THE 3RD INTERNATIONAL CONFERENCE ON SECURITY IN FOOD, RENEWABLE RESOURCES, AND NATURAL MEDICINE 2019 (SFRN 2019)
P3M Politeknik Pertanian Negeri Payakumbuh Jl. Raya Negara Km. 7 Tanjung Pati, Kec. Harau Kab. Lima Puluh Kota Sumatera Barat 26271. Telp. 0752-7754192, Fax. 0752-7750220

ACCEPTANCE LETTER

ID-Number : O-239/UA/PLT/IC-SFRN 2019

Payakumbuh, 17 September 2019

Dear Aflizar, Jamaluudin, Amrizal, Roni Afrizal, Edi Syafri

This letter is to confirm that Your paper entitled **"3D Evaluation of Land Capability for Gambir (Uncaria Gambir Robx) Gardens in Mahat Watershed using Surfer Tool."** was **ACCEPTED** by the committee of the **3RD IC-SFRN 2019**, and will be considered to be published in the Q2/Q3/Q4 Scopus Indexed Journal and/or Conference proceeding*.

Best regard,
On behalf of the Organizing Committee
3RD IC-SFRN2019
Conference Chair

Fithra Herdian, S.TP, MP

Security in food, renewable resources, and natural medicines

Certificate

SFRN 2019

No.38/PL25/PT.01.06/2019

This is to certify that

Aflizar

has contributed on The 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines 2019 (SFRN 2019)" as

Oral Presenter

Reg.No. O-239/UA/PLT/IC-SFRN 2019

Held on 25- 26 September 2019, at Gedung Serba Guna— (GSG) Politeknik Pertanian Negeri Payakumbuh
West Sumatra, Indonesia

hosted by,
Politeknik Pertanian Negeri Payakumbuh

co -Hosted by,
Universitas Andalas (UNAND)

Director of Payakumbuh State Polytechnic of Agriculture

(Ir. Elvin Hasman, MP)

Conference Chair
SFRN 2019

(Fithra Herdian, STP,MP)

Keynote & Invited Speaker from,

PCI-15

3D Evaluation of Land Capability for Gambir (*Uncaria Gambir Robx*) Gardens in Mahat Watershed using Surfer Tool

Aflizar , Jamaluudin, Amrizal, Roni Afrizal, Edi Syafri

State Politechnic Payakumbuh for Agriculture , jl. Raya Negera KM 7 Tanjungpati, Kec. Harau, Kab Limapuluh Kota, Sumbar, 26271,Indonesia

E-mail: aflizar_melafu@yahoo.com

Abstract— This study aims to invest in the land capability classes on agricultural land in the Mahat watershed that has been sustainably planted in Gambir gardens by rural communities. Useful for making sustainable Gambir Garden Planning where a three-dimensional (3D) map distribution is made using the Surfer Tool. Mahat Watershed is located in Limapuluhkota Regency, Indonesia, which is already known as a supplier of 70% of Gambir World's needs. 3D maps of Land Capability are compiled based on DEM data, slope and soil characteristics by taking soil samples based on differences in soil family, land use and topography. Then the results of the analysis are matched with the FAO 1976 land capability class assessment table. From the results of the analysis it can be concluded that the most dominant subclass in the Mahat watershed is VIIIs. The slope class of 0-20% is found 10% of the total Mahat watershed. Mahat watershed area in the form of cauldron with flat area (slope 0-8%) found 5%. Gambir Gardens in the Mahat watershed were found to be nearly 80% planted and grown on land with VIIIs land capability classes. The meaning is that the Gambir gardens currently planted must be provided with terrace conservation and agroforestry technology to prevent soil erosion and critical soil. The surfer tool has proven to be an excellent tool for determining the 3D land capability because it has the facility to store digital data, input large amounts of data, visualize 3D maps and making it possible to make recommendations for future environmental management plans.

Keywords— Gambir gardens, soil survey, Surfer tool, 3D map

PCI-16

Characteristics of Crude Ficin Enzyme Prepared from *Ficus Padana burm.f.* Stem Latex with Different of Drying Methods

Rina Yenrina*, Ismed, Daimon Syukri

Department of Agricultural Product Technology,

Faculty of Agricultural Technology

Universitas Andalas, Kampus Limau Manis, Padang-25163

Email: yenrinarusdi@yahoo.co.id

Abstract—The effect of drying methods on yield, moisture content, colour properties (L*, a*, b*, C*, 0H, ash content, and enzyme activity of crude ficin enzyme prepared from *Ficus padana burm.f.* stem latex was investigated. Samples were dried with three different drying methods: solar, freeze and vacuum drying. The result shows yield 8.53-15.70, moisture content 0.57-7.64%, colour properties (L* 70.00-86.70), (a* -0.30-0.09), (b* 5.20-12.50), (C* 5.20-12,60), (0H 85.80-93.30), ash content 0.38-0.65%, enzyme activity 11.67-14.81. For different drying methods, it was found that freeze drying was most advantageous to maintain crude enzyme fisin prepared from *Ficus padana burm.f.* stem latex with the lowest moisture content and the greatest yield, colour (*L value), ash content, and enzyme activity.

Keywords— plant protease, crude enzyme ficin, *Ficus padana burm.f.*, stem latex, characteristics

3D Evaluation of Land Capability for Gambir (*Uncaria Gambir Robx*) Gardens in Mahat Watershed using Surfer Tool

Aflizar [#], Jamaluudin[#], Amrizal [#], Roni Afrizal [#], Edi Syafri [#]

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3D Evaluation of Land Capability for Gambir (*Uncaria Gambir Robx*) Gardens in Mahat Watershed using Surfer Tool

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3D Evaluation of Land Capability for Gambir (*Uncaria Gambir Robx*) Garden in Mahat Watershed using Surfer Tool



ISFRN, September 25-26, 2019. Politeknik Pertanian Negeri Payakumbuh, Indonesia

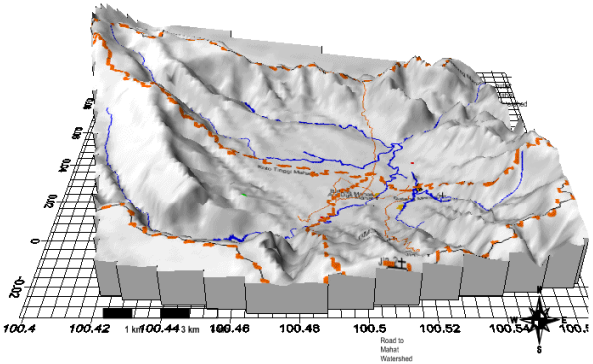
Presented by Aflizar

Co-author: Jamaluudin, Amriza, Roni Afrizal, Edi Syafri

Jurusan Teknologi Pertanian

Politeknik Pertanian Negeri Payakumbuh

Introduction



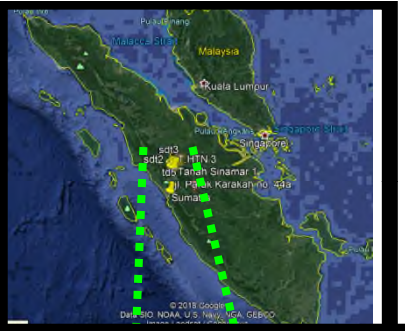
Mahat Watershed in 3D Map

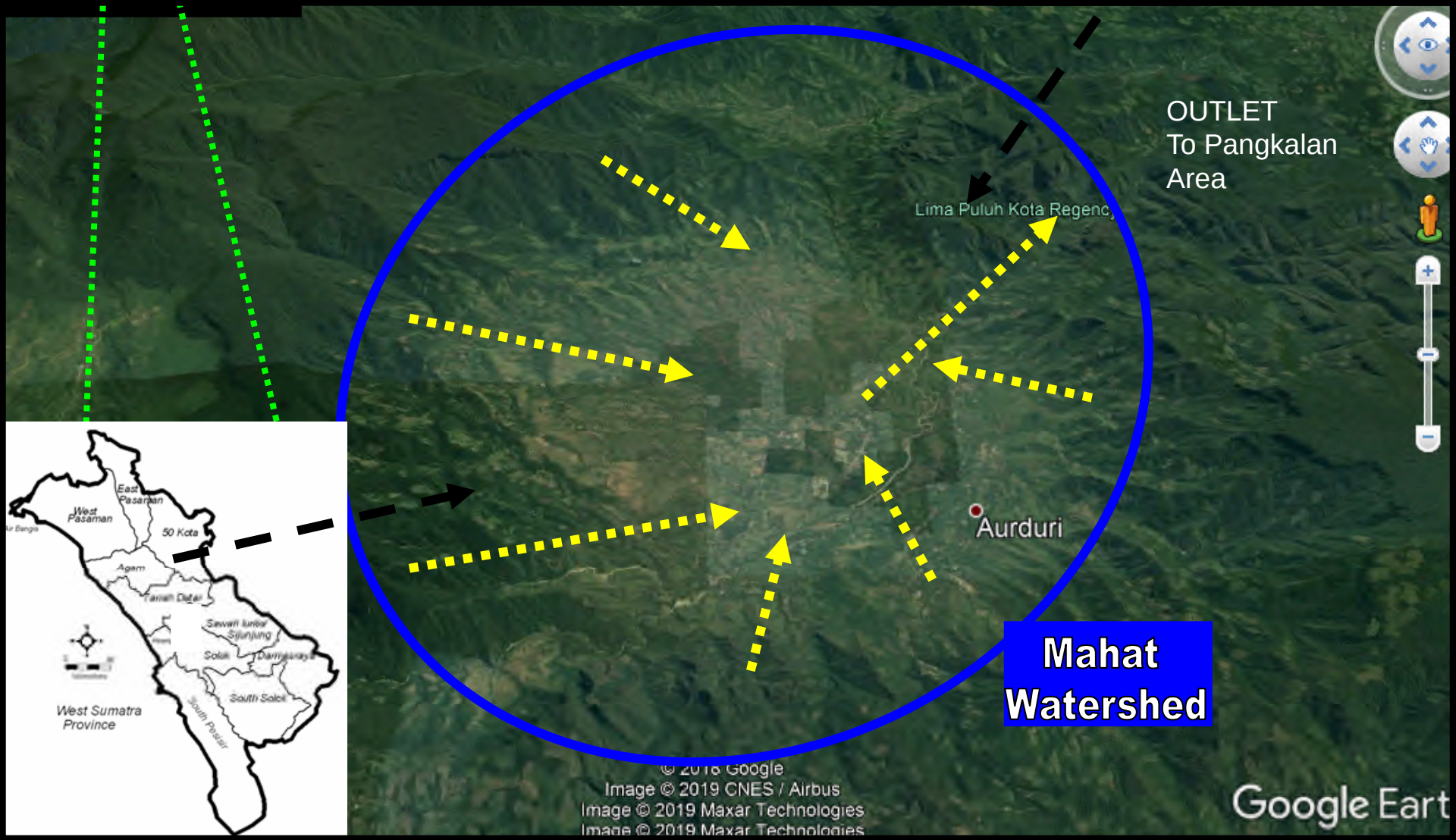
Gambir (Uncaria) Gardens

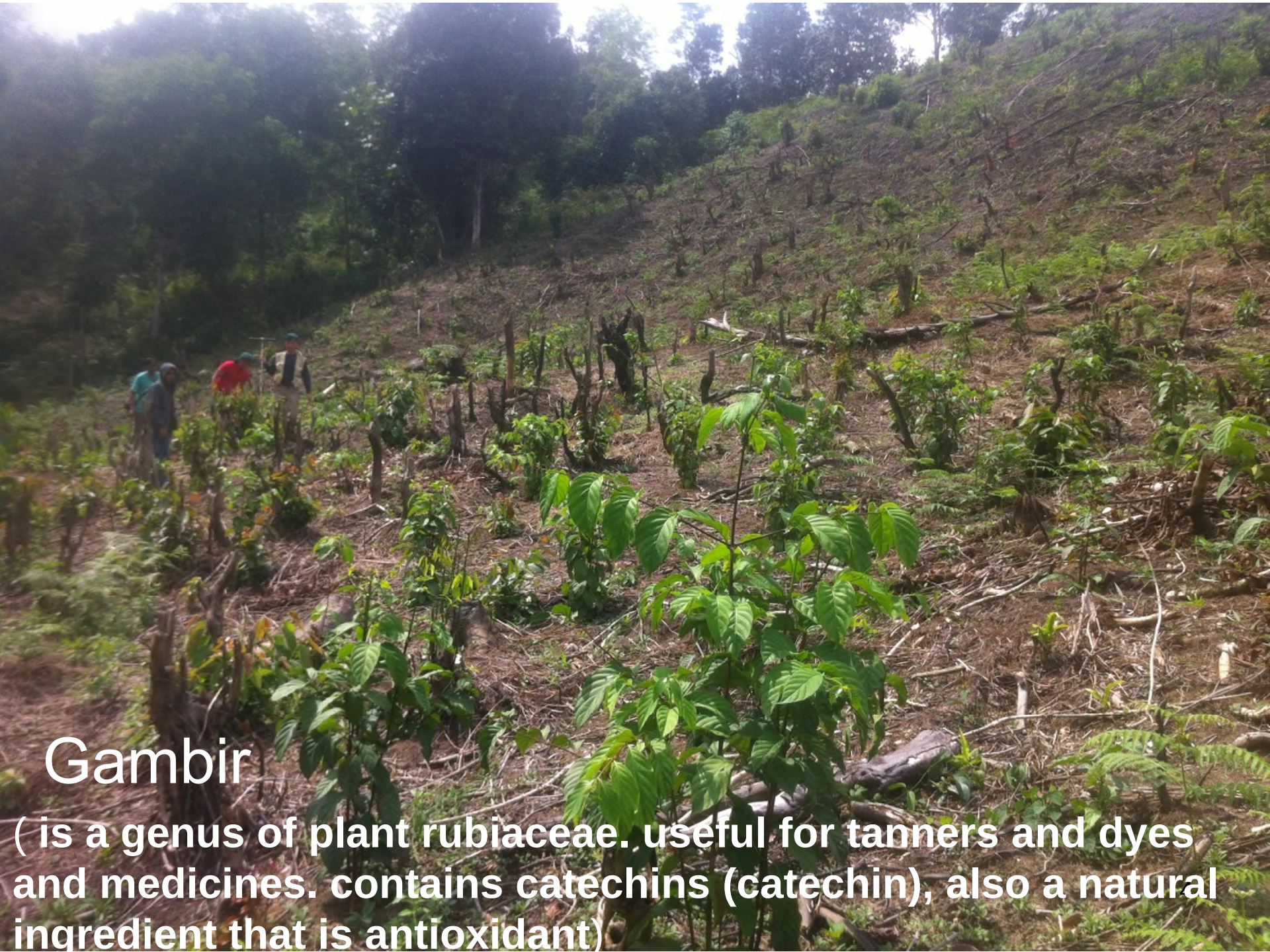
catechin

- Mahat watershed is located in Kab. 50 Kota, West Sumatra Indonesia. Nearly 80% of the world's gambier needs are fulfilled in this area. However, soil conservation practices are not very good.
- Evaluation of land Capability for proper land use planning by doing every work in a rational, orderly manner and taking into account the environment, ensures that the farming business done by farmers receives high financial benefits.
- Gambir is a genus of plant rubiaceae. useful for tanners and dyes and medicines. contains catechins (catechin), also a natural ingredient that is antioxidant.
- The purpose of this study is to create a limiting factor zone of the FAO land capability class and make use of appropriate designations in the Mahat watershed as the center Gambir production in Indonesia.

STUDY SITE IN MAHAT WATERSHED 50 KOTA DISTRICT WEST SUMATRA







Gambir

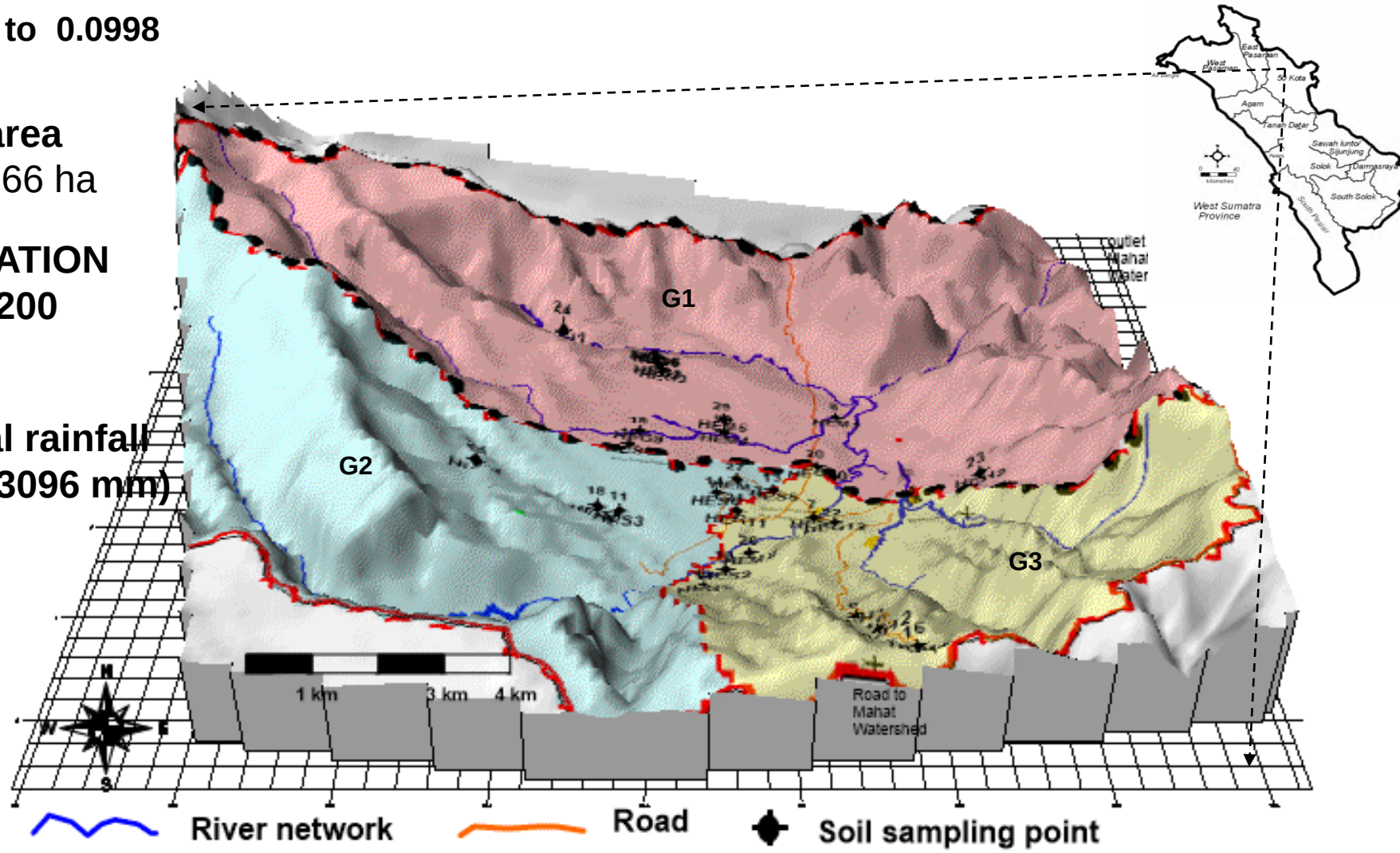
(is a genus of plant rubiaceae. useful for tanners and dyes and medicines. contains catechins (catechin), also a natural ingredient that is antioxidant)

100.402 to -0.0242
100.55 to 0.0998
(position)

Total area
17849.66 ha

ELEVATION
100-2200
m.asl

Annual rainfall
(1859-3096 mm)



Study site and sampling points

Three (3) Subwatershed : (G1), (G2), (G3),

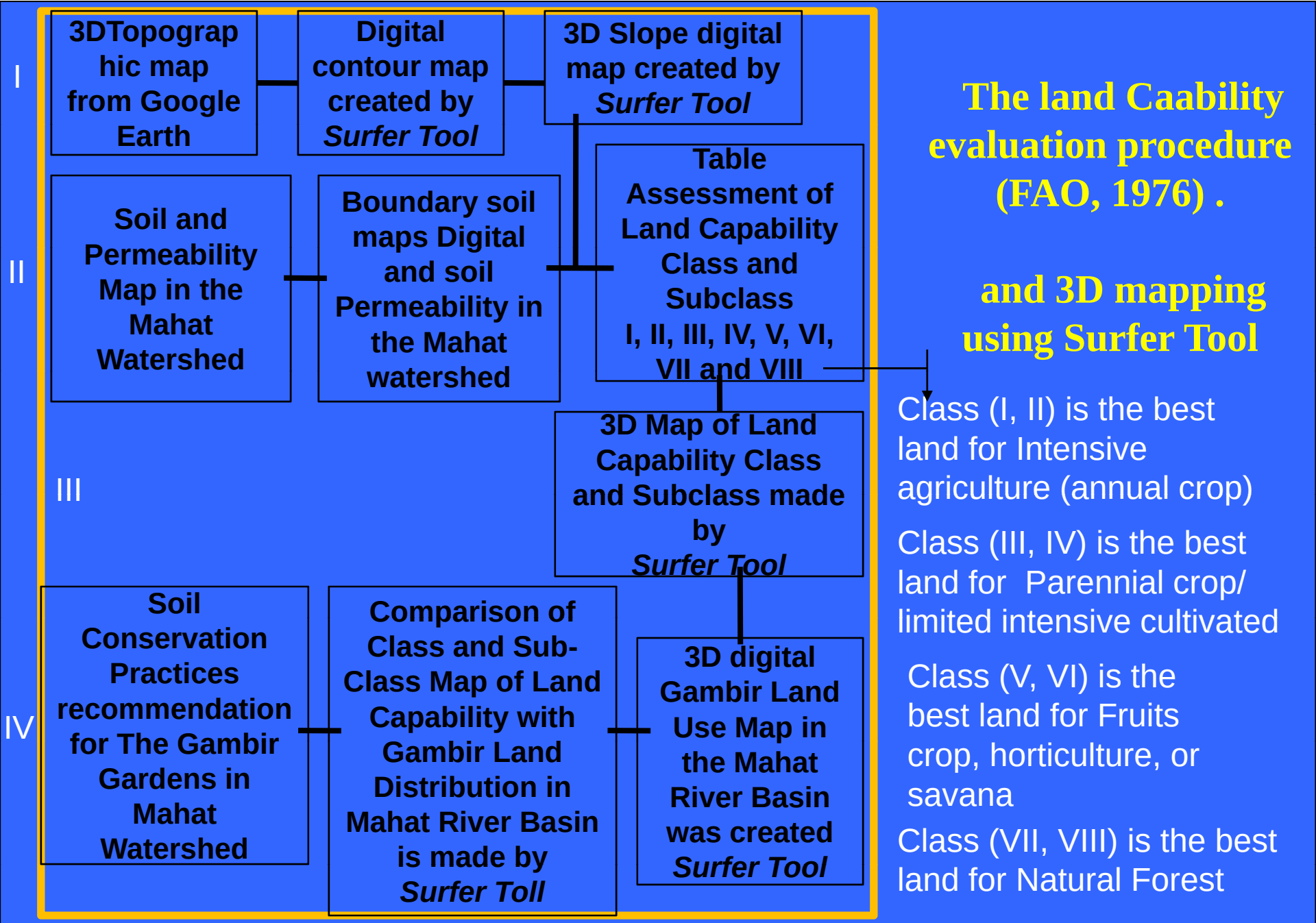
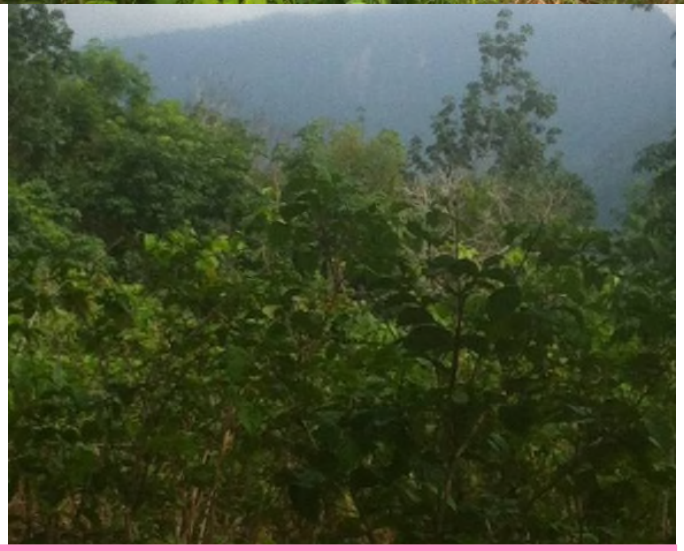


Fig 1. Procedure Evaluation of Land Capability for Gambir Garden

Location: Upland topography



Location: Middle topography

Location: Hilly side topography

Location: Lowland topography

Condition of Traditional Gambir garden at sampling

Soil analyses and data processing

- Soil samples ⟶ 29 sawah soil sample
- Soil analyses ⟶ SL=Slope, ES =Soil erodibility, ER=The erosion rate, SD=Soil depth, TT=Texsture of top soil, TS=Texture of subsoil, SP=Soil Permeability, DN=Drainage, GR=Gravel / rock, FT=Flood threat, SN=Salinity (s)
- Other data ⟶ Land use map (Google Earth), contour map (google earth),) soil type map, DEM

Universal Soil Loss Equation (USLE)

Erosion(E) = R*K*LS*C*P

(Wischmeier and Smith 1978)

R = rainfall erosivity factor
K = soil erodibility factor
LS= length and slope factor
C =land cover crop factor
P =soil conservation factor

Surfer 9 software → 3D Map Land Capability

Result

Table 1. General data and Parameter for Land Capability in Mahat Watershed

n=29	Mean	Max	Min	SD
1.Slope (%)	41	80	4	31
2. Soil erodibility	0.2	0.3	0.2	0.0
3. Erosion rate (ton/ha/y)	163	350	7	128
4. Soil depth (cm)	97	110	90	5.5
5. Texsture of top soil	-	Clay	Clay sandy	
6. Texsture of subsoil	-	Clay	Loamy sandy	
7.Permeability (cm/jam)	0.5	1.8	0.2	0.5
8. Drainage	-	good	not good	
9. Gravel / rock	-	none	few	
10.Flood threat	-	never	never	
11. Salinity (uhos/cm)	0.5	1.2	0.1	0.3

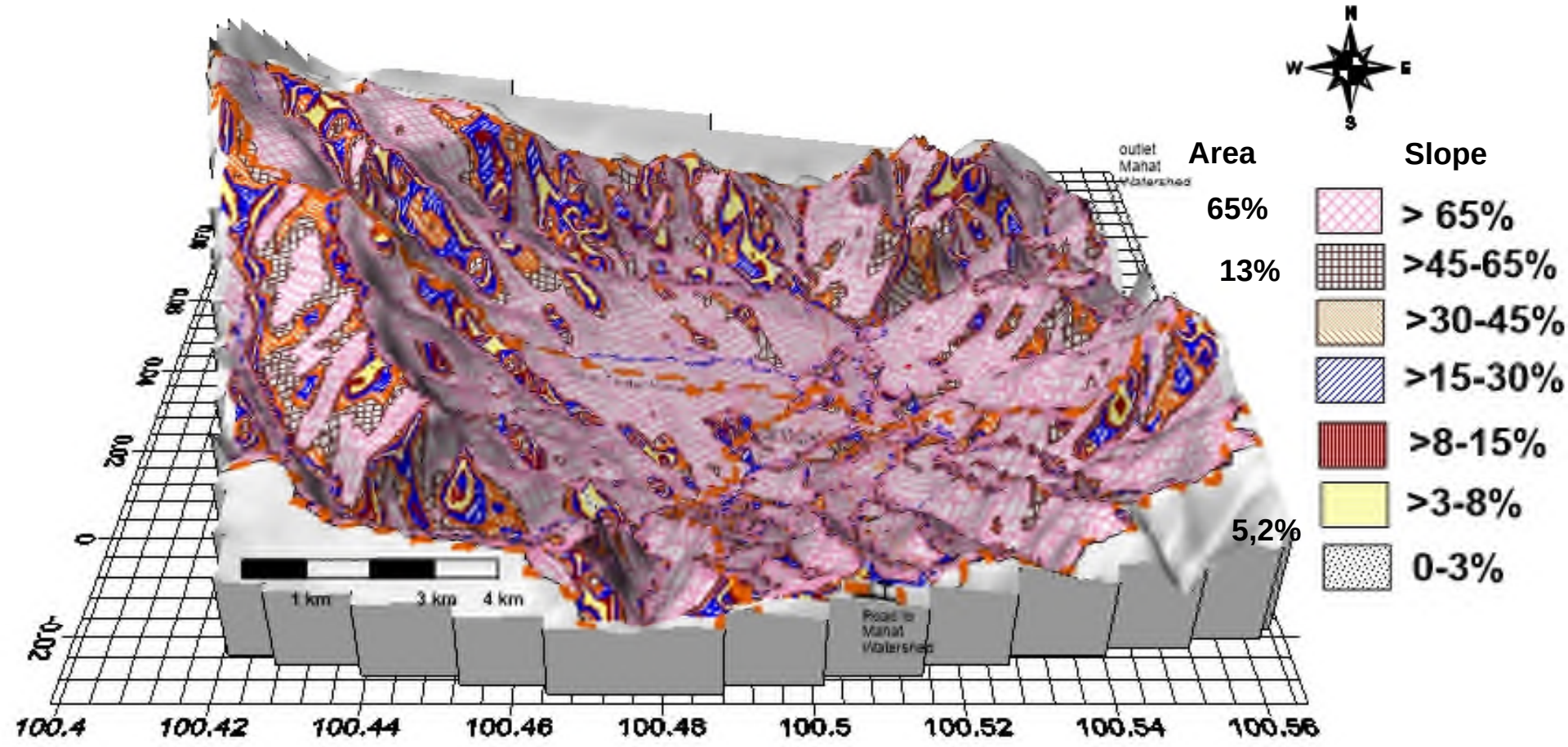


Fig 2. 3D Map of % Slope in the Mahat watershed

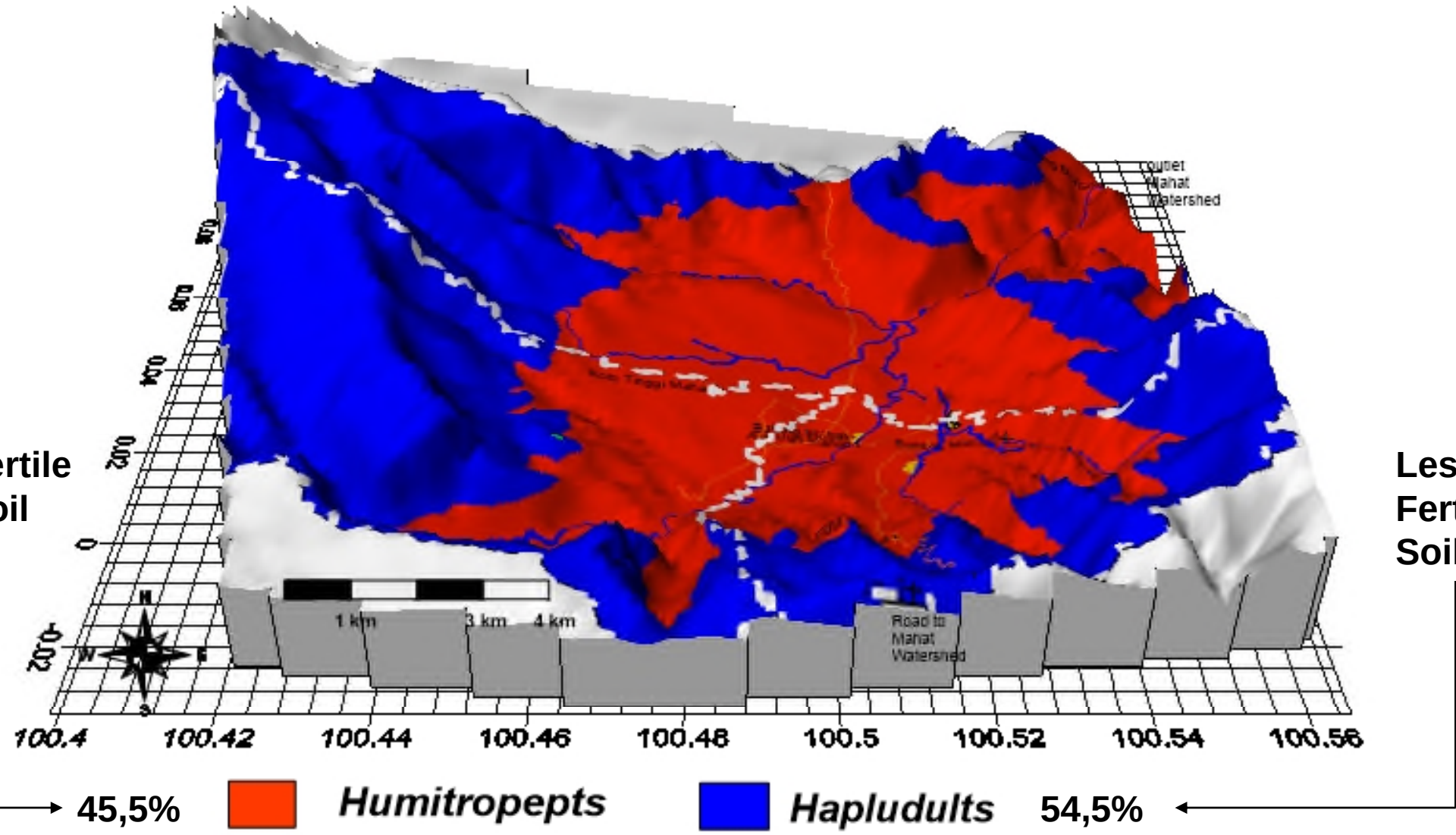


Fig 3. 3D Map of Soil distribution in the Mahat watershed . USDA great group (P2TABP3, 1990)

Table 2. Tabulation to determine class and subclass of Land Capability according to FAO Criteria

Limiting Factor	Criteria	Land Capability Class Criteria							
		I	II	III	IV	V	VI	VII	VII
	Flat(A)	X							
	Sloping (B)		X						
1.Slope(e)	Wavy(c)			X					
	Hilly(d)				X				
	Mountainous(e)						X		
	Steep(F)							X	
	Very steep(G)								X
	Very low(KE1)	X							
2.Soil erodibility (e)	Medium(KE3)		X						
	Rather high(KE4)			X					
	Nothing(e0)	X							
	Light		X						
3.The erosion rate(e)	Medium			X					
	Rather heavy				X				
	Heavy						X		
	Very heavy							X	

Note: No erosion (e0); Lightness is less than 25% of the lost layer (e1); Medium 25-75% of the upper layer is lost (e2); It is more heavy than 75% of the upper layer to less than 25%;. > 90cm (in): k0; 90-50cm (medium): k1; 50-25 cm (shallow): k2; Less than 25 cm (very shallow): k3. Permeability classes: Slow (P1) less than 0.5 cm / hour; Slightly (P2) 0.5-0.2 cm / hour; Medium (P3) 2.0-6.25 cm / hour; Quite fast (P4) 6.25-12.5 cm / hour; Fast (P5) more than 12.5 cm / hour

Table 2. Continued

Limiting Factor	Criteria	Land Capability Class Criteria							
		I	II	III	IV	V	VI	VII	VII
4.Soil depth(s)	> 90cm:k0	X							
	Smooth(t1)	X							
5.Texsture of top soil(s)	Rather Roughly(t4)			X					
	Smooth(t1)	X							
6.Texsture of subsoil(s)	Rather Roughly(t4)			X					
	Slow (P1)					X			
7. Soil Permeability	Rather slow (P2)	X							
	well(d1)	X							
8.Drainage(w)	Rather bad(d3)			X					
	None or few(b0)	X							
9.Gravel / rock(w)	Medium (b1)			X					
10.Flood threat(w)	None(o0)	X							
11.Salinity(s)	Free(g0) ----------→	X							

Note: No erosion (e0); Lightness is less than 25% of the lost layer (e1); Medium 25-75% of the upper layer is lost (e2); It is more heavy than 75% of the upper layer to less than 25%;. > 90cm (in): k0; 90-50cm (medium): k1; 50-25 cm (shallow): k2; Less than 25 cm (very shallow): k3. Permeability classes: Slow (P1) less than 0.5 cm / hour; Slightly (P2) 0.5-0.2 cm / hour; Medium (P3) 2.0-6.25 cm / hour; Quite fast (P4) 6.25-12.5 cm / hour; Fast (P5) more than 12.5 cm / hour

Table 3. Slope classes in the Mahat watershed

Slope class (%)	The area according to slope class	
	Ha	%
(Flat) 0-3	214,196	1,2
(Sloping) >3-8	713,988	4
(wavy) >8-15	464,092	2,6
(hilly) >15-30	1320,88	7,4
(mountainous) >30-45	1249,48	7
(Steep) >45-65	2231,21	12,5
(Very steep) >65	11655,9	65,3
Total	17849,66	100

5,2%

79%. Best be forest

Table 4. Soil types area founded in the Mahat watershed

USDA Soil Great group	Area of USDA Soil great Group	
	Ha	%
Humitropepts	8117,42	45,48
Hapludults	9732,24	54,52
Total	17849,66	100

45,48 ------→ Fertile soil

54,52 ------→ No Fertile soil

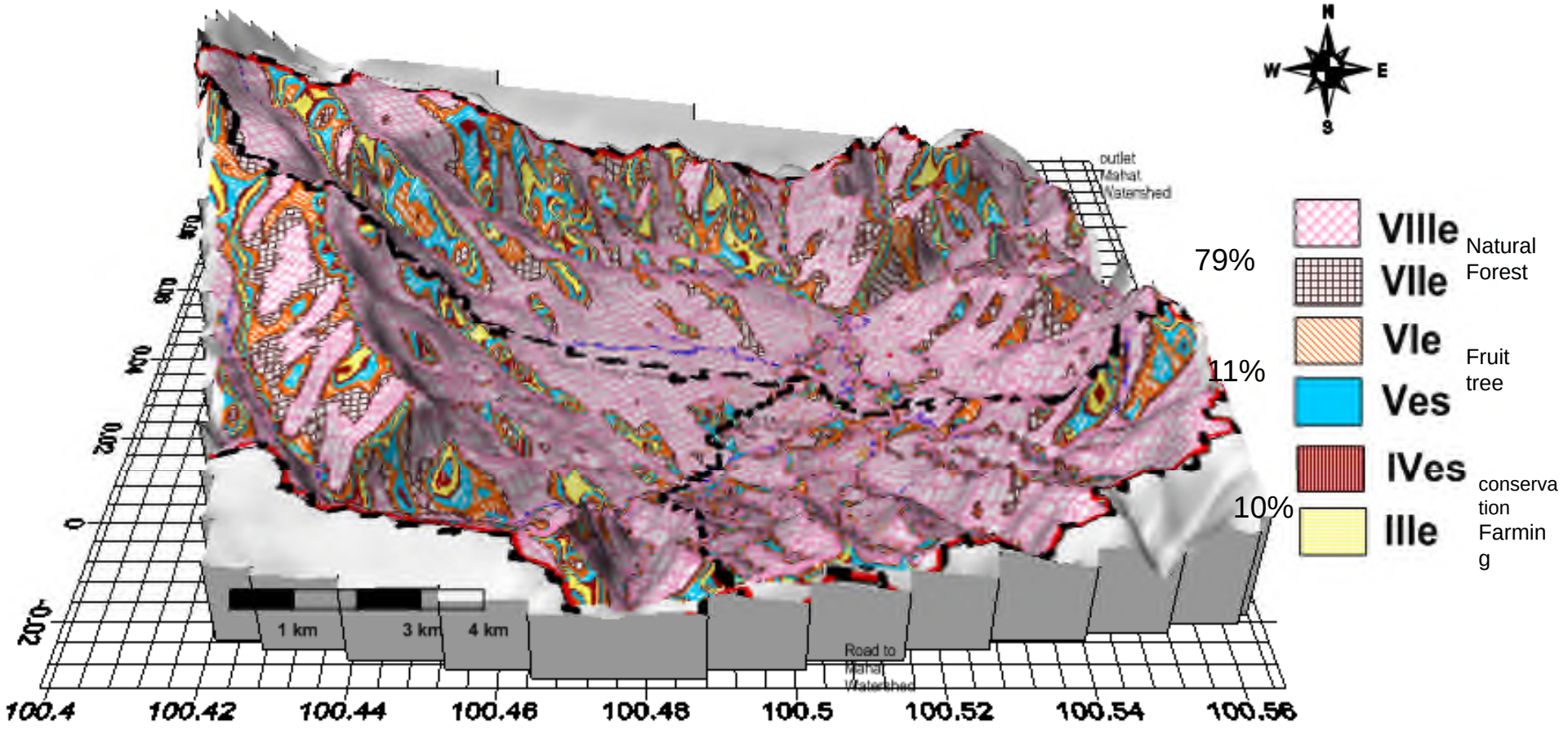


Fig 4. 3D Map Land Capability subclass in Mahat Watershed

Table 4. Determination of land capability classes and subclasses at Gambir Garden in the Mahat watershed

Long (N)	Lat (E)	Soil code	(e) SL	(e) ES	(e) ER	(s) SD	(s) TT	(s) TS	(e) SP	(w) DN	(w) GR	(w) FT	(s) SN	class es	Sub classes
100,481	0,055	HEG1	III	II	II	I	I	I	I	I	I	I	I	III	IIIe
100,482	0,055	HEG2	III	II	II	I	I	I	I	I	I	I	I	III	IIIe
100,482	0,054	HEG3	III	II	II	I	I	I	I	I	I	I	I	III	IIIe
100,481	0,058	HEG4	II	II	II	I	I	I	I	I	I	I	I	III	IIIe
100,481	0,058	HEG5	II	II	II	I	I	I	I	I	I	I	I	III	IIIe
100,481	0,058	HEG6	II	II	II	I	I	I	I	I	I	I	I	III	IIIe
100,511	-0,013	HUF2	VIII	II	I	I	I	I	V	I	I	I	I	VIII	VIIIe
100,515	-0,020	HUF3	VIII	II	I	I	I	I	V	I	I	I	I	VIII	VIIIe
100,488	0,005	HEG7	VII	II	II	I	I	I	V	I	I	I	I	VII	VIIe
100,472	0,020	HEG8	VI	II	II	I	I	I	V	I	I	I	I	VI	VIe
100,478	0,038	HEG9	VII	II	II	I	I	I	V	I	I	I	I	VII	VIIe
100,506	0,033	HEG10	VII	II	II	I	I	I	V	I	I	I	I	VII	VIIe
100,493	0,021	HEG11	VIII	II	II	I	I	I	V	I	I	I	I	VIII	VIIIe
100,508	0,019	HEG12	VIII	II	II	I	I	I	V	I	I	I	I	VIII	VIIIe
100,476	0,019	HES3	V	II	I	I	I	I	V	IV	I	I	I	V	Ves
100,477	0,035	HES4	V	II	I	I	I	I	V	IV	I	I	I	V	Ves
100,495	0,012	HEM2	VIII	II	II	I	I	I	V	I	I	I	I	VIII	VIIIe
100,493	0,028	HEM3	VIII	II	II	I	I	I	V	I	I	I	I	VIII	VIIIe
100,492	0,040	HEM4	VIII	II	II	I	I	I	V	I	I	I	I	VIII	VIIIe
100,491	0,009	HES2	IV	II	I	I	I	I	I	IV	I	I	I	IV	IVes
100,465	0,063	HEF3	VIII	II	I	I	I	I	V	I	I	I	I	VIII	VIIIe
100,454	0,025	HUF3	VIII	II	I	I	I	I	V	I	I	I	I	VIII	VIIIe

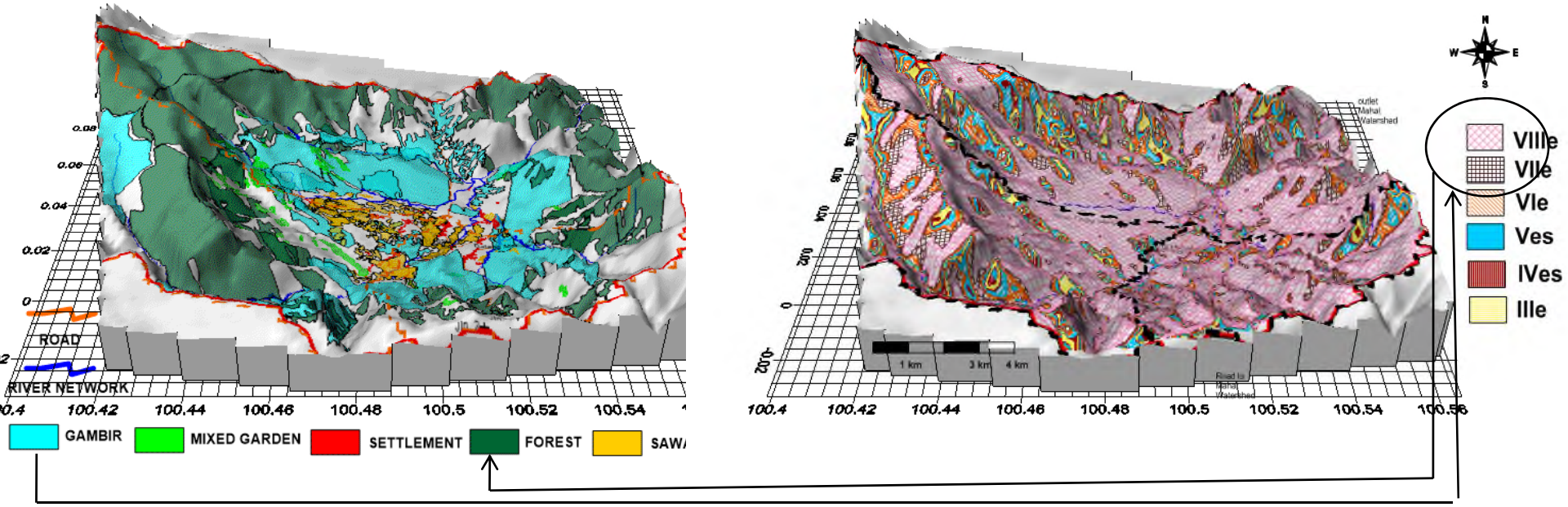
SL=Slope, ES =Erosion sensitivity/ Soil erodibility, ER=The erosion rate, SD=Soil depth, TT=Texsture of top soil, TS=Texture of subsoil, SP=Soil Permeability, DN=Drainage, GR=Gravel / rock, FT=Flood threat, SN=Salinity (s)

Table 5. The Subclasses of land capability founded in the Mahat watershed

Subclass Land Capability	The area of the land capability subclass		
	Ha	%	
IIIs	1392,276	7,8	conservation
IVes	589,039	3,3	Farming
Ves	731,836	4,1	Fruit tree
VIe	1249,48	7	
VIIe	2231,21	12,5	
VIIIe	11655,9	65,3	Natural Forest
Total	**17849,66**	**100**	

Land use in 2019

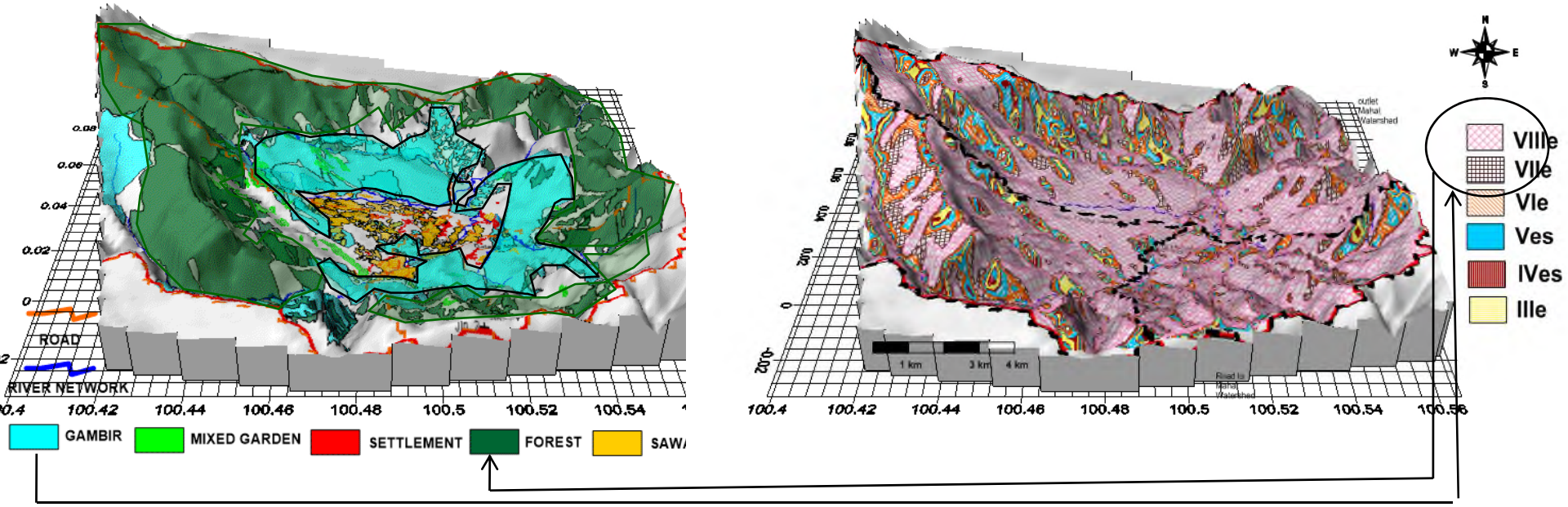
Land Capability Class in 2019



Distribution of Land use in 2019 and Land Capability Class in Mahat Watershed

Land use in 2019

Land Capability Class in 2019



Distribution of Land use in 2019 and Land Capability Class in Mahat Watershed

Conclusion

- This methodology is able to determine the slope class: 0-3%, >3-8%, > 8-15%, > 15-30%, > 30-45%, > 45-65%, > 65%.
- Slope classes > 65% are most commonly found in the Mahat watershed (65.3%) and are distributed in humitropepts and Hapludults. The land capability subclass found in the Mahat watershed with the Surfer Tool is IIIs (7,8%), IVes(3,3%), Ves(4,1%), Vie(7%), VIIe(12,5%) and VIIIe(65,3%)
- The most commonly found land capability class is class VIII. slope class > 65% found more than 65% of the total Mahat watershed. A slope of 0-15% was found to be 15.2% of the total of the mahat watershed.
- The surfer tool proved to be an excellent tool for determining the use of the FAO land capability because it accelerated data processing, providing data, storing data. Surfer tools may be used for further analysis in the future for geoenvironmental and agroecological planning.

1.Asssalamualaikum wr.wb. Good Day ladie and gentlement. I am aflizar from Politeknik Pertaniain negeri Payakumbuh. The title of my presentation is" 3D evaluation of land Capability for Gambir (Uncaria Gambir Robx) garden in Mahat Watershed using Surfer Tool

2.Mahat watershed is main Uncaria Gambir Robx production area in Indonesia . However limited in soil conservation practices.

•Evaluation of land capability for Gambir useful for land use planning for Gambir garden in order to keep environmental and contribute to high beneficial benefit for farmer.

•Uncaria gambir contain chatechin that is for natural ingredient, antioxidant, medicine, tanners and dyes.

•The aim of this study is to create a limiting factor zone of land capability class of FAO and make use of appropriate conservation method for gambir garden.
3.Mahat watershed located in 50 kota district, West Sumatra indonesia. the arrow refer to all water flow Pangkalan area
Next please

4.This is Gambir garden in Mahat Watershed with etnoconservation.

5.This is 3D landscape of Mahat watershed.Total areas is 17849,66 ha. The elevation range between 200 and 2200 m asl. (Point out). The soil sampling point is shown in the black circle. Annual rainfall in the ranges between from 1800 to 3000 mm. There are 3 subwatershed suc as: : (g1), (g2), (g3),

6.This is procedure evaluation of land capability for Gambir garden using Surfer Tool.
Step I= making digital kontur form google earth then digital slope
Step II. Making digital soil map, soil characteristic boubdary and table assessment for land capability
Step III=making 3D map 3D Map subclass of land capability
Step 4=soil conservation recommendation based on land capability map and distribution gambir

7.This is condition of gambir garden at sampling point in different topography in mahat watershed

8. We done soil survey. We collected 29 soil sampling based on land use type, soil type and topography position Soil and analyses is SL=Slope, ES =Soil erodibility, ER=The erosion rate, SD=Soil depth, TT=Texsture of top soil, TS=Texture of subsoil, SP=Soil Permeability, DN=Drainage, GR=Gravel / rock, FT=Flood threat, SN=Salinity (s).
Other we collected is land use map, contur map. Soil erosion estimated by usle model. For making 3D map and land capability , we use surfer 9 software.

9. This slide show general data and parameter for land capability FAO. Mahat watershed generally is Mountainiuos area with the slope 41%. Erosion rate is high level. With eleven paremeter . We create land class and sub class in Mahat Watershed

10. This is 3D map distribution slope . We found significnly slope > 65% indicated by cross pink that covered 65% total area. Incontrast , flat area 0-8% slope indicate with yellow and black dot covered 5% total area.

11.Soil type in Mahat watershed , that covered 46% by Humitropept as fertile soil and 55% by Hapludult as less fertile soil

12.This is Tabulation to determine class and subclass of land capability according FAO criteria. Based on % slope class we we found land capability clas I, II, III, IV, VI, VII and VIII class. Based on criteria soil erodibility , we found land capability class I and II

13. Based on criteria salinity, we found land capability class I because free very little salt concentration in soil

14. Table 3 show that 79% soil in the mahat watershed located at steep and very steep slope. It mean must be keep as natural forest. However, table 4 show 45% soil in mahat watershed categorized as fertile soil.

15. This is 3D map of capability subclass in Mahat watershed. We found VIIe and VIIIe about 65% because limiting factor is erosion factor.

16. This procedure to determination of subclass of Land capability. The higher number limiting factor to be number clases and sub class

17. Table 5 show that 78% soil in mahat watershed must be natural forest.

18. This is distribution map of land use 2019, and we compare with land capability map. We found Natural forest located at class VIII e. It is suitable. However we found gambir garden located at class VIII. it is problem. Our recommendation is. Gambir garden should be introduce conservation practices suc as terrace and agroforestry and agroecological land use planning. For controlling soil erosion and keep environmental.

19. This is distribution map of land use 2019, and we compare with land capability map. We found Natural forest located at class VIII e. It is suitable. However we found gambir garden located at class VIII. it is problem. Our recommendation is. Gambir garden should be introduce conservation practices suc as terrace and agroforestry and agroecological land use planning. For controlling soil erosion and keep environmental.

20.This methodology is able to determine the slope class: 0-3%, >3-8%, > 8-15%, > 15-30%, > 30-45%, > 45-65%, > 65%.
Slope classes > 65% are most commonly found in the Mahat watershed (65.3%) and are distributed in humitropepts and Hapludults. The land capability subclass found in the Mahat watershed with the Surfer Tool is IIIs (7,8%), IVes(3,3%), Ves(4,1%), Vie(7%), VIIe(12,5%) and VIIIe(65,3%)
The most commonly found land capability class is class VIII. slope class > 65% found more than 65% of the total Mahat watershed. A slope of 0-15% was found to be 15.2% of the total of the mahat watershed.
The surfer tool proved to be an excellent tool for determining the use of the FAO land capability because it accelerated data processing, providing data, storing data. Surfer tools may be used for further analysis in the future for geoenvironmental and agroecological planning.

3D Evaluation of Land Capability for Gambir (*Uncaria Gambir Robx*) Gardens in Mahat Watershed using Surfer Tool

Aflizar [#], Jamaluudin[#], Amrizal [#], Roni Afrizal [#], Edi Syafri [#]

[#] *State Politechnic Payakumbuh for Agriculture , jl. Raya Negera KM 7 Tanjungpati, Kec. Harau, Kab Limapuluh Kota, Sumbar, 26271,Indonesia*
E-mail: aflizar_melafu@yahoo.com

Abstract **- This study aims to invest in the land capability classes on agricultural land in the Mahat watershed that has been sustainably planted in Gambir gardens by rural communities. Useful for making sustainable Gambir Garden Planning where a three-dimensional (3D) map distribution is made using the Surfer Tool. Mahat Watershed is located in Limapuluhkota Regency, Indonesia, which is already known as a supplier of 70% of Gambir World's needs. 3D maps of Land Capability are compiled based on DEM data, slope and soil characteristics by taking soil samples based on differences in soil family, land use and topography. Then the results of the analysis are matched with the FAO 1976 land capability class assessment table. From the results of the analysis it can be concluded that the most dominant subclass in the Mahat watershed is VIIIs. The slope class of 0-20% is found 10% of the total Mahat watershed. Mahat watershed area in the form of cauldron with flat area (slope 0-8%) found 5%. Gambir Gardens in the Mahat watershed were found to be nearly 80% planted and grown on land with VIIIs land capability classes. The meaning is that the Gambir gardens currently planted must be provided with terrace conservation and agroforestry technology to prevent soil erosion and critical soil. The surfer tool has proven to be an excellent tool for determining the 3D land capability because it has the facility to store digital data, input large amounts of data, visualize 3D maps and making it possible to make recommendations for future environmental management plans.**

***Keywords*— Gambir gardens, soil survey, Surfer tool, 3D map.**

I. INTRODUCTION

Praktek pertanian yang sehat dan memperhatikan aspek ekologi dengan menerapkan praktek konservasi tanah dan air telah banyak digunakan dan dipraktekkan secara luas di Indonesia dalam beberapa dekade terakhir karena banyaknya program dan banntuan pemerintah Indonesia dan NGO. Dalam pengambangan visi baru pertanian di Indonesia yang bertujuan untuk menjaga kwalitas fisika tanah, kimia tanah, serta biologi tanah. Berkembangnya kesadaran untuk penerapan manajemen tindakan darurat terhadap pencegahan bencana yang meliputi tindakan menanggulangi erosi tanah, adanya inovasi dalam teknik mekanisasi pertanian dan penggunaan pupuk berimbang serta pemakaian pestisida yang benar.

Tindakan konservasi tanah dan air yag bertujuan untuk mempertahankan kwalitas tanah dengan kegiatan perencanaan penggunaan lahan yang tepat. Dalam prakteknya petani dibantu pemerintah melakukan pada setiap pekerjaan pertanian secara rasional, teratur dan memperhatikan kaedah lingkungan. Maka oleh sebab itu dapat dijamin setiap usaha pertanian yang dikerjakan oleh petani lokal, swasta dan pemerintah bisa mendapat keuntungan dalam bentuk uang yang banyak.Diampimg itu, melindungi sumber daya alam dari degradasi yang banyak terjadi saat ini di Indonesia. Hal ini, merupakan faktor penting yang harus diperhatikan

secara menyeluruh dalam mengolah tanah pertanian di Indonesia karena sebagai negara tropis yang memiliki curah hujan tinggi sepanjang tahun.

Mengetahui Penggunaan Kelas Kemampuan Lahan bertujuan untuk memanfaatkan kondisi tanah yang alami yang apa adanya, tepat dalam penggunaannya untuk pertanian, peternakan dan hutan dengan meminimalkan kehilangan kemampuan tanah. Kelas Kemampuan lahan diciptakan berdasarkan melihat dan mempertimbangkan faktor pembatas atau pengggangu yang signifikan yang dapat mempengaruhi pengelolaan pertanian. Faktor pembatas lahan yang dapat mempengaruhi kemampuan lahan itu seperti: Relief, erosi, karakteristik tanah, iklim. Setelah menginvestigasi faktor pembatas maka melahirkan solusi inovasi untuk mengatasi faktor pembatas itu menjadi lebih baik bagi tanaman. Praktek inovasi itu merupakan dasar untuk perencanaan penggunaan kemamouan lahan secara rasional.

Penelitian ini bertujuan untuk mengetahui faktor pembatas kelas Kemampuan lahan pada tanah yang digunakan untuk kebun Gambir (*Uncaria Gambir Robx*) di DAS Mahat, Kabupaten Lima Puluh Kota, bertujuan untuk perencanaan penggunaan Kemampuan lahan 3D untuk lahan Kebun Gambir yang tepat memakai Surfer Tool. Kami yakin bisa memberikan hasil yang lebih detail dan belum pernah dilakukan oleh studi lain di Indonesia sebelumnya.

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TABLE I
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9	author email address	abstract	abstract heading

	(in Courier), cell in a table	body	(also in Bold)
10	level-1 heading (in Small Caps), paragraph		level-2 heading, level-3 heading, author affiliation
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24	title		

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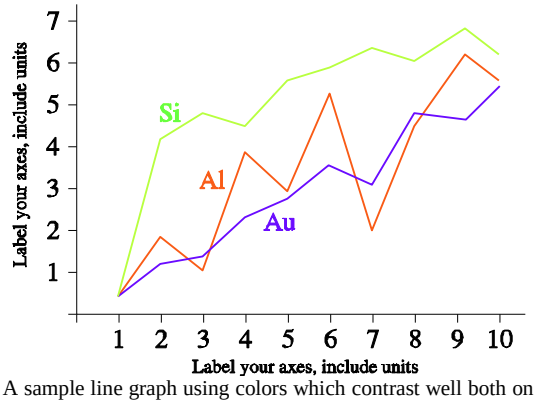

Fig. 1 A sample line graph using colors which contrast well both on screen and on a black-and-white hardcopy

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Figures must be numbered using Arabic numerals. Figure captions must be in 8 pt Regular font. Captions of a single line (e.g. Fig. 2) must be centered whereas multi-line captions must be justified (e.g. Fig. 1). Captions with figure numbers must be placed after their associated figures, as shown in Fig. 1.

Fig. 2 Example of an unacceptable low-resolution image

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Nomenclature

a	specific surface area	m^2m^{-3}
x	length co-ordinate	m
Greek letters		
α	heat transfer coefficient	$Wm^{-2}K^{-1}$
τ	residence time	s
Subscripts		
i	inlet	
e	equilibrium	

Acknowledgment

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