

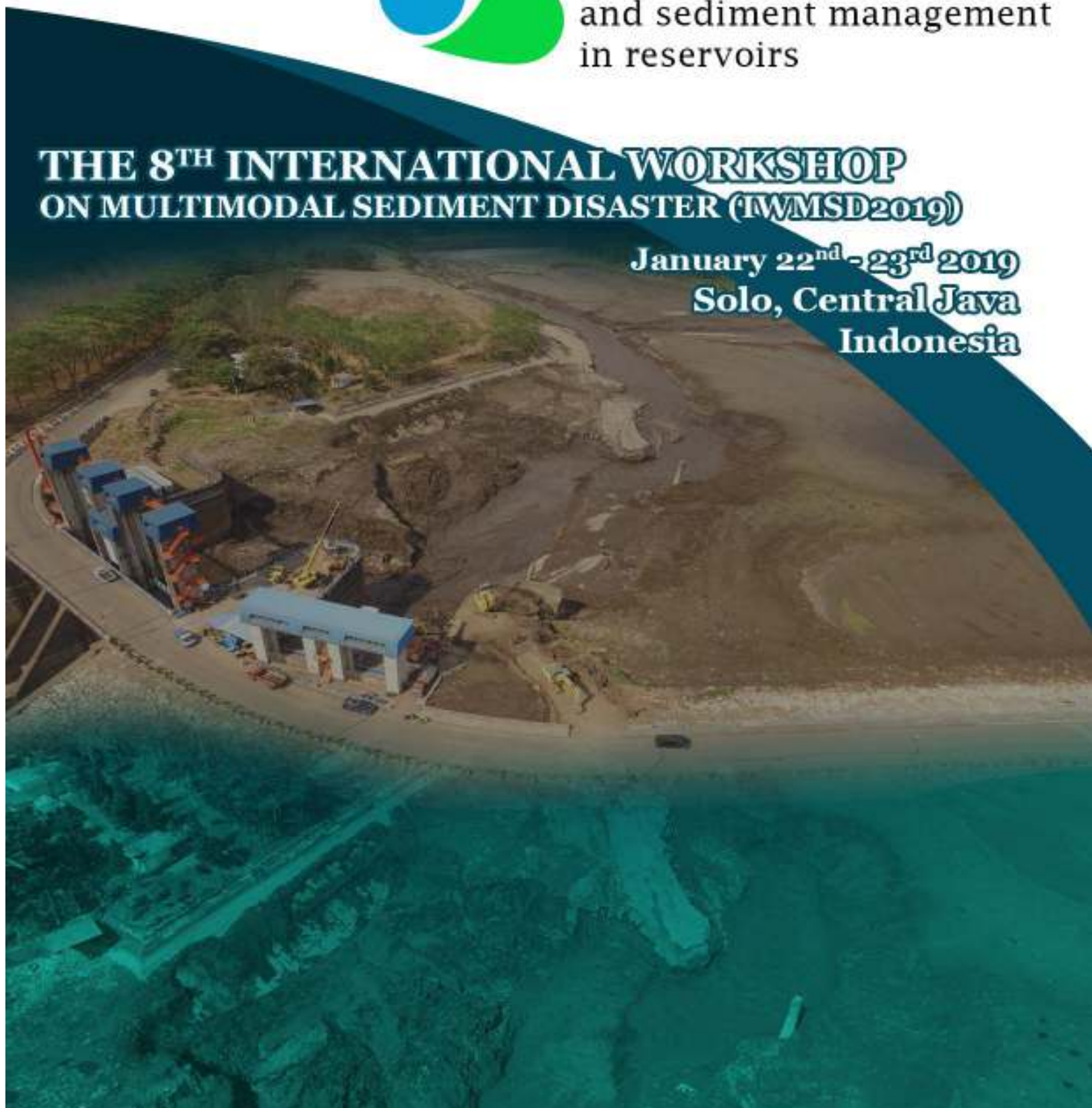


IWMSD 2019

Integrated water
and sediment management
in reservoirs

THE 8TH INTERNATIONAL WORKSHOP ON MULTIMODAL SEDIMENT DISASTER (IWMSD2019)

January 22nd - 23rd 2019
Solo, Central Java
Indonesia



WORKSHOP AGENDA

The 8th International Workshop on Multimodal Sediment Disaster (IWMSD2019) **INTEGRATED WATER AND SEDIMENT MANAGEMENT IN RESERVOIRS**

Wednesday, January 23th 2019

Technical Session

07.30 – 08.30 Registration

08.30 – 08.45 Opening Remarks (President Director of Jasa Tirta I)

08.45 – 09.00 Keynote Speaker 1 (Dr. Made Sumiarsih - Dam Center PUPR)

09.00 – 09.15 Keynote Speaker 2 (Prof. Tetsuya Sumi, DPRI Kyoto Univ)

09.15 – 09.30 Coffee Break

First Session (Moderator: UGM - Dr. Rachmad Jayadi)

09.30 – 09.45 1st Presenter (Directorate of O&M - PUPR)

09.45 – 10.00 2nd Presenter (Water R&D - PUPR)

10.00 – 10.15 3rd Presenter (JWA Japan - Satoshi Ojima)

10.15 – 10.30 4th Presenter (World Bank - Jun Matsumoto)

10.30 – 10.45 5th Presenter (DPRI Japan - Masaharu Fujita)

10.45 – 11.00 6th Presenter (Nippon Koei Japan)

11.00 – 11.15 7th Presenter (PJT I - Agung Nugroho)

11.15 – 11.45 Discussion

11.45 – 13.00 Break and lunch

Second Session (Moderator: UGM - Muhammad Sulaiman D.Eng)

13.00 – 13.15 8th Presenter (HATHI Yogyakarta - Ir. Amos Sangka)

13.15 – 13.30 9th Presenter (ITB - Prof. Indratmo)

13.30 – 13.45 10th Presenter (UGM - Prof. Radianta)

13.45 – 14.00 11th Presenter (UB - Dr. Dian Sisinggih)

14.00 – 14.15 12th Presenter (UGM - Adam Pamudji, Ph.D.)

14.15 – 14.30 13th Presenter (UNISULA - Ir. Tri Hardono)

14.30 – 15.00 Discussion

15.00 – 15.15 Coffee Break

Third Session (Moderator: UMY – Jazaul Ihksan, P.hD.)

15.15 – 15.30 14th Presenter (UB - Dr. Runi Asmaranto)

15.30 – 15.45 15th Presenter (UB - Dr. Eng. Andre Primantya)

15.45 – 16.00 16th Presenter (POLINES - Prof. Dr. Muhammad Mukhlisin)

16.00 – 16.15 17th Presenter (POLINEMA - Ratih Indri Hapsari, Ph.D.)

16.15 – 16.30 18th Presenter (UGM - Rian Mantasa S.T., M.T.)

16.30 – 16.45 19th Presenter (UNILA - Dwi Jokowinarno, ST., M.Eng)

16.45 – 17.15 Discussion

17.15 – 17.30 Closing Remarks (UGM - Prof. Djoko Legono)



TECHNICAL SESSION



Selamat Datang

WELCOME

Sugeng Rawuh











GAMA-InaTEK



JASA TIRTA I

































SETARIA SPHACELATA GRASS FOR PREVENTING EROTION IN WAY BESAI WATERSHED

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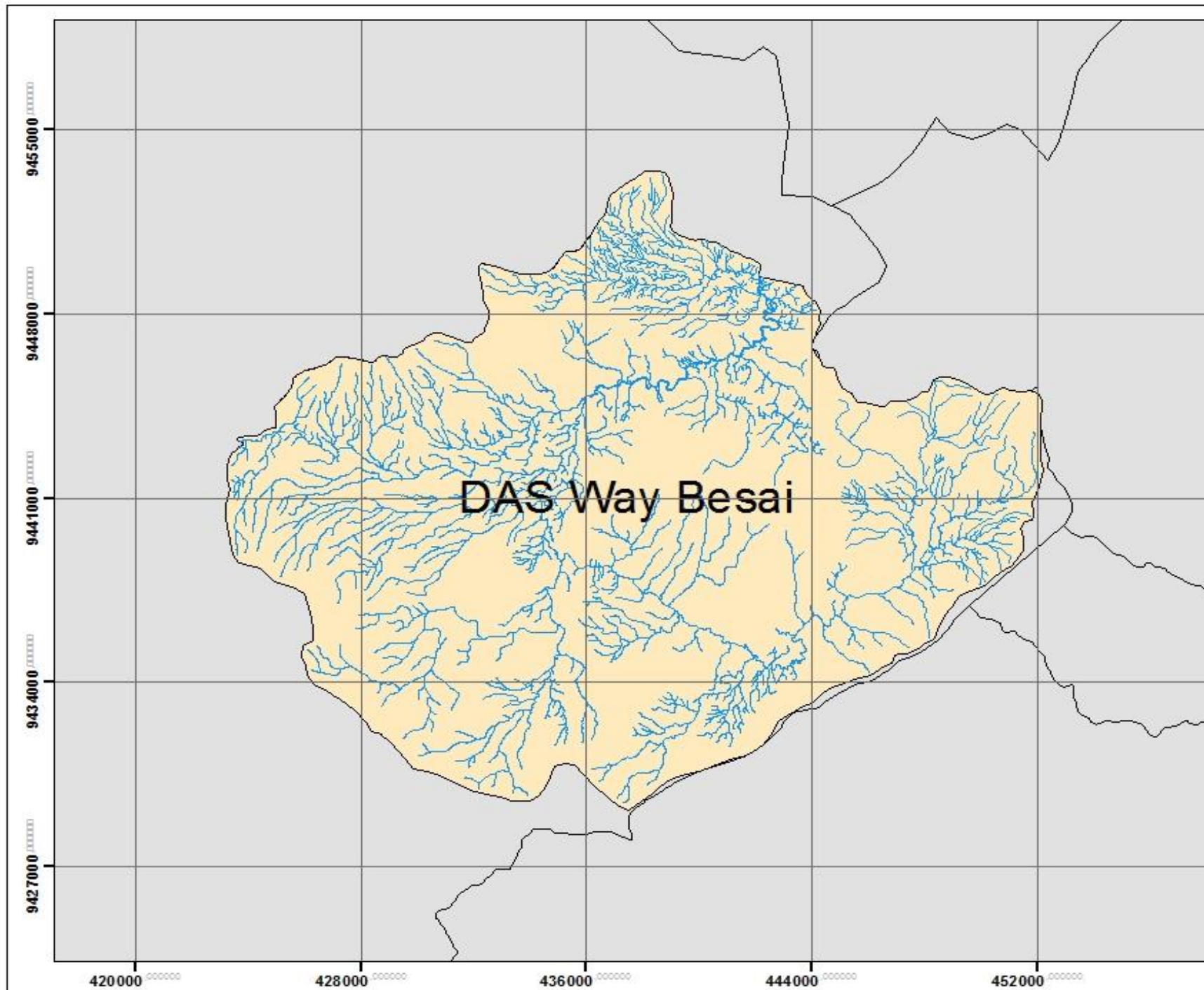
**The 8th International Workshop on Multimodal Sediment Disaster
Solo, 23rd January 2019**

LATAR BELAKANG

- Way Besai Power Plant located at Sumber Jaya, West Lampung District, Lampung Province for producing 90,4 MW (2 x 45 MW).

- Way Besai Power Plant is *run off river* type.

Way Besai Watershed at Way Besai Power Plant has 415 km² area, reservoir volume at KTH (Kolam Tandon Harian) = 1.200.000 m³ , inundated area = 0,70 km² , debit to generate power = 24,30 m³/det.



Peta DAS Way Besai



Skala 1:200.000

0 2.125 4.250 8.500



Meters

Legend

 Way Besai

 DAS Way Besai



$A = 415 \text{ km}^2$

- At this moment, Way Besai Power Plant production decreasing from 90 MW to 50 MW.
- Water availability and sedimentation are the main issue for causing of decreasing electricity production.

DATA AVAILABILITY

■ Rainfall Data

- There are some rainfall station in Way Besai Watershed, namely Mutar Alam, Pajar Bulan, Sumber jaya, Bungin, Pinau Jaya, Rawa bebek dan Air Item, but only Rawa Bebek and Air Item Stasion are reliable. Lokasi Stasiun Hujan DAS Way Besai

Stasiun	Latitude	Longitude	Periode pencatatan
Air Item	5 ⁰ 4'59,999"	104 ⁰ 25'0,001"	1974 - 2005
Rawa Bebek	5 ⁰ 7'0,001"	104 ⁰ 28'59,999"	1974 - 2005

■ Water Level Data

AWLR in Way Petai

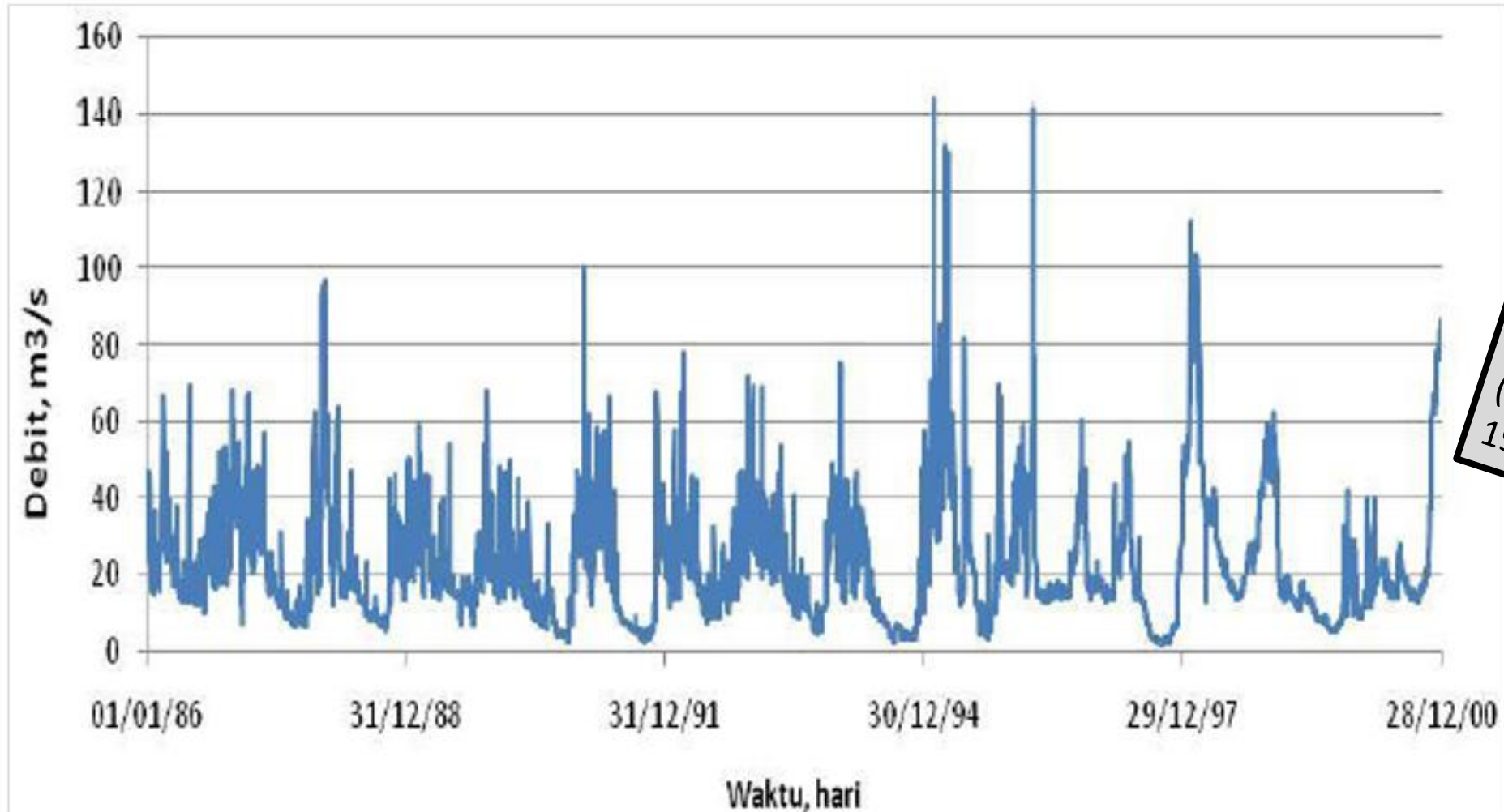
■ Spatial Data



RESULT AND DISCUSSION

Water Availability

Based on daily debit of 01st January 1986 to 31st December 2000:



$Q_{maks} = 141 \text{ m}^3/\text{det}$ (13 February 1995 and 07 April 1996);
 $Q_{average} = 23,05 \text{ m}^3/\text{det}$;
 $Q_{min} = 2,23 \text{ m}^3/\text{det}$ (27 Sept 1997, 28 Sept 1997, and 03 Okt 1997)

Using frequency analysis on variate n data maximum can be found debit for variate return periode as follow:

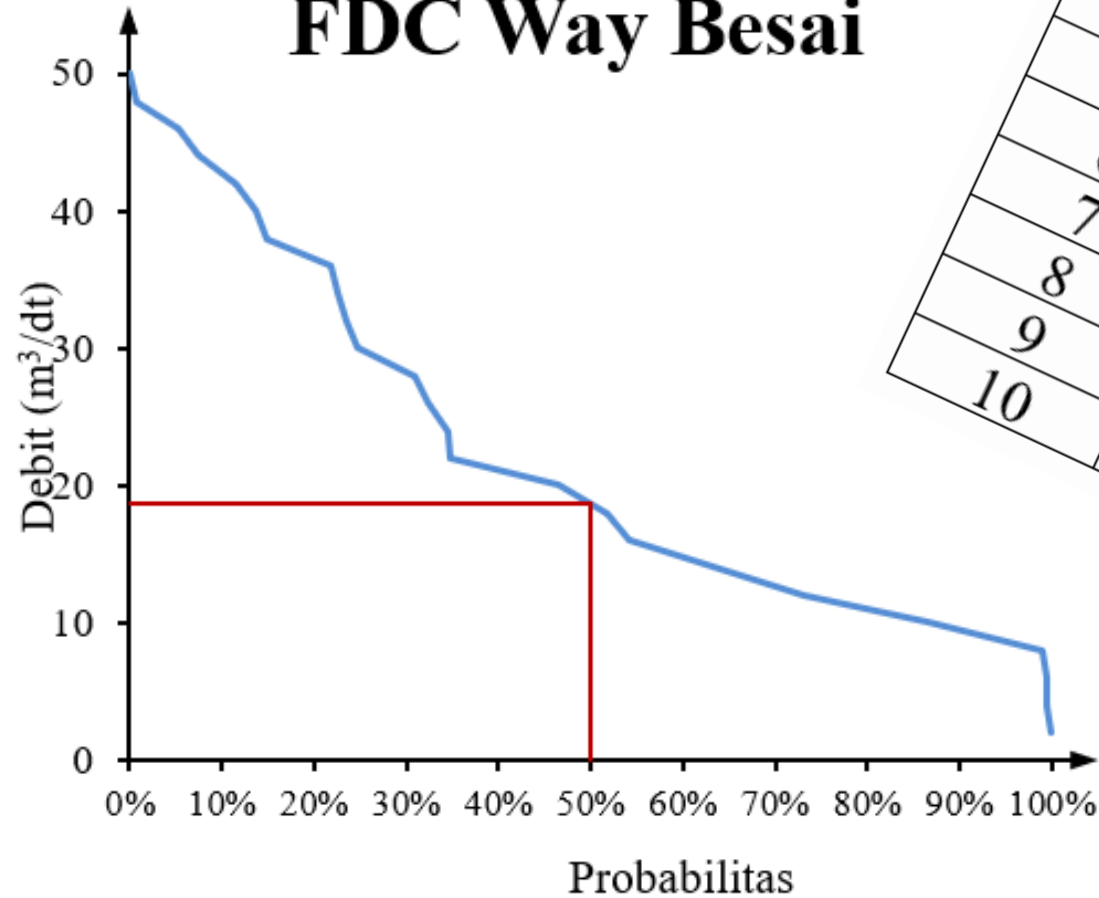
Kala Ulang (Tahun)	Q _T (m ³ /detik)				
	1 Maksimum	2 Maksimum	3 Maksimum	4 Maksimum	5 Maksimum
2	80,9	80,9	74,5	74,2	83,5
5	113,6	129,5	117,6	114,5	132,1
10	175,3	165,8	150,6	143,1	169,7
25	233,8	215,1	197,2	181,2	223,0
50	277,9	254,8	235,4	210,6	267,1
100	326,5	296,6	276,7	240,8	314,9
200	378,3	341,1	321,5	272,2	367,1

Almost equal with Q time series

FDC Debit

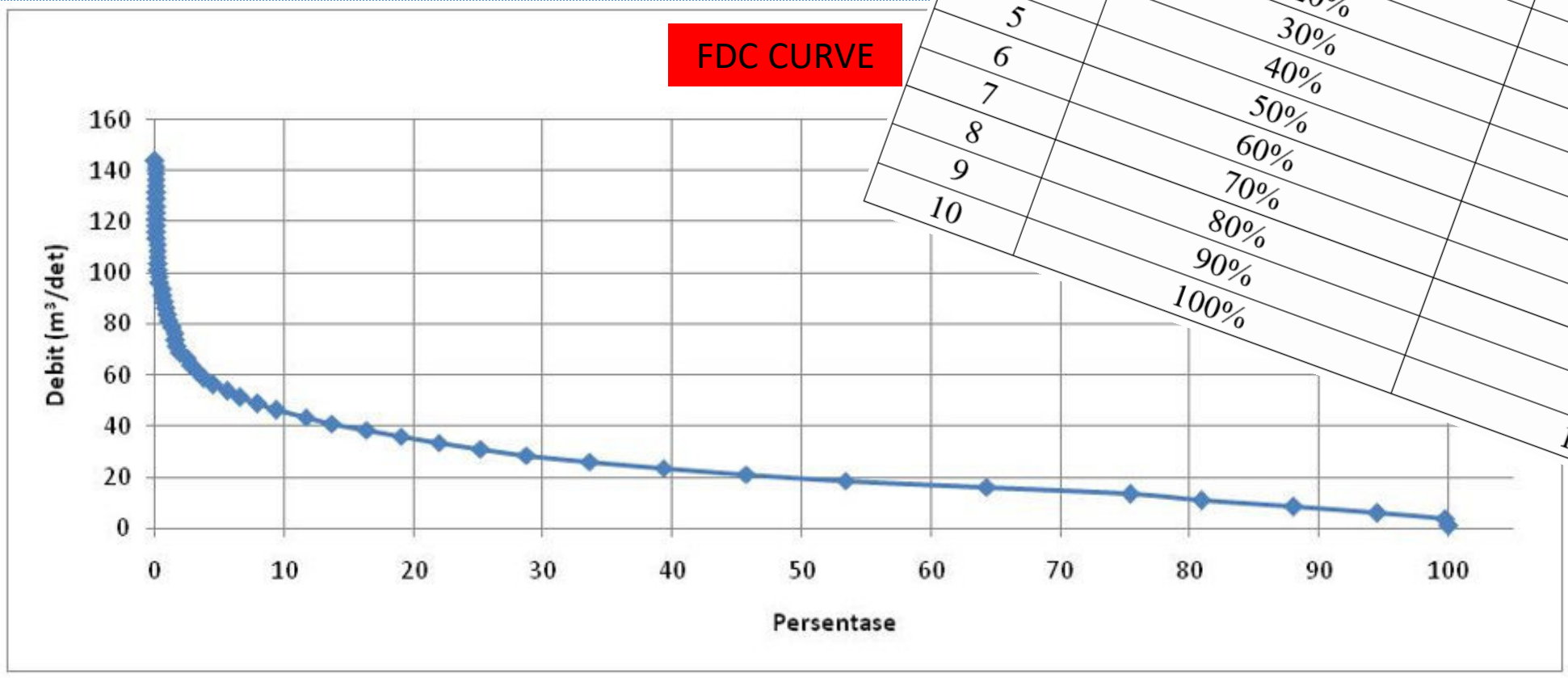
FDC was made based on Way Besai Reservoir
Debit of 9 years (from year 2004 to 2012).

FDC Way Besai



No.	Probabilitas	Debit (m³/dt)
1	10%	42,73
2	20%	36,50
3	30%	28,28
4	40%	21,11
5	50%	18,68
6	60%	14,80
7	70%	12,67
8	80%	10,48
9	90%	9,44
10	100%	2,00

FDC Debit Time Series (1986-2000)



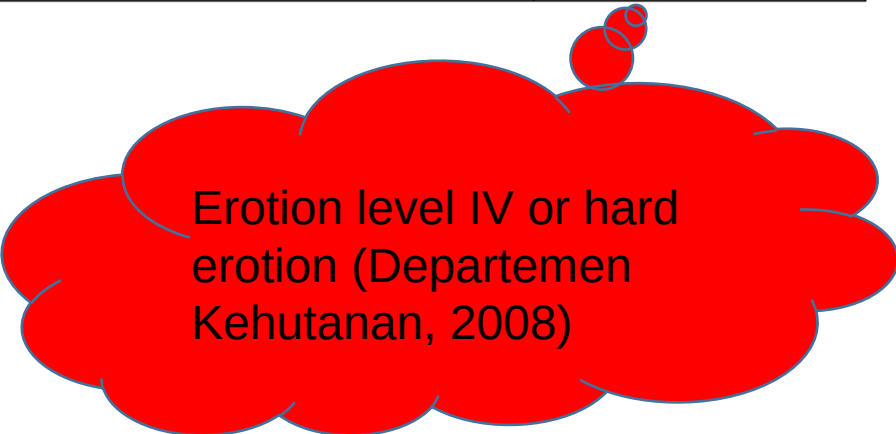
No.	Probabilitas	Debit (m³/dt)
1	10%	45,56
2	20%	35,39
3	30%	28,08
4	40%	23,47
5	50%	19,84
6	60%	17,23
7	70%	14,97
8	80%	11,65
9	90%	7,99
10	100%	1,25

To generate turbin
need 24,3 m^3/det

Sediment

Sediment analysis was conducted on Way Besai Watershed, using USLE methode (Universal Soil Loss Equation)

Kemiringan Lahan (%)	R	K	Ls	C	P	Erosi (ton/ha/th)
< 8%	1473,350	0,208	0,400	0,108	0,437	5,76
8% - 15%	1473,350	0,208	1,400	0,108	0,437	20,14
15% - 25%	1473,350	0,208	3,100	0,108	0,437	44,60
25% - 45%	1473,350	0,208	6,800	0,108	0,437	97,84
>45%	1473,350	0,208	9,500	0,108	0,437	136,69
Jumlah Tingkat Bahaya Erosi						305,03

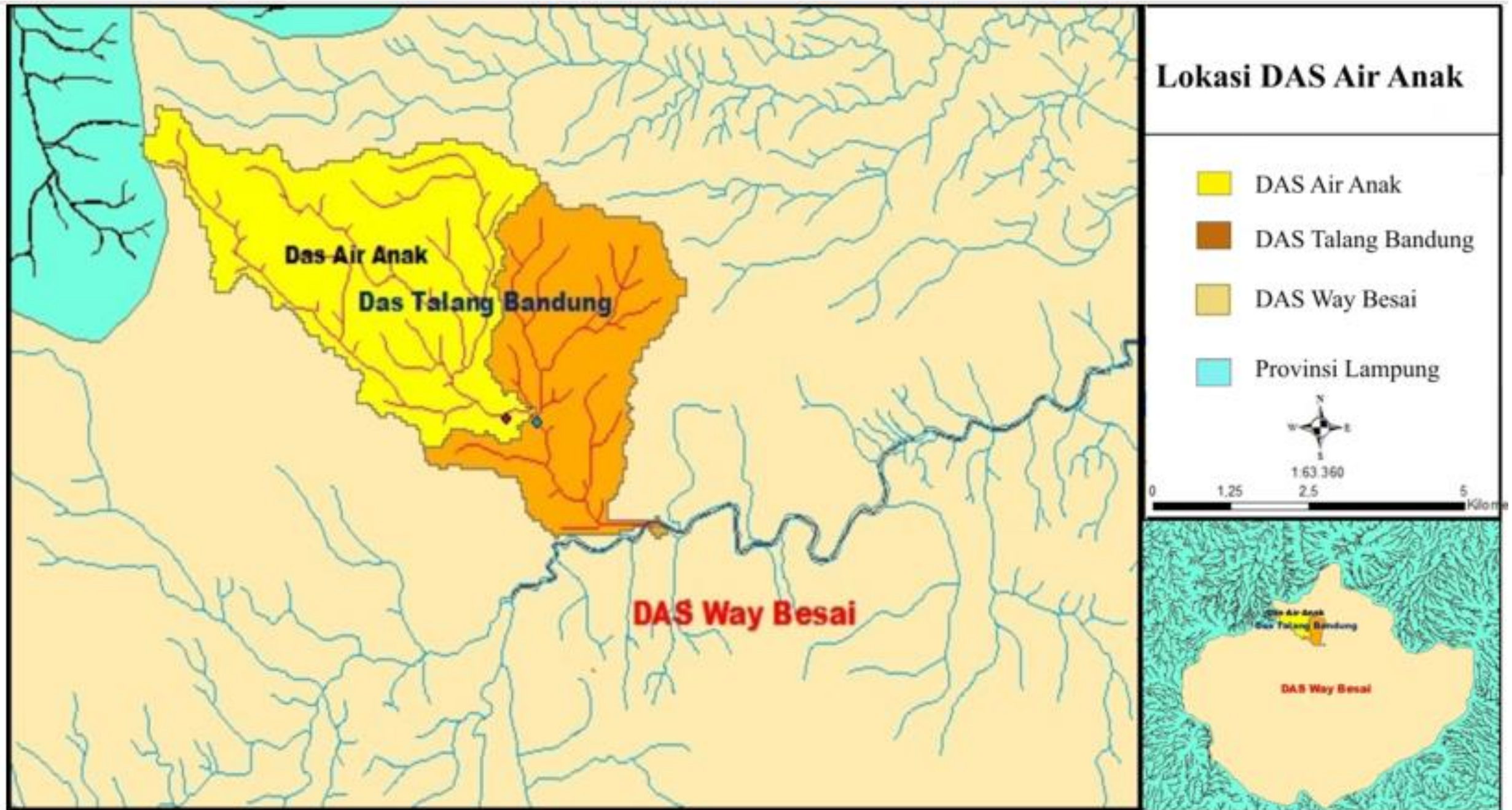


Erosion level IV or hard erosion (Departemen Kehutanan, 2008)

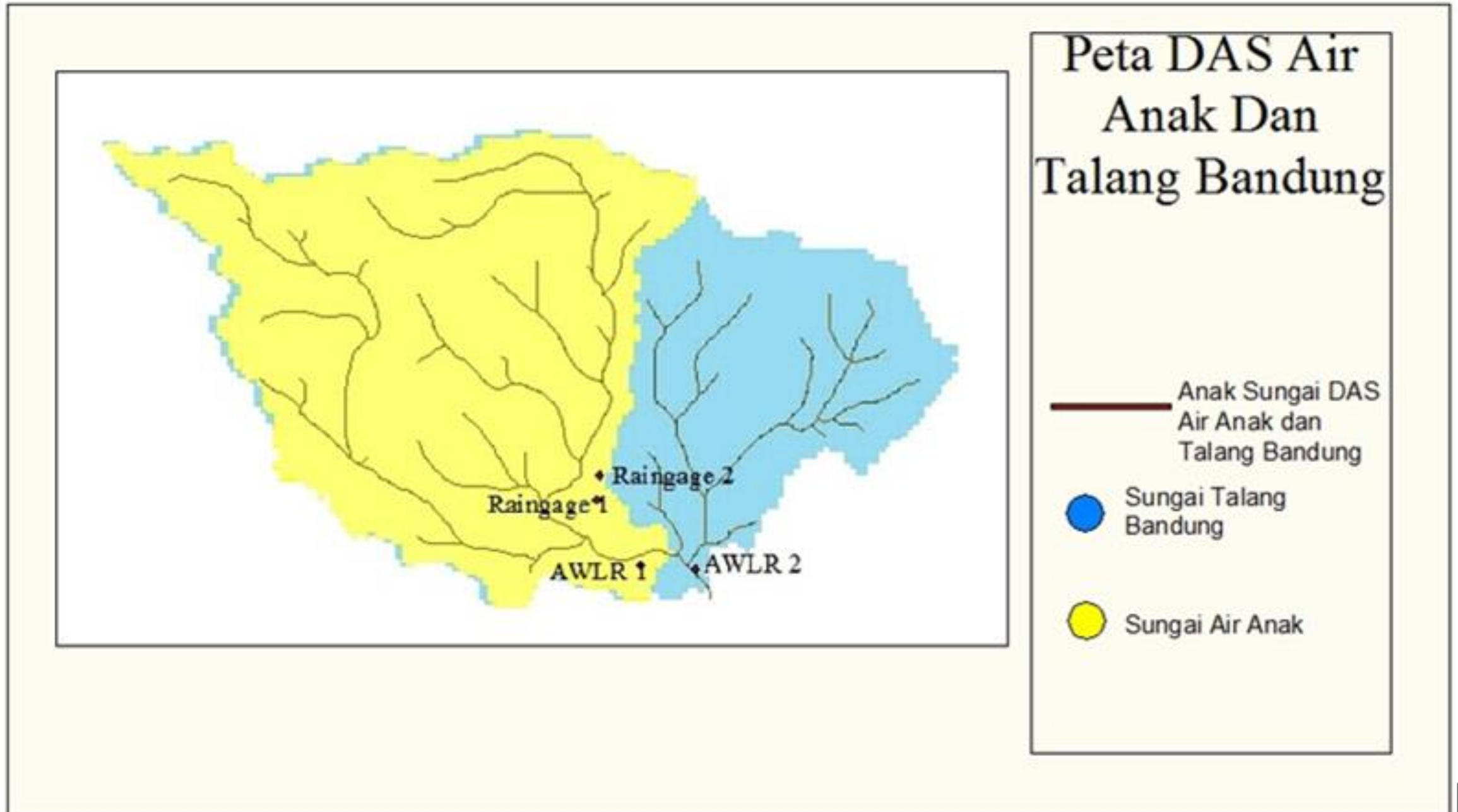
Sediment Potensial per Year

Kemiringan Lahan (%)	Erosi (ton/ha/th)	Luas (Ha)	SDR	Sedimentasi Potensial (ton/th)
0-8	5,76	18101,78	0,086	8979,57
8-15	20,14	9282,33	0,105	19691,48
15-25	44,60	6911,67	0,115	35469,91
25- 45	97,84	6096,00	0,119	71257,55
>45	136,69	1082,00	0,201	29680,63
Jumlah Sedimen				165.079,13

SETARIA SPHACELATA GRASS IN PREVENTING EROSION



LOCATION OF AWLR AND RAINGAUGE



Planting Setaria Grass by CSR (Corporate Social Responsibility) of PT PLN (National power Corporation)



Sediment rate in Air Anak Basin based on measurement at periode of December 2017 to March 2018 = 4.862,82 ton/year, compare to measurement at periode of January 2015 to December 2015 = 9.539,60 ton/year. (Decreasing of 49,02%)

Sediment rate in Talang Bandung Basin based on measurement at periode of December 2017 to March 2018 = 11.974,53 ton/year, compare to measurement at periode of January 2015 to December 2015 = 22.058,936 ton/year. (Decreasing of 45,7%)

Farmer plant *Setaria Sphacelata* Grass and using this grass to feed lamb
(PE = Peranakan Etawa)



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