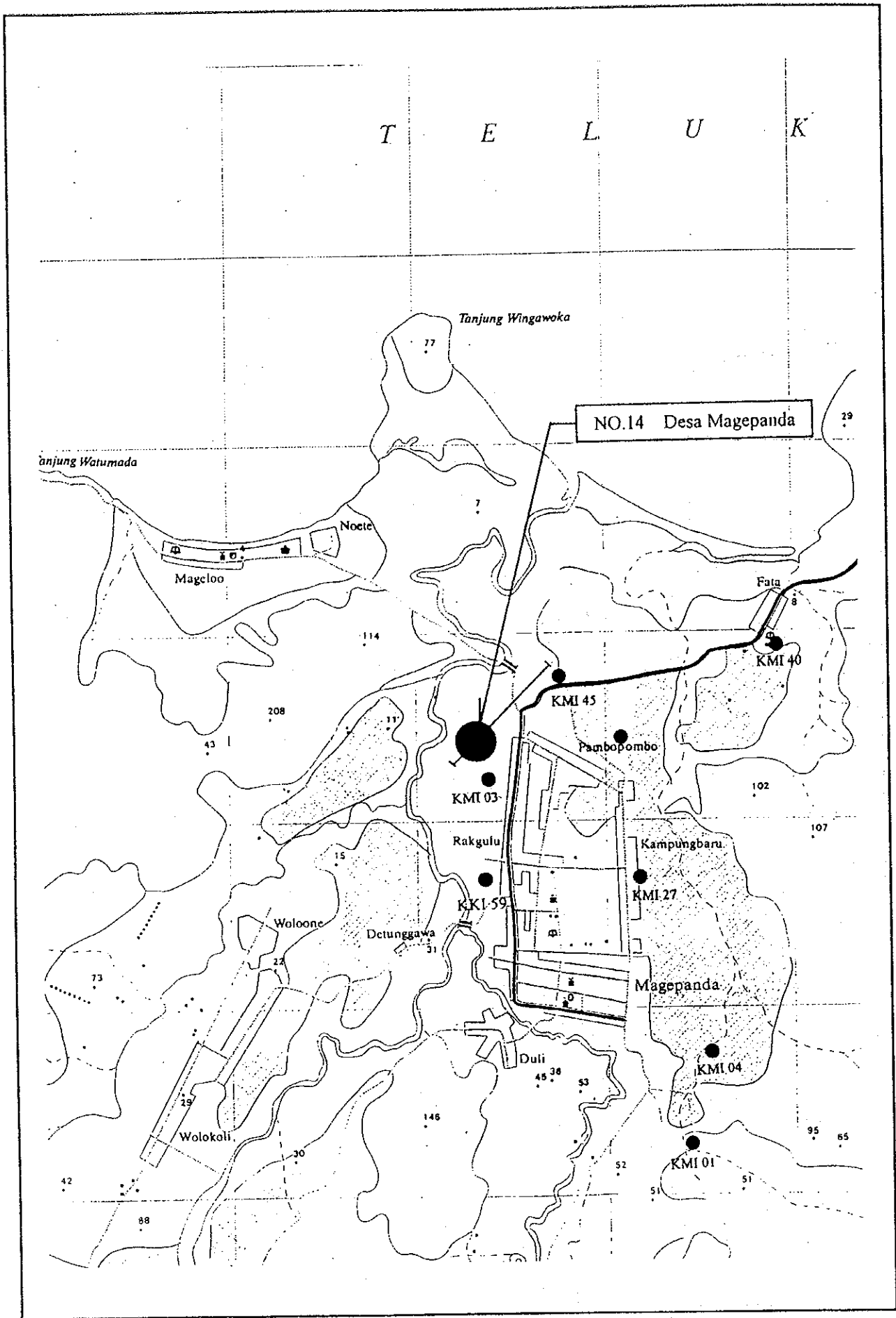
U K P E D A N G



Location Map (9/12)

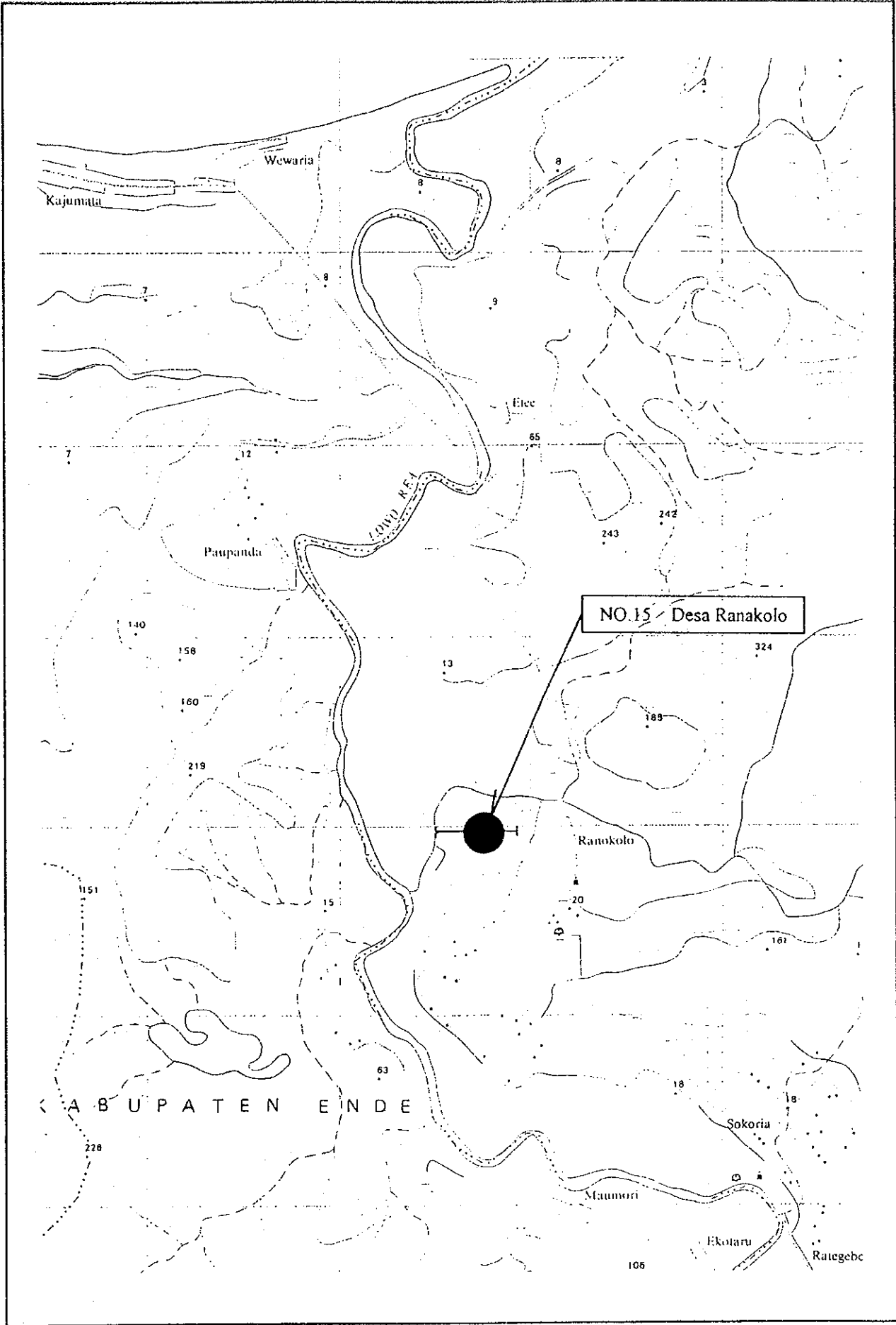
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T E L U K



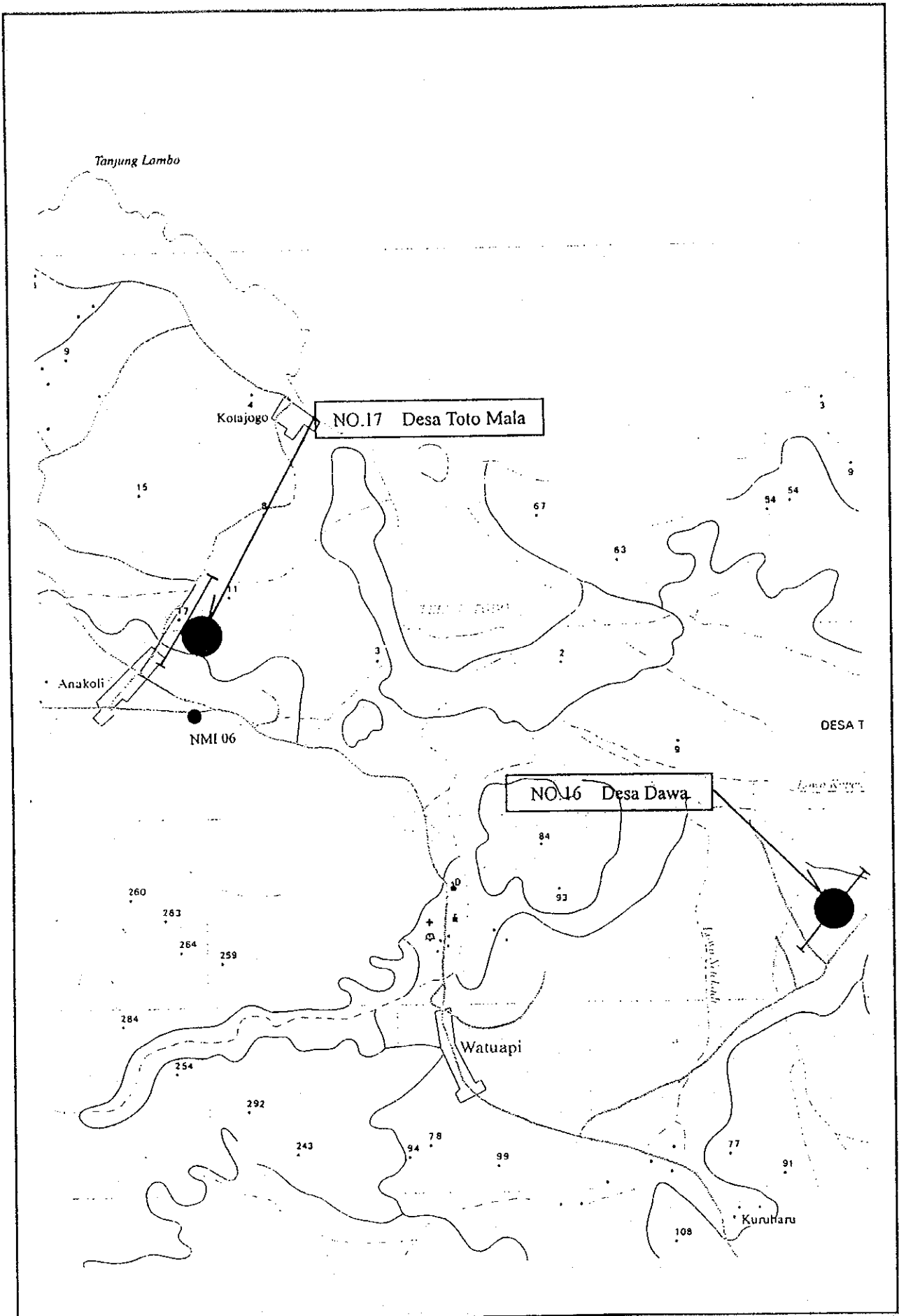
Location Map (10/12)

Scale = 1/25,000



**Location Map (11/12)**

Scale = 1/25,000



**Location Map (12/12)**

Scale = 1/25,000









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