

## The Fiscal Aspect For Land Accretion Development By Using Landsat TM / ETM Image ( Case Study Segara Anakan Area)

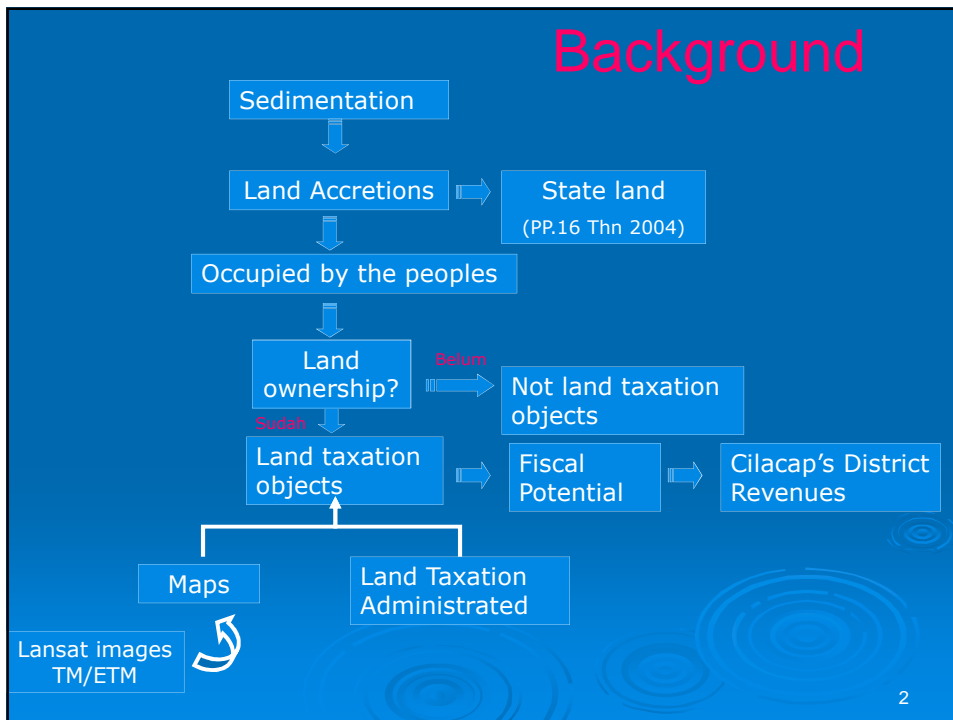


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## Background



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## Problems

- There is no rules for any land accretion to be taxed by Local governments,
- It's difficult to identify or mapping the land accretion changes and developments
- Land accretions are belong to the state/local government and still have not the ownership titles.

## Questions

- ✓ How to determine the potential capacity of Land Taxation for the land accretion products by satellite imagery (Landsat TM/ETM).
- ✓ How to manage the land accretion objects.
- ✓ How to manage the land taxation for local government regarding to the land accretion products.

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## Objectives

1. To determine the potential land taxation capacity for the land accretion products.
2. To identify the land accretion change and development by using multi temporal satellite imagery
3. To evaluate the fiscal aspects related to the land accretion products and developments for local government revenues.

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## Limitation and Asumtion

- Location: Kampung Laut sub district, District of Cilacap, West Java Province.
- Neglection of erosion level, tide gauges influence, current.
- Land value per m2 base on Land taxation office report.
- Land value adjustment is made for every 3 years.
- All the accretion land product has an ownership title related to the land properties.
- Each land parcel as one land taxation object.
- Only for land taxation as a local government revenues

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## Methods

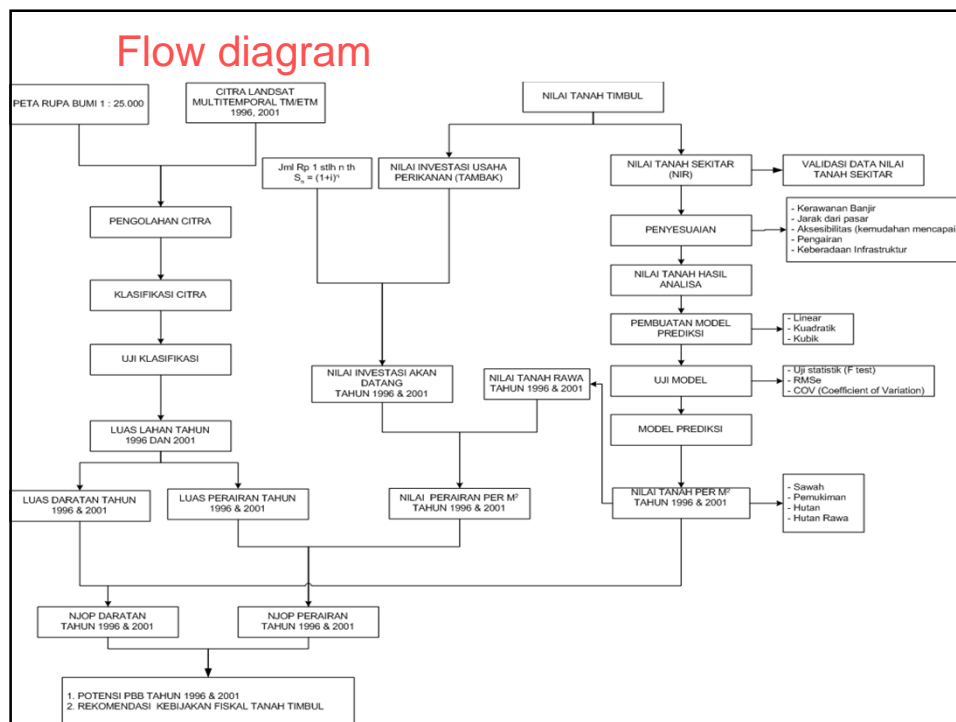
- Land valuation
- Land valuation within waters area.
- Image processing and analysis

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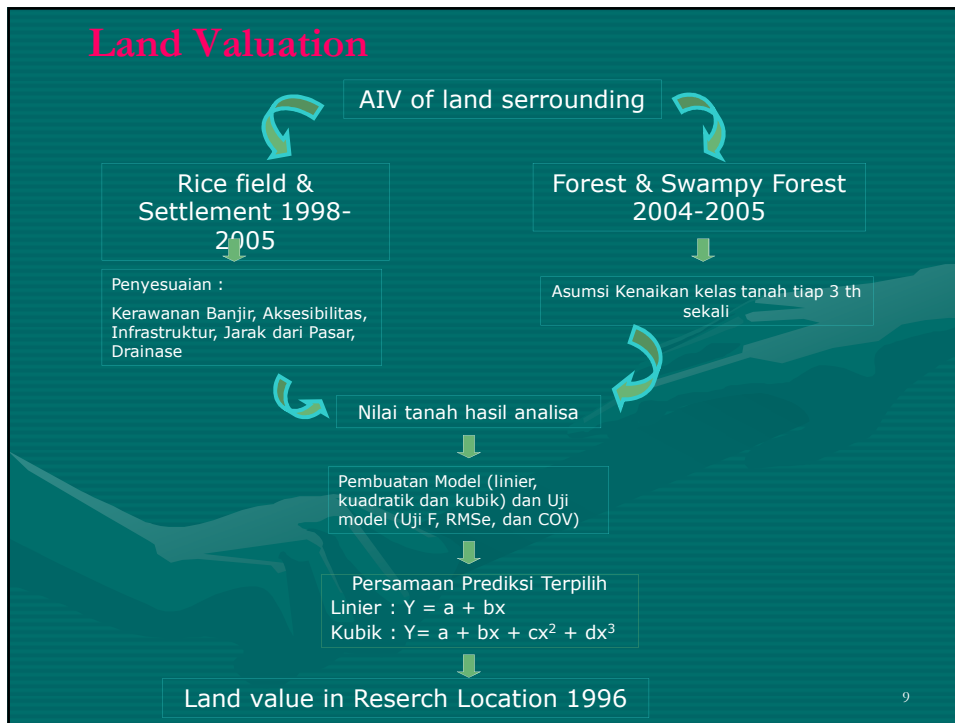
## Data to be used

- Landsat Imagery Landsat TM/ETM year 1996 and 2001
- Topographical Map scale 1 : 25.000
  - Sheet No. 1308-241 Kalipucang,
  - Sheet No. 1308-242 Pengolahan,
  - Sheet No. 1308-243 Gandrungmangu
- Area of land and waters from Water Resource Agency
- Others

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# Land Valuation



# Land valuation result

Nilai tanah obyek (hasil analisa)

Tahun	Hutan	Htn Hutan rawa	Pemukiman	Sawah
1998	1200	660	1,863	1,581
1999	1700	660	1,863	1,581
2000	1700	910	2,056	2,019
2001	1700	910	2,844	2,559
2002	2450	910	3,125	3,209
2003	2450	1200	3,369	3,116
2004	2450	1200	3,556	3,544
2005	3500	1200	4,925	4,509

Uji RMSe menunjukkan bahwa model linier untuk hutan dan rawa krn cenderung konstan

Hasil uji F menunjukkan bahwa F hitung > F tabel, berarti model/persamaan dapat digunakan untuk mengambil kesimpulan/berarti.

Hasil uji COV menunjukkan bahwa nilai tanah seragam (tidak terdapat kesenjangan)

Lahan	Model	Persamaan
Hutan	Linier	$Y = 0,920 + 0,272x$
Hutan rawa	Linier	$Y = 0,563 + 0,088x$
Pemukiman	Kubik	$Y = 1,22 + 0,373x - 0,052x^2 + 0,006x^3$
Sawah	Kubik	$Y = 01,116 + 0,102x + 0,031x^2 + 0,000x^3$

Lahan	F Hitung	F Tabel
Hutan	37,723	5,79
Hutan rawa	49,951	5,79
Pemukiman	23,638	6,59
Sawah	31,328	6,59

Lahan	St.Dev	COV (%)
Hutan	0,013	1,349
Hutan rawa	0,006	0,627
Pemukiman	0,008	0,751
Sawah	0,005	0,537

Pembuatan Model (linier, kuadratik dan kubik)

	linier	quadratic	cubic	linier
R Square	0,887	0,912	0,863	
Adj R Sq				
SEE	0,850	0,907	0,893	
F test	0,857	0,838	0,875	
t test	0,942	0,947	0,907	
a	0,919	0,907	0,891	
b	0,265	0,285	0,308	
c	0,959	0,959	0,941	
d	0,943	0,929	0,931	
e	0,208	0,233	0,230	
f	59,076	31,528	95,287	
g	0,856	0,197	9,761	
h	1,092	1,116	0,727	
i	0,127	0,102	0,346	
j	0,024	0,031		
k		0		

## Land Valuation Results

Model prediksi terpilih

Lahan	Model	Persamaan
Hutan	Linier	$Y = 0,920 + 0,272x$
Hutan rawa	Linier	$Y = 0,563 + 0,088x$
Pemukiman	Kubik	$Y = 1,22 + 0,373x - 0,052x^2 + 0,006x^3$
Sawah	Kubik	$Y = 01,116 + 0,102x + 0,031x^2 + 0,000x^3$

Nilai tanah tahun 1996 dan 2001 (Rp/m<sup>2</sup>)

Lahan/Tahun	1996	2001	Perubahan (%)
Hutan	376	2450	551.60
Hutan rawa	387	910	135.14
Pemukiman	218	2789	1179.36
Sawah	1036	2657	156.47

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## Land waters valuation

- Perairan tdk untuk usaha tambak ➡ Kep-16/PJ.6/1998 (lamp Va)  
Rp 4,8 (1996) dan Rp 12 (2001)
- Perairan untuk usaha tambak, sebagai berikut :

Nilai Investasi Usaha Tambak tahun 1997

Jml Rp 1 stlh n th =  $(1+i)^n$

$$FV = PV \times (1+i)^n$$

FV = Future Value

PV = Present Value

+

Nilai tanah sekitar (rawa)

No	Tahun	Tahun ke	Suku Bunga	Sn	NI	NIAD
1	1996	-1	0,1	0,91		895
2	1997	0	0,1	1,00	984	984
3	2001	4	0,1	1,46		1.441

1996 = Rp 387

2001 = Rp 910

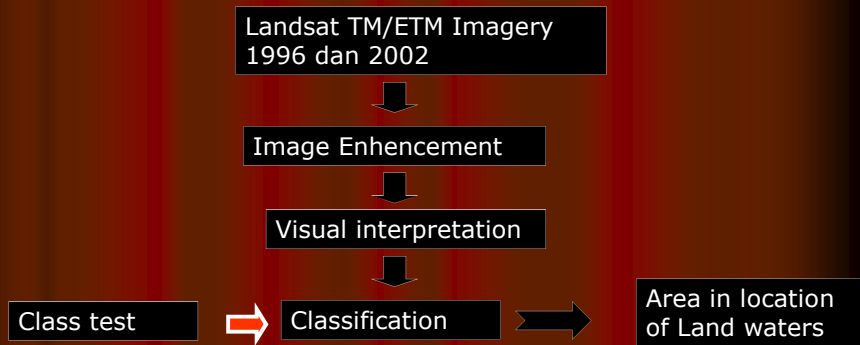
Nilai Perairan th 1996 dan 2001

1996 = 895 + 387 = 1282

2001 = 1441 + 910 = 2351

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# Image Processing



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## Visual Interpretation

Kegiatan untuk menafsirkan atau mengenali obyek yang terdapat di permukaan bumi dari data citra satelit.

Jenis lahan	RGB321 (1996)	RGB321 (2001)
Hutan	Hijau tua	Hijau tua
Hutan rawa	Hijau muda	Hijau muda
Air jernih	Biru,	Biru,
Air keruh	biru kehijauan	biru kehijauan
Pemukiman	Coklat muda terang	Coklat muda
Sawah	Coklat gelap, keunguan	Coklat tua, keunguan

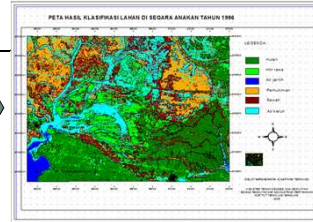
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## Classification of images

Topographical map 1 : 25.000



1996



2001



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## Image Classification

No	Penggunaan Areal	Jumlah Pixel		Luas (ha)	
		1996	2001	1996	2001
1	Hutan	92.044	87.239	8.284	7.851
2	Htn Rawa	51.475	66.897	4.632	6.021
3	Air jernih	7.287	10.413	656	937
4	Air keruh	73.386	32.635	6.604	2.937
5	Pemukiman	48.559	59.851	4.370	5.387
6	Sawah	73.784	92.965	6.640	8.367
	jumlah	346.535	350.000	31.186	31.500
	tdk terklasifikasi	3.465	0	314	0
	Total	350.000	350.000	31.500	31.500

### Citra tahun 1996

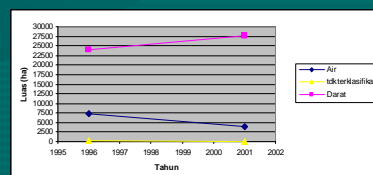
- Perairan = luas kelas air jernih + air keruh = 7.260 ha
- Daratan = luas kelas hutan + htn hutan rawa + pemukiman + sawah = 8.284 + 4.632 + 4.370 + 6.640 = 23.926 ha
- Tidak terklasifikasi = 314 ha

### Citra tahun 2001

- Perairan = luas kelas air jernih + air keruh = 3.874 ha
- Daratan = kelas hutan + htn hutan rawa + pemukiman + sawah = 7.851 + 6.021 + 5.387 + 8.367 = 27.626 ha

- Diasumsikan 30 luas air keruh dipergunakan untuk usaha tambak

No	Penggunaan Areal	Luas (ha) RGB 321		perubahan luas (ha)
		1996	2001	
1	Darat	23926	27626	3700
2	Air	7260	3874	-3386
	jumlah	31186	31500	314
	tdk terklasifikasi	314	0	-314
	Total	31500	31500	0



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## Classification test

Pengujian dilakukan dengan cara membandingkan dua peta yaitu peta citra hasil klasifikasi dan peta lain yang diasumsikan benar atau dianggap benar (Peta Rupa Bumi Bakosurtanal)



Year	Number Observation	Percentage of accuracy(%)
1996	125	79,2
2001	125	70,4

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## Fiscal aspects management

- ◆ To indentify land waters tax object which never taxed it before
- ◆ To apply the land waters taxation procedures more efficient and effective.



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## Land taxation procedures

Area of land = Area of classification result

Land value 1996 = LV prediction result

Land value 2002 = LV analysis result

Waters value = Land value around + Investation value

Selling value land Object (NJOP) = Land area x Waters value

Selling Value NoTaxed (NJOPTKP) = < 12 juta

Selling value to be taxed (NJOPKP)= 20% atau 40 % (Act No 46 Tahun 2000)

Tarif 0,5% = UU No 12 Tahun 1994

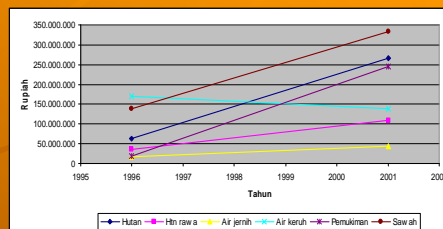
Land Taxation = (NJOP – NJOPTKP) x NJKP 40% x Tarif 0,5%

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## Potential Land Taxation PBB

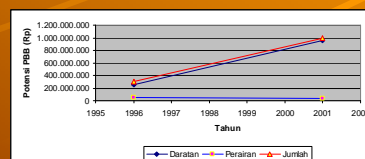
### Potential of Land taxation per unit parcel

Lahan	Potensi PBB (Rp)		
	1996	2001	%
Hutan	62.281.680	266.920.000	328,57
Htn rawa	35.837.680	109.568.200	205,73
Air jernih	24.488	105.440	330,58
Air keruh	214.894	239.708	11,547
Air keruh (tambak)	50.765.957	41.409.584	-18,43
Pemukiman	19.039.200	244.555.800	1184,5
Sawah	137.566.800	332.323.240	141,57
Jumlah	305.730.699	995.121.972	225,49



### Potential of Land taxation on the land and waters

Lahan	Potensi PBB (Rp)		Perubahan (%)
	1996	2001	
Daratan	254.725.360	953.367.240	274,27
Perairan	51.005.339	41.754.732	-18,14
Jumlah	305.730.699	995.121.972	225,49



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## Analysis

### 1. Analysis of Land and waters valuation

Land value information

Valuation policy

TAHUN	NILAI				
	Sawah	Pmk	Rawa	TnKsng	Hutan
1996	1,036	0,218	0,387	0,465	0,376
1997	1,045	0,789	0,475	0,596	0,646
1998	1,328	1,662	0,66	0,91	1,7
1999	1,328	1,662	0,66	0,91	1,7
2000	1,596	1,835	0,91	1,2	1,7
2001	1,966	2,538	0,91	1,2	1,7
2002	2,657	2,789	0,91	1,2	2,45
2003	2,657	3,012	1,2	1,7	2,45
2004	3,322	3,174	1,2	1,7	2,45
2005	3,766	4,394	1,2	1,7	3,5
2006	4,545	4,739	1,355	1,906	3,369
2007	5,236	5,75	1,443	2,037	3,64
2008	6,989	7,017	1,531	2,168	3,912
2009	6,804	8,576	1,619	2,299	4,184
2010	7,681	10,463	1,707	2,43	4,456

Tahun	NAD	Rawa	N.Air
1996	0,741	0,387	1,128
1997	0,815	0,475	1,290
1998	0,897	0,651	1,548
1999	0,986	0,739	1,725
2000	1,085	0,827	1,912
2001	1,193	0,915	2,108
2002	1,313	1,003	2,316
2003	1,444	1,091	2,535
2004	1,588	1,179	2,767
2005	1,747	1,267	3,014
2006	1,922	1,355	3,277
2007	2,114	1,443	3,557
2008	2,325	1,531	3,856
2009	2,558	1,619	4,177
2010	2,814	1,707	4,521

**Lands:** minimal 2 tahun sekali, karena nilai tanah dalam kurun waktu 2 tahun masih dalam interval 1 (satu) kelas tanah

**Waters:** minimal 3 tahun sekali, karena nilai perairan dalam kurun waktu 3 tahun masih dalam 1 (satu) interval kelas

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## Analysis

### 2. Analysis of data (area changes)

Information of land area

Data policy

Luas lahan dari hasil klasifikasi citra

Didasarkan atas perubahan luas lahan dan perkiraan potensi PBB.

No	Penggunaan Areal	Luas (ha) RGB 321		Estimasi perubahan		Estimasi perubahan/th	
		1996	2001	ha	%	ha	%
1	Hutan	8.284	7.851	-433	-1,4	-87	-0,27
2	Hin Rawa	4.632	6.021	1389	4,4	278	0,88
3	Air jernih	656	937	281	42,8	56	8,5
4	Air keruh	6.604	2.937	-3667	-11,6	-733	-2,33
5	Pemukiman	4.370	5.387	1017	23,3	203	0,65
6	Sawah	6.640	8.367	1727	25,9	345	5,2
	jumlah	31.186	31.500	314	1,0	63	0,20
	tdk terklasifikasi	314	0	-314	-100	-63	-20
	Total	31.500	31.500	0	0,0	0	0,00

No	Lahan	Alternatif Pendataan	Periode
1	Hutan	Penyampaian dan pengembalian SPOP	Setiap tahun
2	Hutan rawa	Penyampaian dan pengembalian SPOP	Setiap tahun
3	Perairan	SPOP Kolektif	2 tahun sekali
4	Pemukiman	Pengukuran bidang OP	5 tahun sekali
5	Sawah	Pengukuran bidang OP	5 tahun sekali

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## Analysis

### 3. Analysis of Land taxation

Information of  
NJOP Land



Policy of Land  
taxation

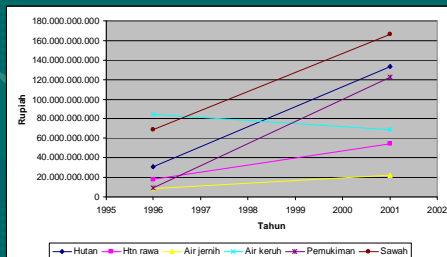
Tingginya NJOP di Segara Anakan disebabkan oleh keluasan lahan yang diasumsikan sebagai satu bidang, sehingga NJOPTKP hanya sekali dan NJKP 40%



NJKP 40% dan tarif 0,5 %



Perlu dipertimbangkan peningkatan besaran NJOPTKP > 7 juta, dengan mengikutsertakan unsur Pemda dalam menetapkan NJOPTKP di Segara Anakan



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## Conclusion

1. The land taxation revenue in year 1996 is Rp 305.730.699 and in year 2001 is **Rp 995.121.972** , There is a potential improvement to be 225.5 % within 5 years.
2. By using the satellite imagery of Landsat TM/ETM was identified :  
The waters area reduction is 3.386 ha, and also there is a new land added is about 3700 Ha. And the unclassified area is 314 Ha.
3. Regarding The fiscal aspect management for the land accretion, the local government should manage the activities for:
  - Data collection :  
by surveying the land taxation objects minimum once in 5 years period. Dan land data updating once a year.
  - Land valuation  
can be done minimum once in 2 years.

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## Suggestions

1. Need some technical aspects in managing for natural land accretion and land reclamation regarding the local government revenues.
2. The regulations is needed to manage the use of state lands which have no title but utilised by privat sectors or institution.
3. Landsat imagery like TM/ETM can be used as an alternative to estimate the land taxation revenues.
4. It should be better of using high resolution satellite imagery data.
5. The multi temporal data images and calibration is strongly needed. r

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**THANK YOU**

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## Potensi PBB

Lahan 1996	Luas (ha)	Nilai/m <sup>2</sup>	NJOP	NJOPTKP	PBB (Rp)
Hutan	8.284	376	31.147.840.000	7.000.000	62.281.680
Htn Rawa	4.632	387	17.925.840.000	7.000.000	35.837.680
Ai jernih	656	4,8	31.488.000	7.000.000	24.488
Air keruh	4.623	4,8	221.894.400	7.000.000	214.894
Air keruh (tambak)	1.981	1282	25.389.978.545	7.000.000	50.765.957
Pemukiman	4.370	218	9.526.600.000	7.000.000	19.039.200
Sawah	6.640	1036	68.790.400.000	7.000.000	137.566.800
Jumlah				Tahun 1996	305.730.699

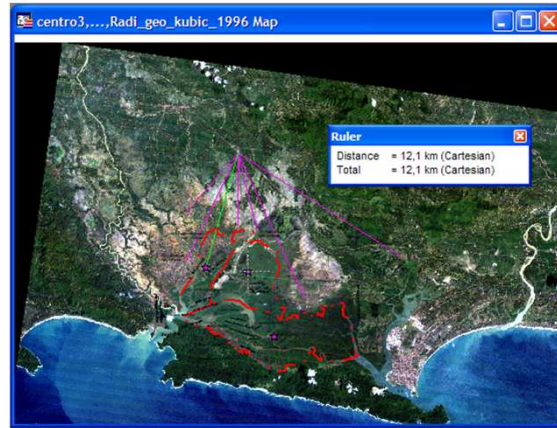
Lahan 2001	Luas (ha)	Nilai/m <sup>2</sup>	NJOP	NJOPTKP	PBB (Rp)
Hutan	7851	1700	133.467.000.000	7.000.000	266.920.000
Htn Rawa	6021	910	54.791.100.000	7.000.000	109.568.200
Air jernih	937	12	112.440.000	7.000.000	105.440
Air keruh	2056	12	246.708.000	7.000.000	239.708
Air keruh (tambak)	881	2351	20.711.792.138	7.000.000	41.409.584
Pemukiman	5387	2270	122.284.900.000	7.000.000	244.555.800
Sawah	8367	1986	166.168.620.000	7.000.000	332.323.240
				Tahun 2001	995.121.972

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## Segara Anakan Tahun 1924

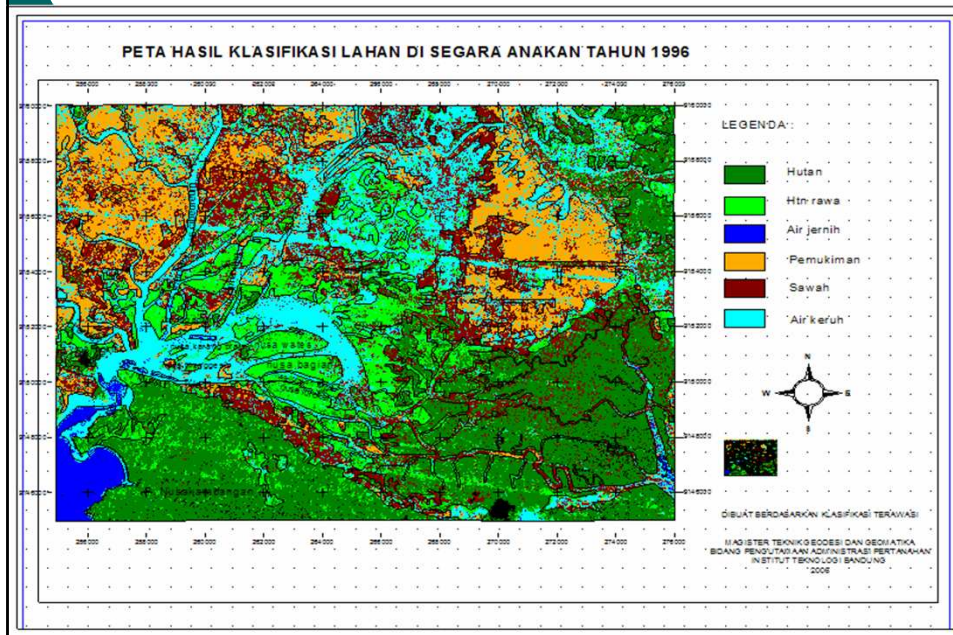


## Jarak dari Pasar

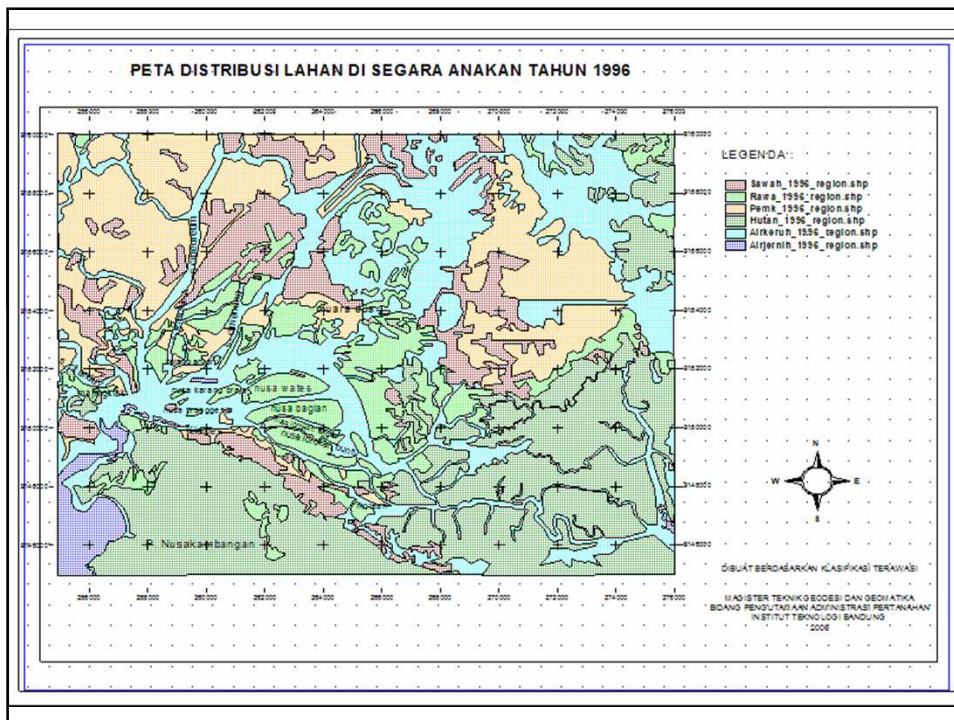
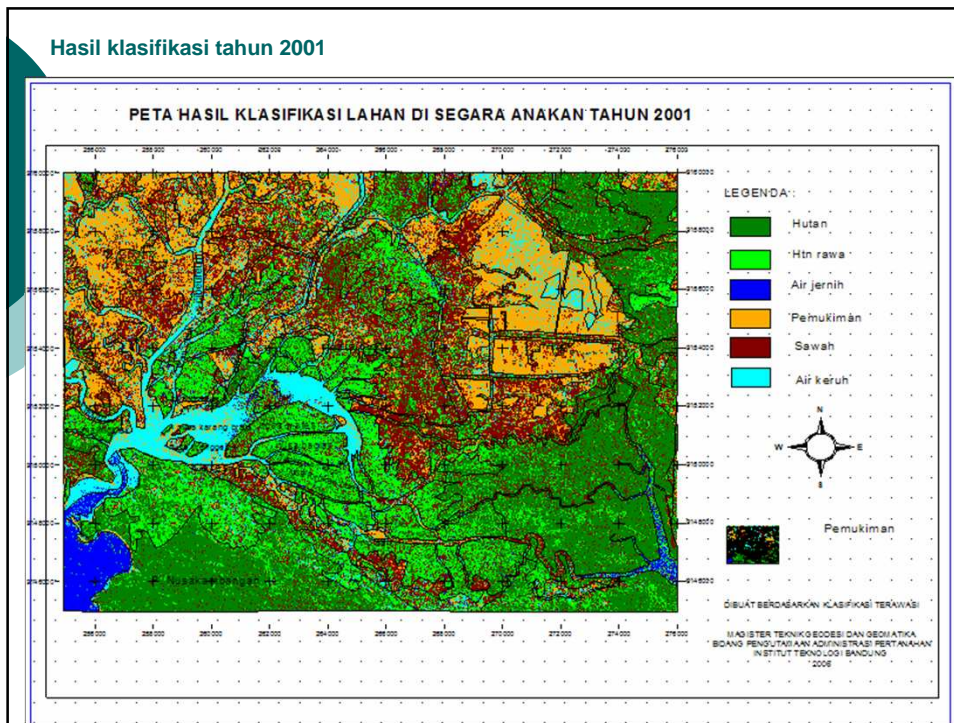


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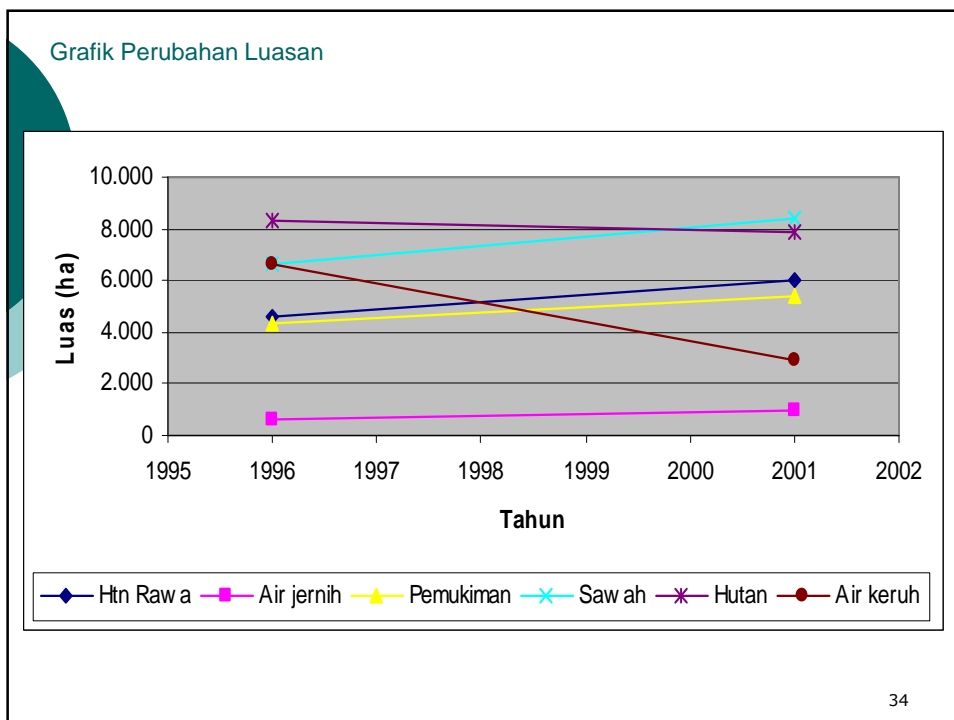
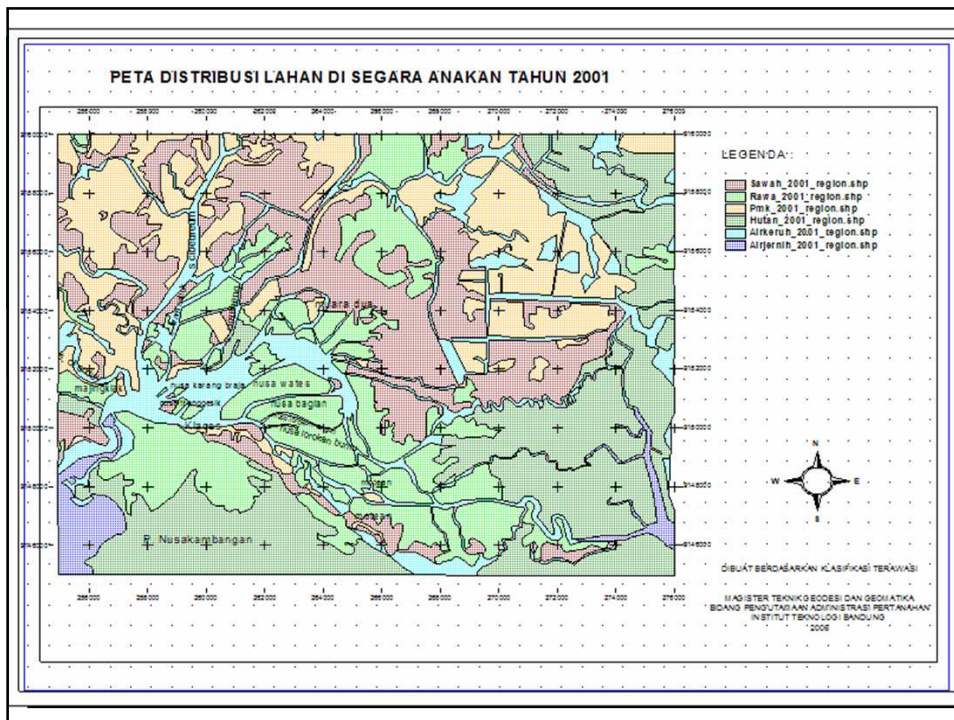
## Hasil klasifikasi tahun 1996



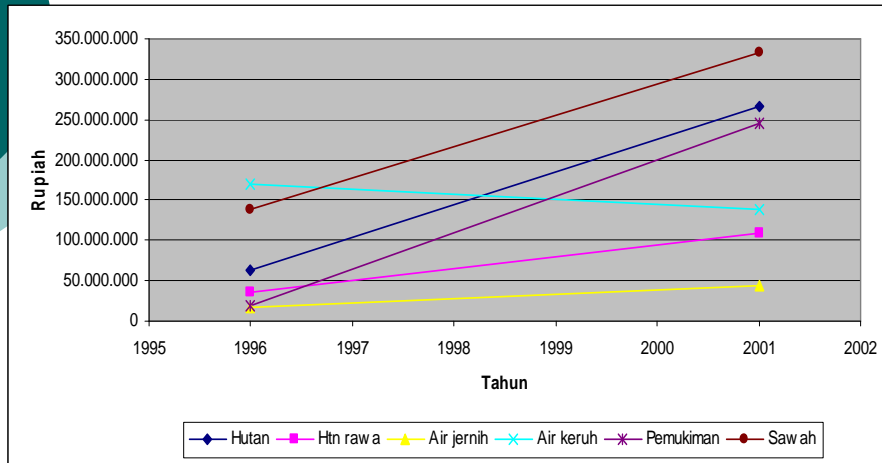
Hasil klasifikasi tahun 2001







## Grafik Potensi PBB



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## Hasil uji klasifikasi

Hasil Uji Klasifikasi Citra Tahun 1996

Jumlah observasi = 125

Persentase akurasi = jumlah diagonal/total observasi = 79,2 %

Peta rujukan	CITRA 1996	Citra yang di evaluasi					Jumlah	omisi	komisi	koreksi	
		Hutan	Rawa	Perairan	pemukiman	sawah					
Hutan		19	4			2	25	24%	16%	76%	
Rawa			21	2		2	25	16%	44%	84%	
Perairan			3	21		1	25	16%	8%	84%	
pemukiman				1		20	4	25	20%	0%	80%
sawah		4	3			18	25	28%	36%	72%	
		23	32	23	20	27	99	21%	21%	79%	

Hasil Uji Klasifikasi Citra Tahun 2001

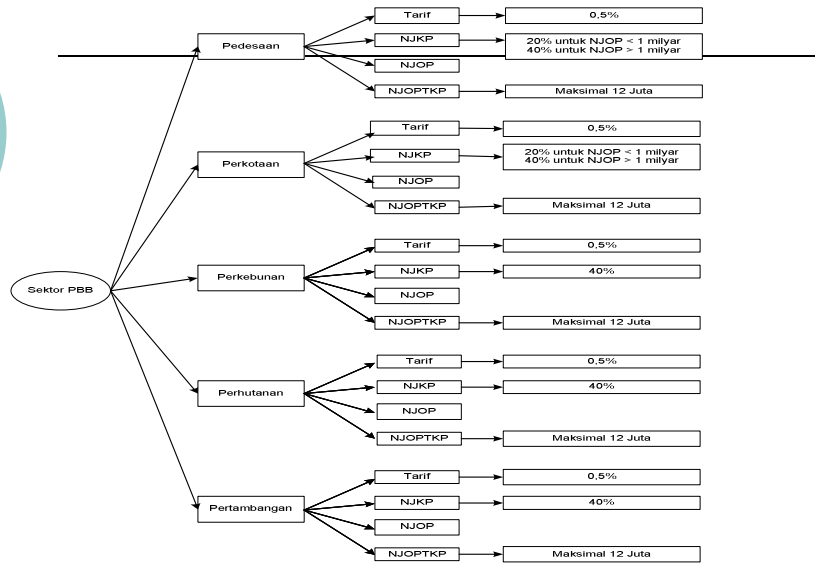
Jumlah observasi = 125

Persentase akurasi = jumlah diagonal/total observasi = 70,4 %

Peta rujukan	CITRA 2001	Citra yang di evaluasi					Jumlah	omisi	komisi	koreksi	
		Hutan	Rawa	Perairan	pemukiman	sawah					
Hutan		19	5			1	25	24%	36%	76%	
Rawa		4	17	1		3	25	32%	52%	68%	
Perairan			3	19		3	25	24%	4%	76%	
pemukiman		2	2			14	7	25	44%	0%	56%
sawah		3	3			19	25	24%	56%	76%	
		28	30	20	14	33	88	30%	30%	70%	

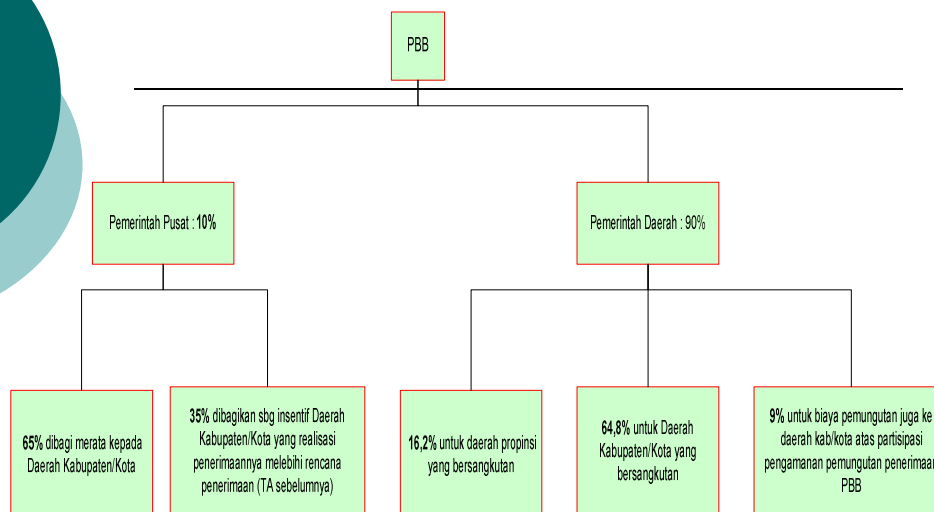
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## Variasi Variabel Penentu Besarnya PBB



Perairan ?

## Rincian Bagi Hasil PBB



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