

# NUTRIENT CONTENT OF RAINFALL, WATER IN CANAL, AND WATER AT DIFFERENT DEPTHS IN PEATLAND IN CENTRAL KALIMANTAN, INDONESIA



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# NUTRIENT CONTENT OF RAINFALL, WATER IN CANAL, AND WATER AT DIFFERENT DEPTHS IN PEATLAND IN CENTRAL KALIMANTAN, INDONESIA



## OUTLINE

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1. INTRODUCTION
2. MATERIALS AND METHODS
3. RESULTS
4. DISCUSSION
5. CONCLUSION
6. ACKNOWLEDGEMENT



# INTRODUCTION

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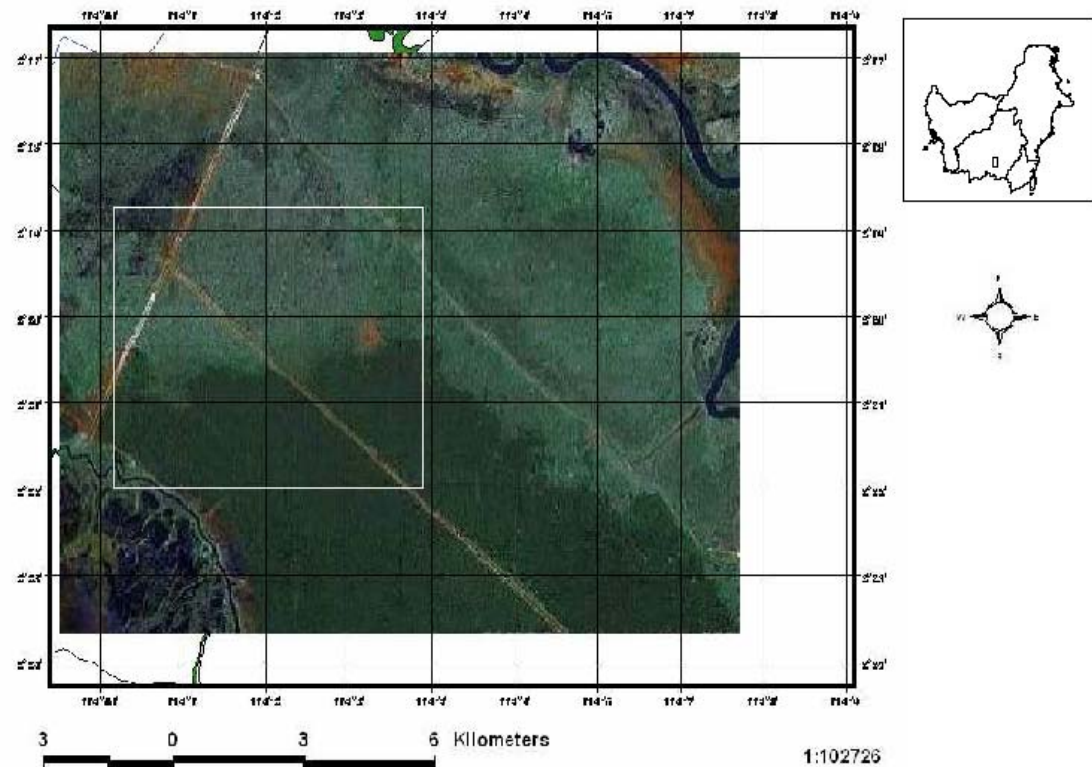
- *Input of inorganic and organic materials from atmosphere (precipitation) is an important in the area where soils have low nutrient availability, such as ombrogenous peatland.*
- *On the other hand, heavy rain could also leach nutrient from ecosystem (nutrient losses from ecosystem). Such as, in the study area where extensive drainage network were constructed (Former ex Mega Rice project).*
- *Drainage also cause oxidation of peat and peat burning ---→ change the characteristic of peat (including chemical and physical properties)*
- *Fluctuation of water table in peat land depend on the season.*
- *In general, water table in wet season near or above to the peat surface while in dry season below the surface.*

## *AIM OF THE STUDY*

- *The aim of this study is to obtain and evaluate data on the nutrient content of rainfall, water in canal, and water in deferent depth in deforested and forest area in upper part of block C ex MRP*

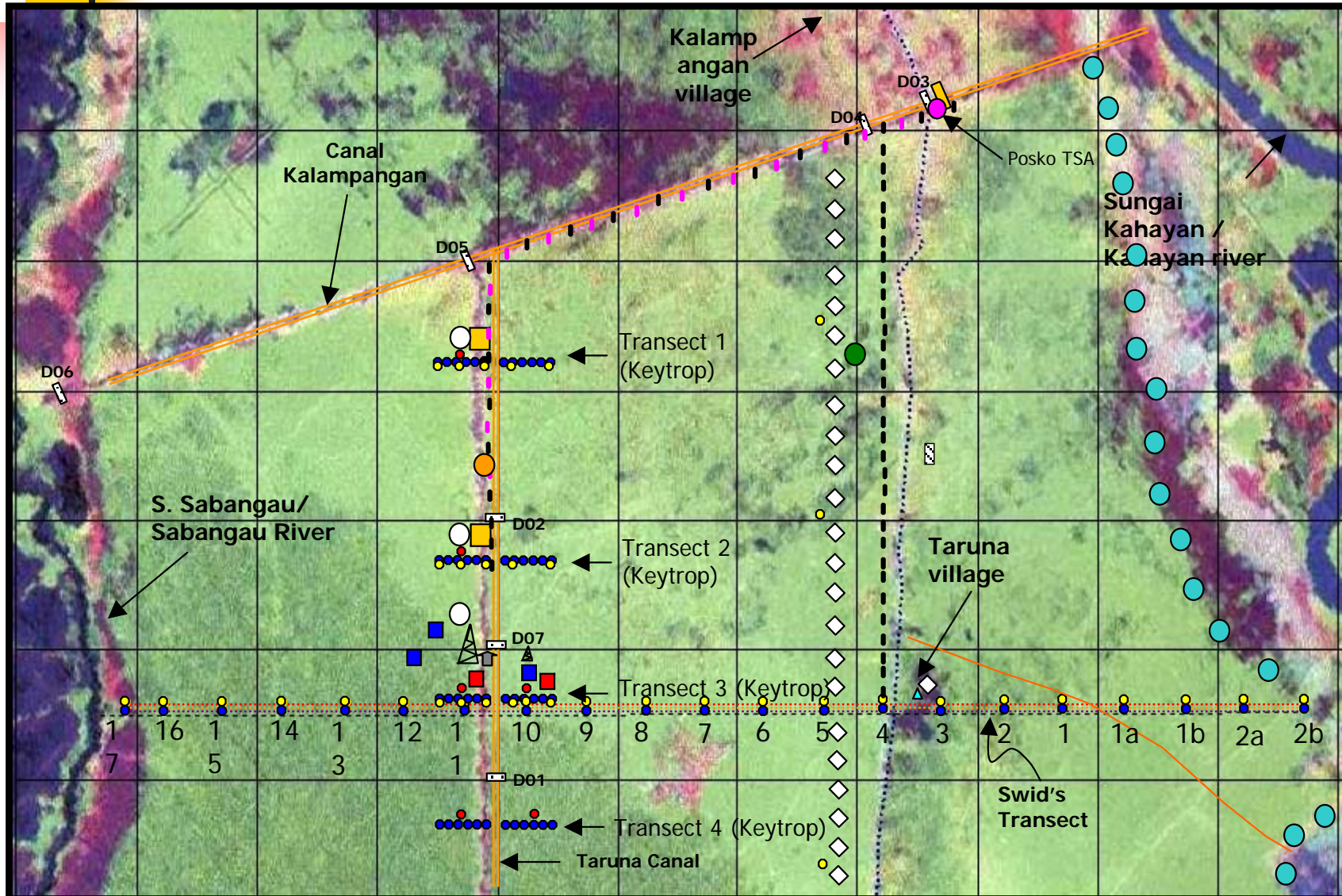
# MATERIALS AND METHODS

Study site ( Ex. Mega Rice Project in the upper part Block C)

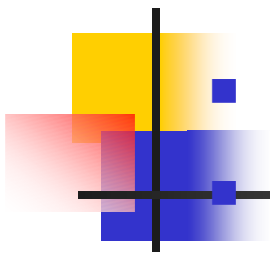


# MATERIALS AND METHODS

## STUDY SITE



## MATERIALS AND METHODS

- 
- Water samples were collected at
    - (a) two rain gauges in open area
    - (b) three permanent sites in a canal
    - (c) a deforested peat area (4 sites)
    - (d) peat swamp forest (2 sites). *50 and 400 m from canal.*
  - At each peatland site, water samples were obtained from different depths of 50, 150 and 250 cm below the surface.
  - At each depth, there was 1 (one) polyethylene pipe. The total of pipe was 18 pipes.
  - Water sample was taken by hand pump.

# MATERIALS AND METHODS



50 cm depth

150 cm depth



250 cm depth

# MATERIALS AND METHODS

Figure of pipe



## MATERIALS AND METHODS

Figure of pipe



## MATERIALS AND METHODS

How to take  
water sample?



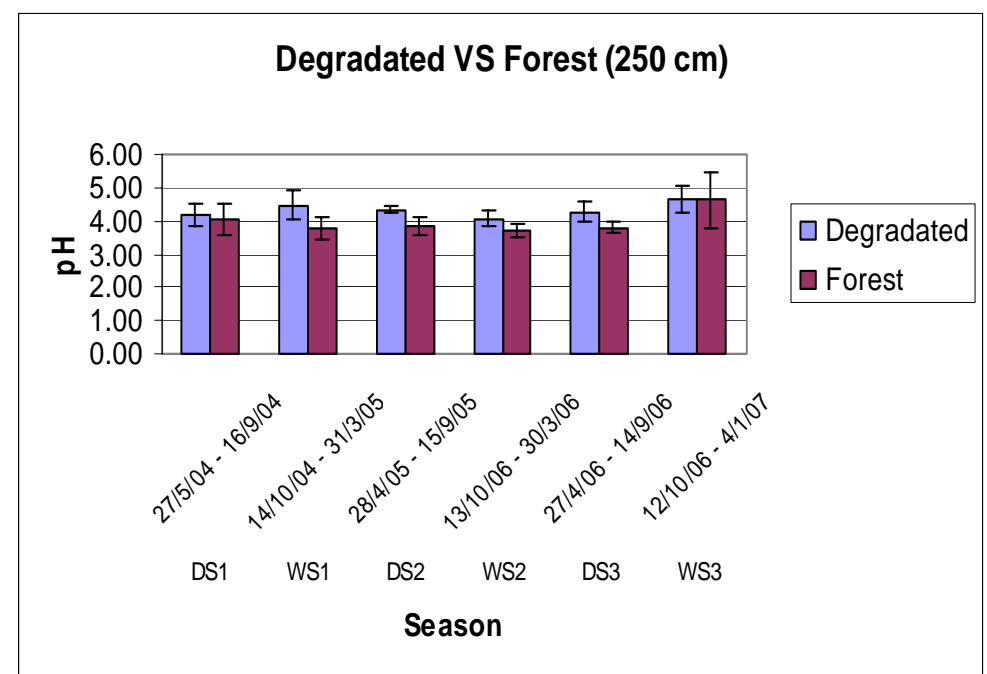
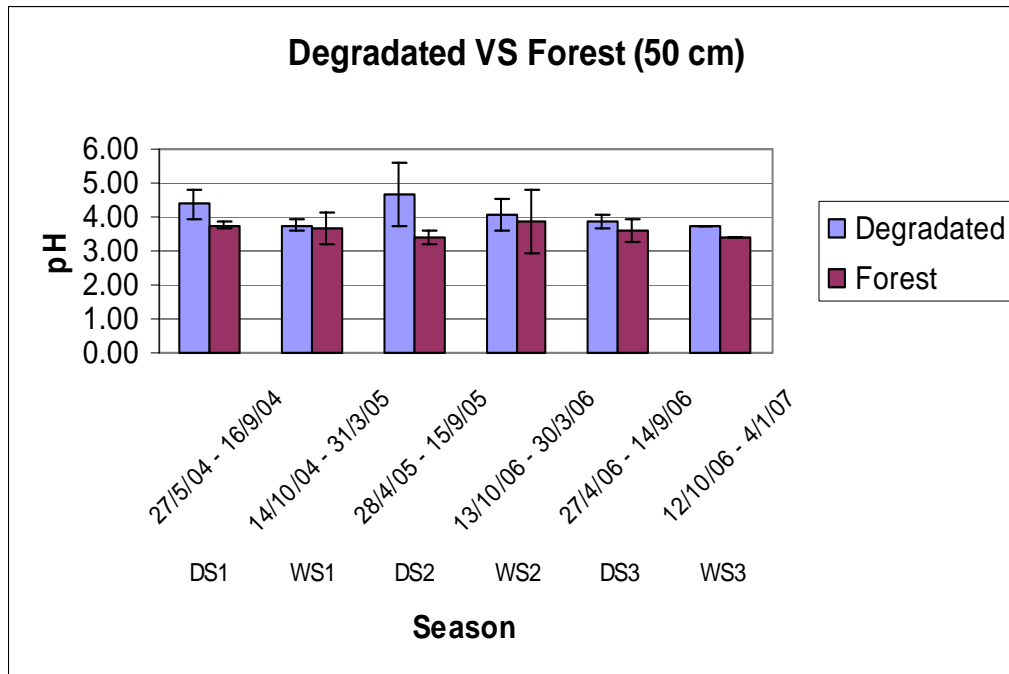
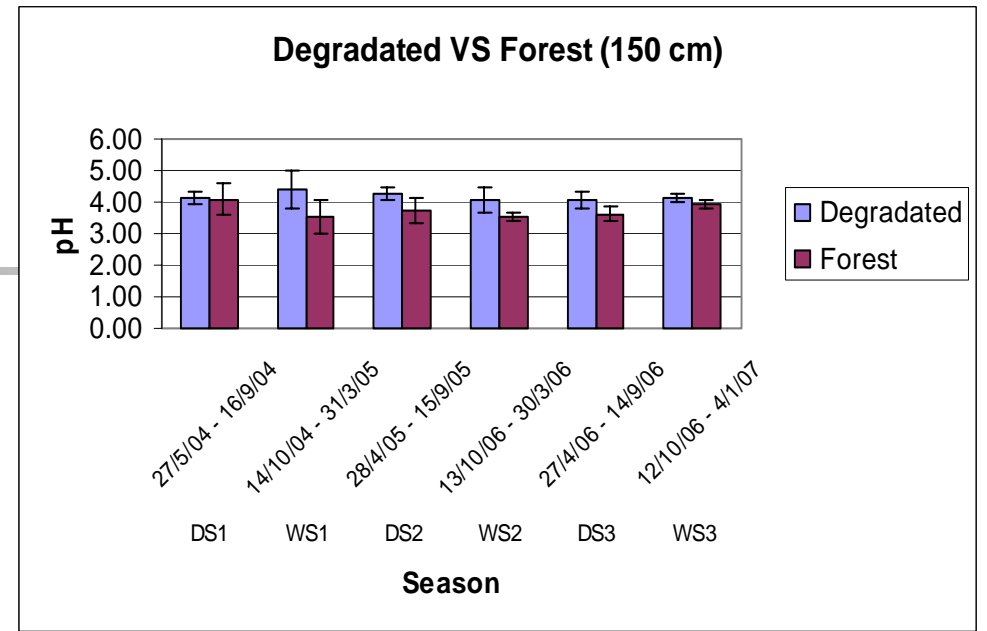
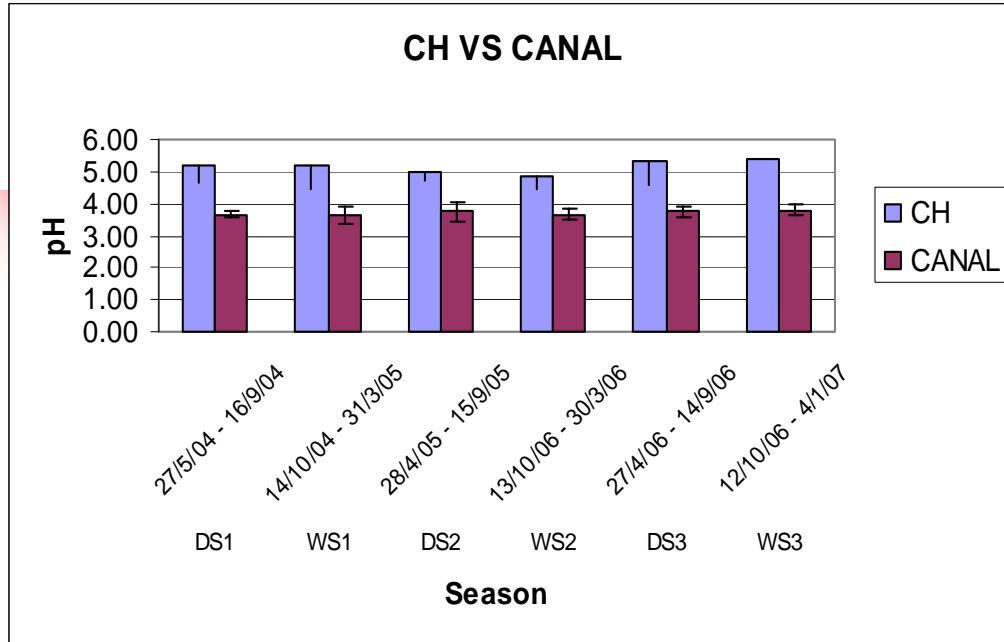


## Methods

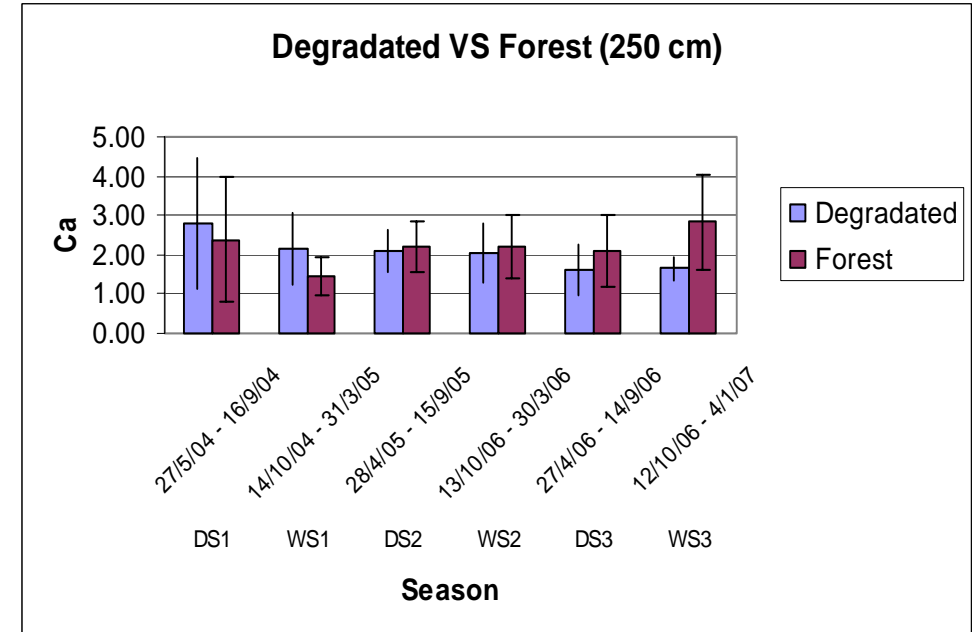
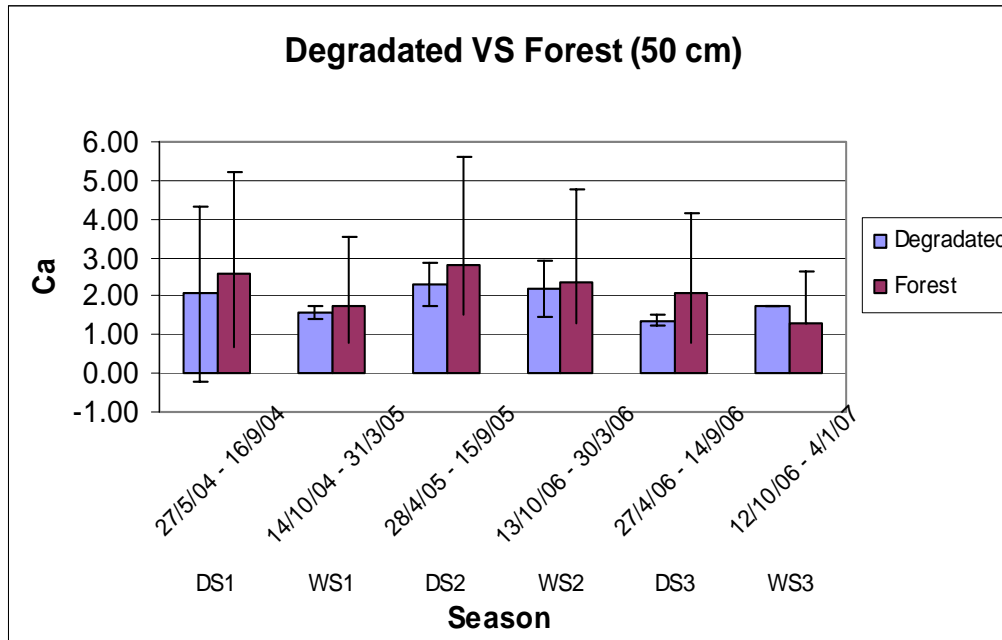
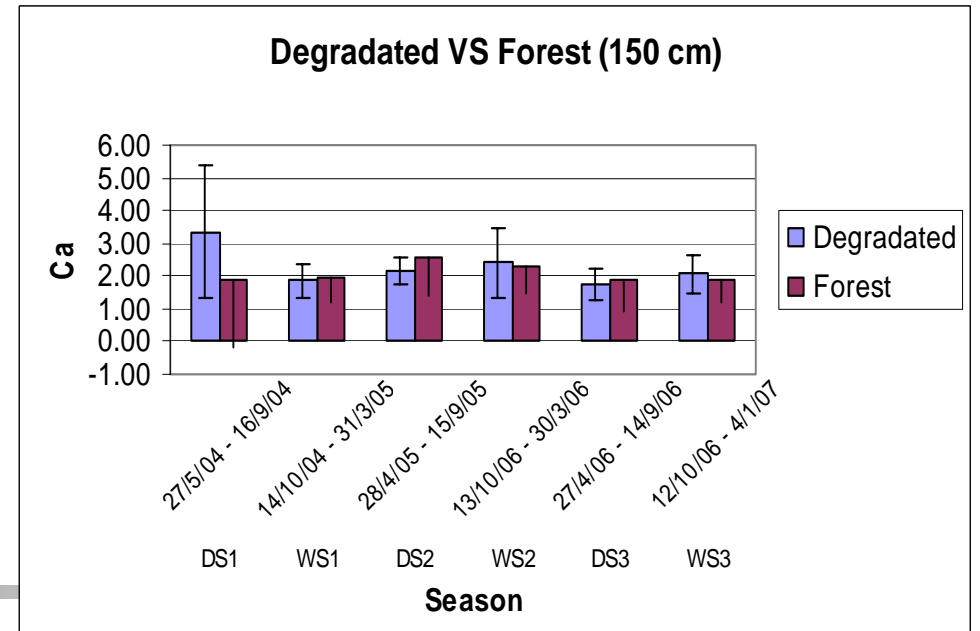
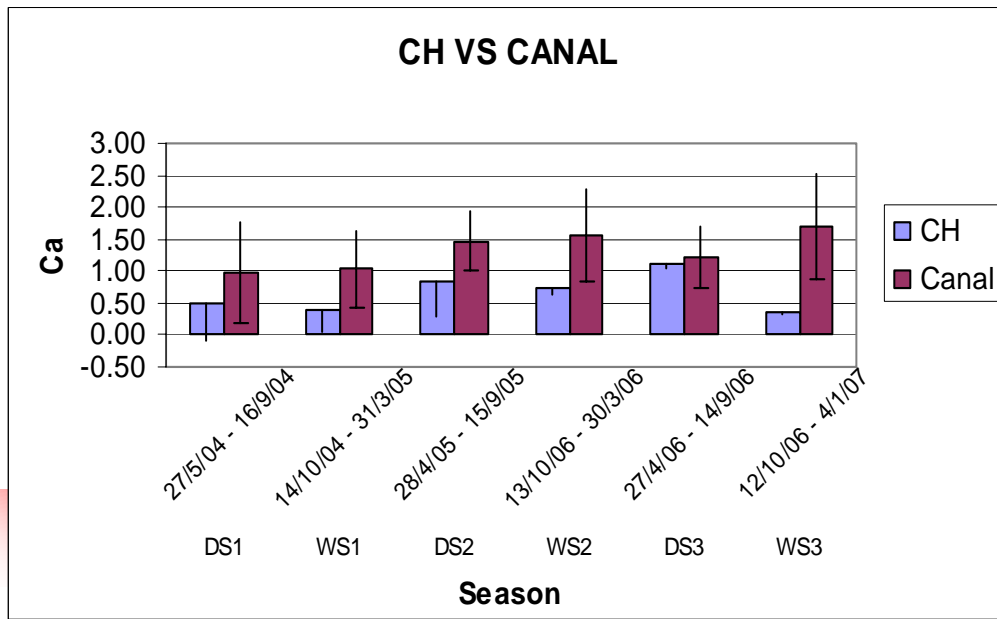
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- Water samples were collected every four weeks from the end of May 2004 to the beginning of January 2007.
- Samples were stored in a refrigerator (4°C) after collection, in the Analytical Laboratory, The University of Palangka Raya.
- **Methods for water nutrient analysis**
- Ca, Mg, K, Na and Fe were analyzed by atomic absorption spectrophotometer (Varian Spectra 30).
- pH using pH meter (Hanna pH 211)

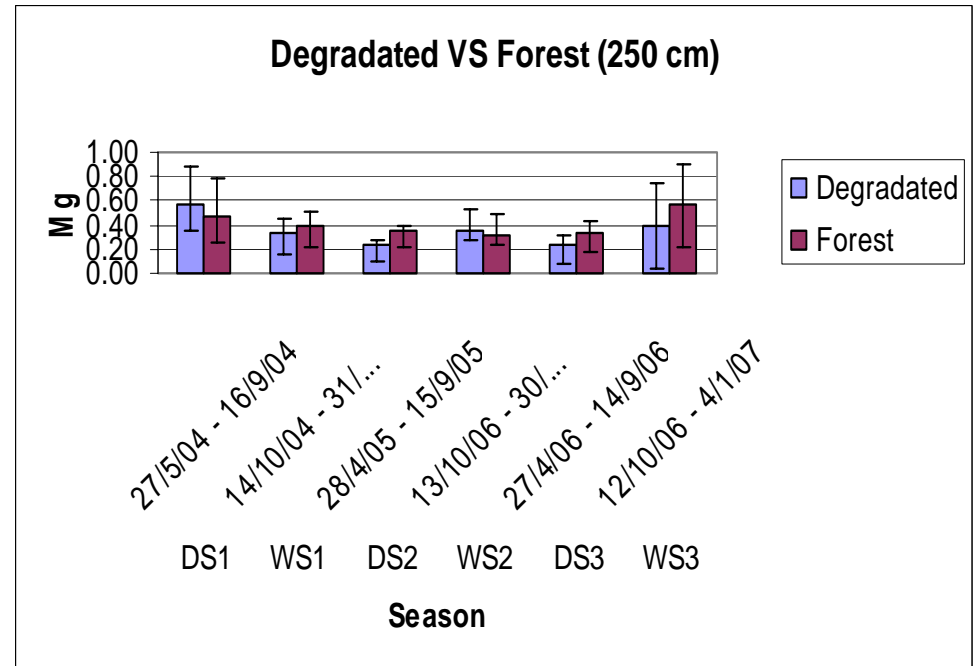
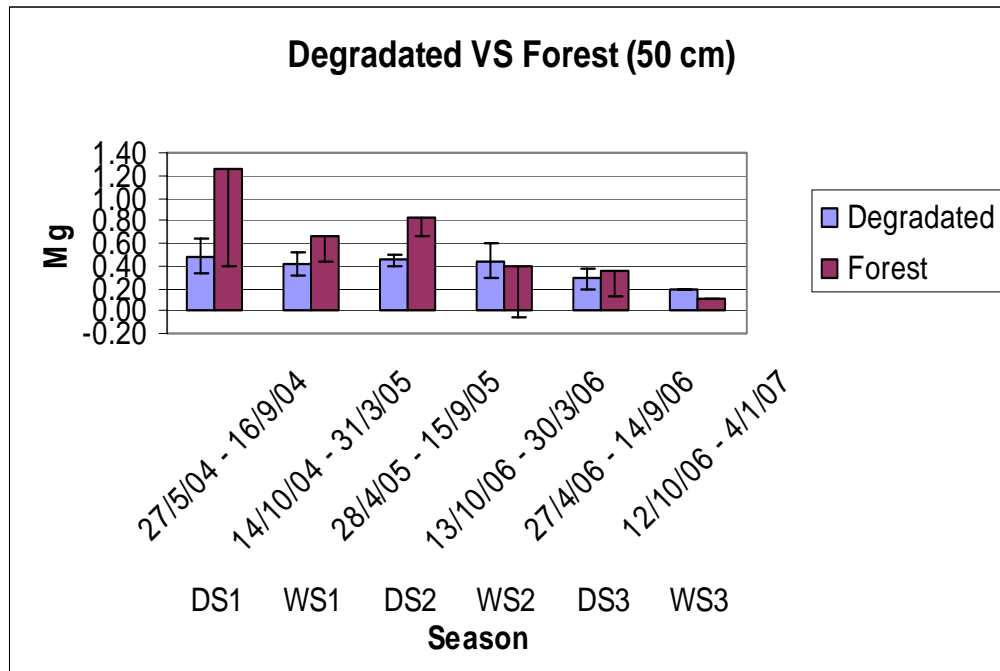
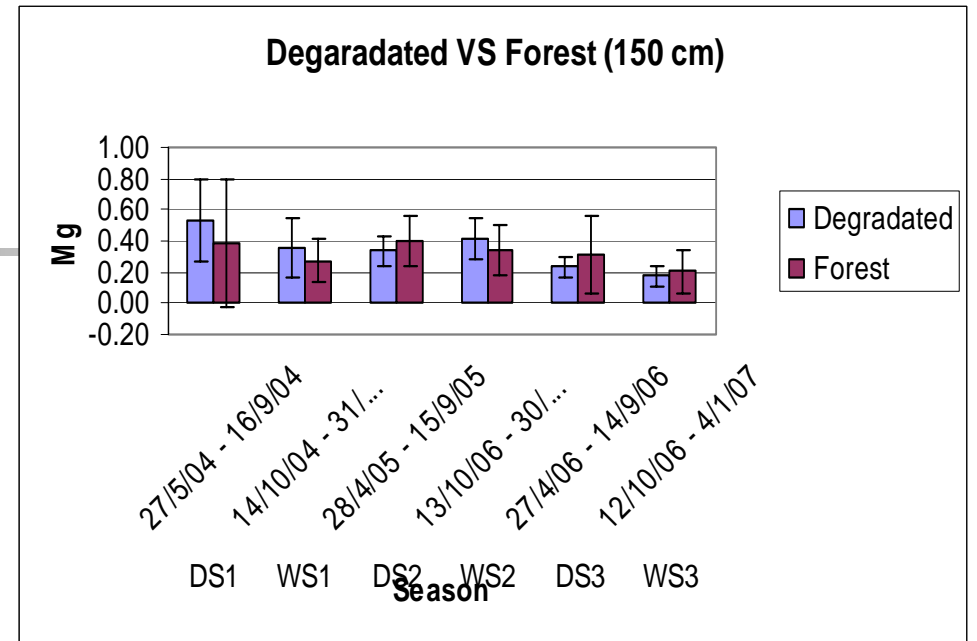
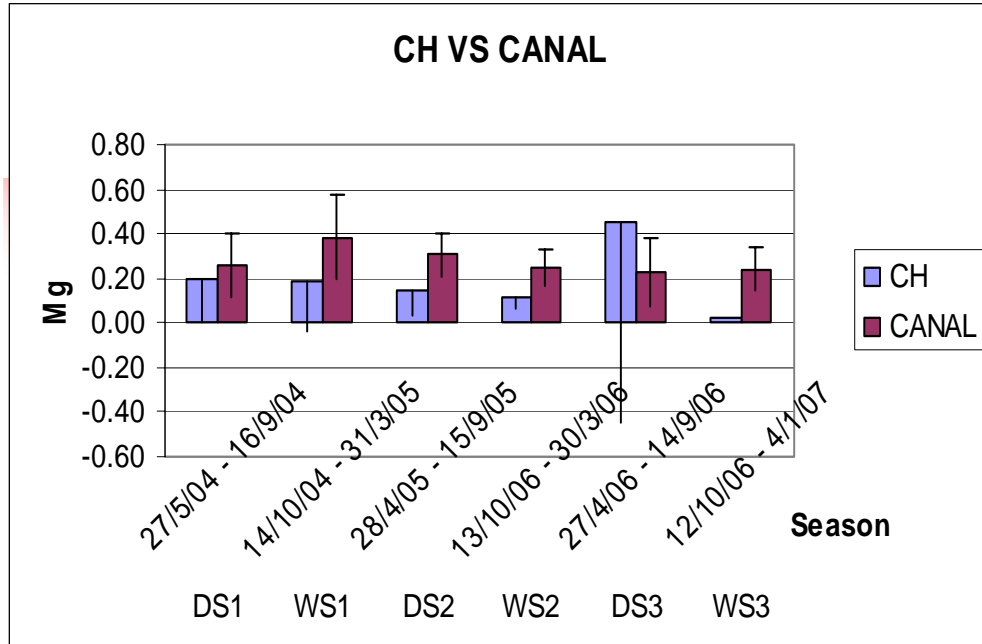
# Result (pH)



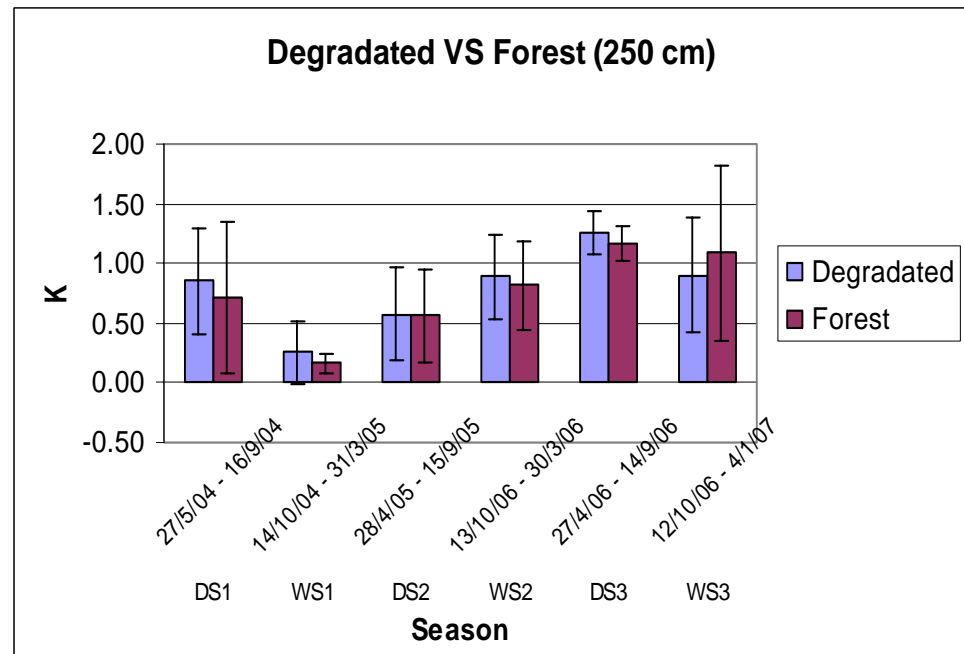
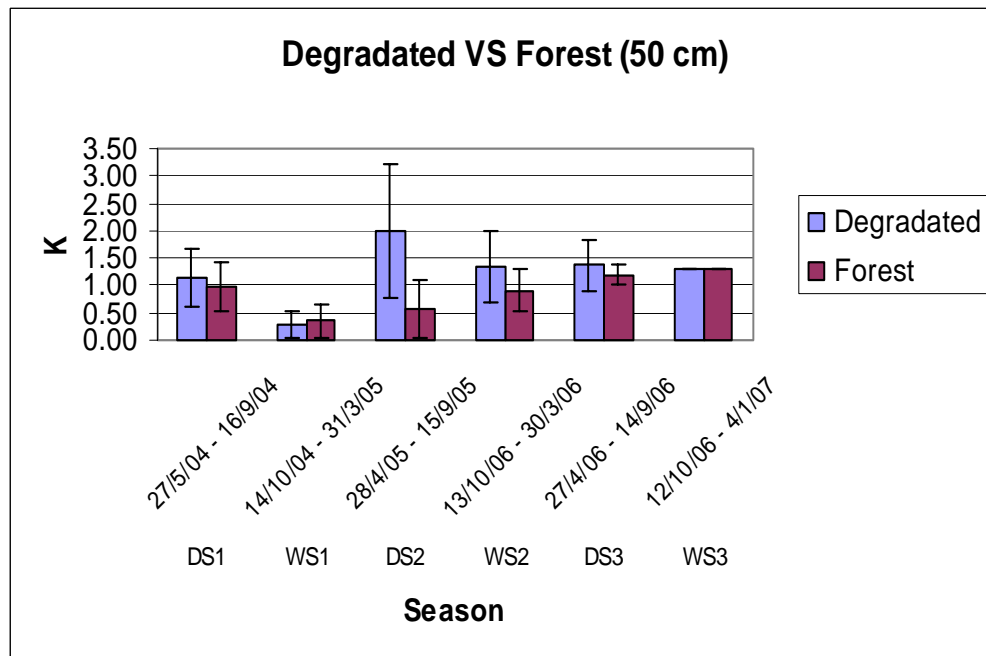
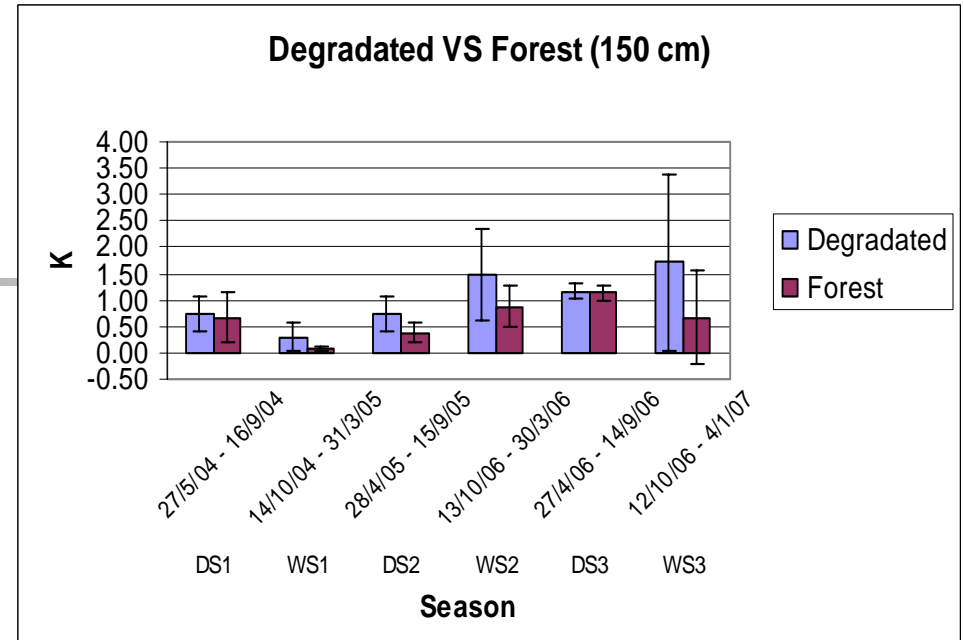
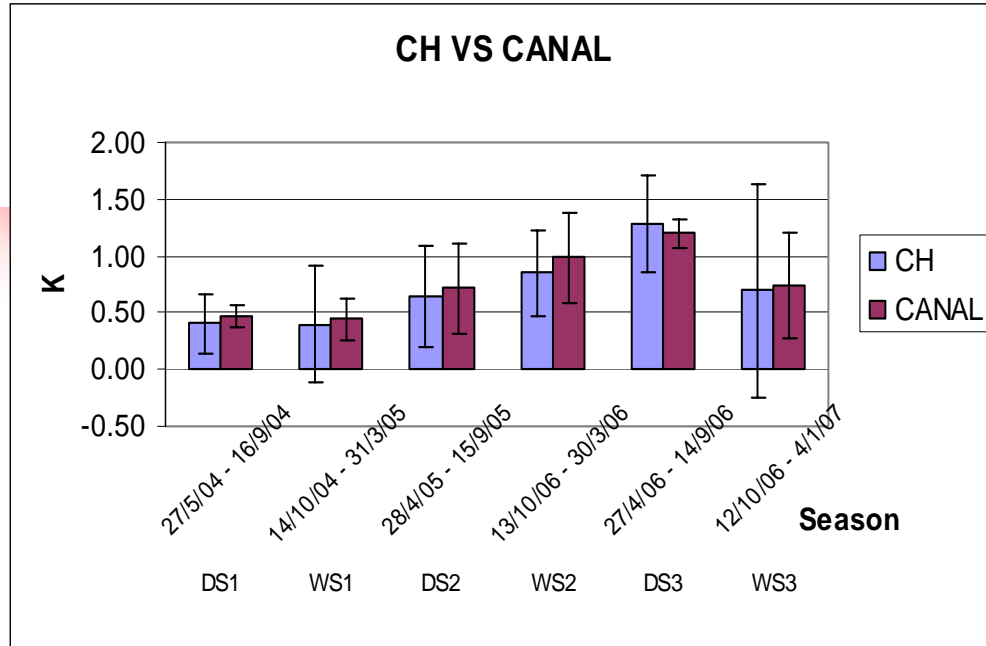
# Result of Calcium (Ca)



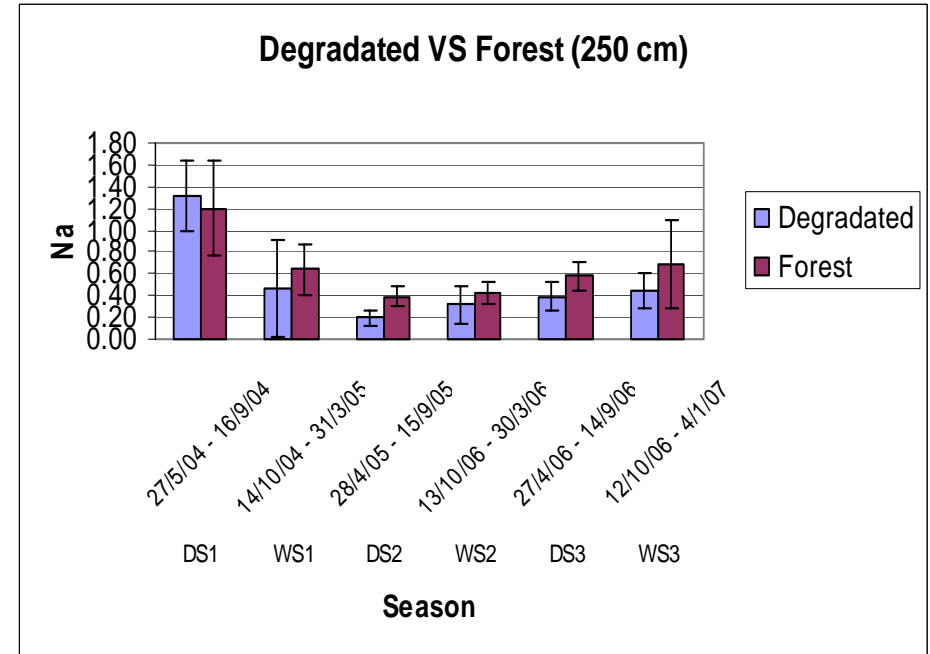
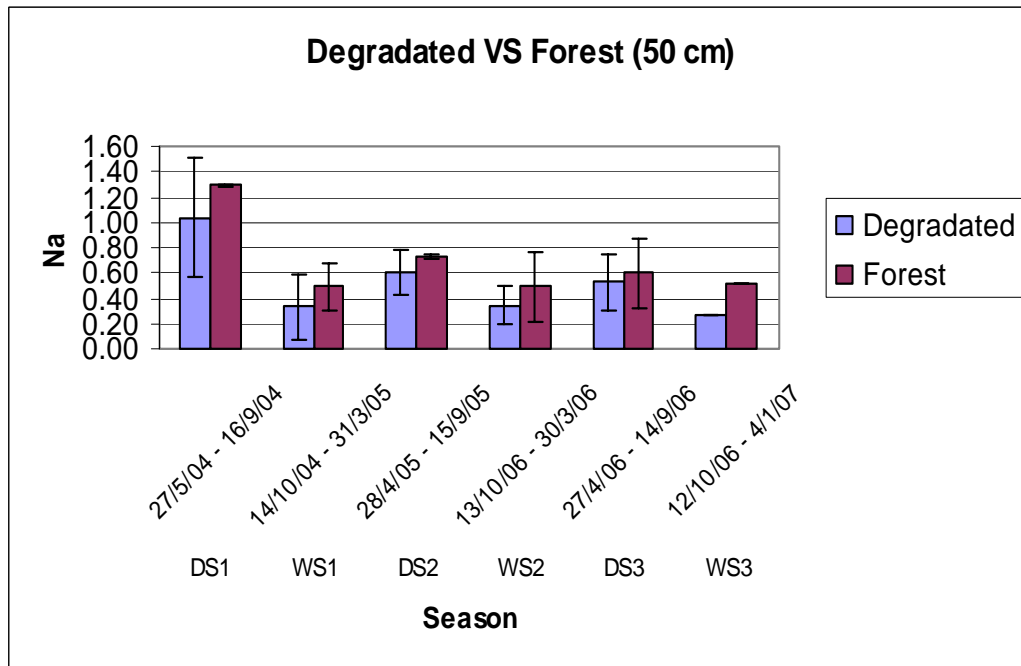
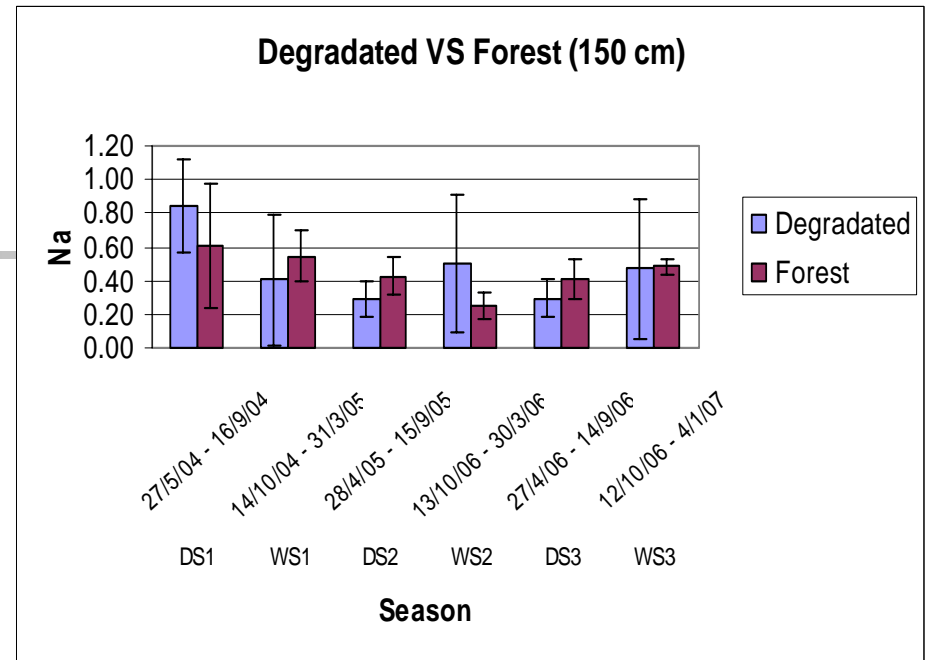
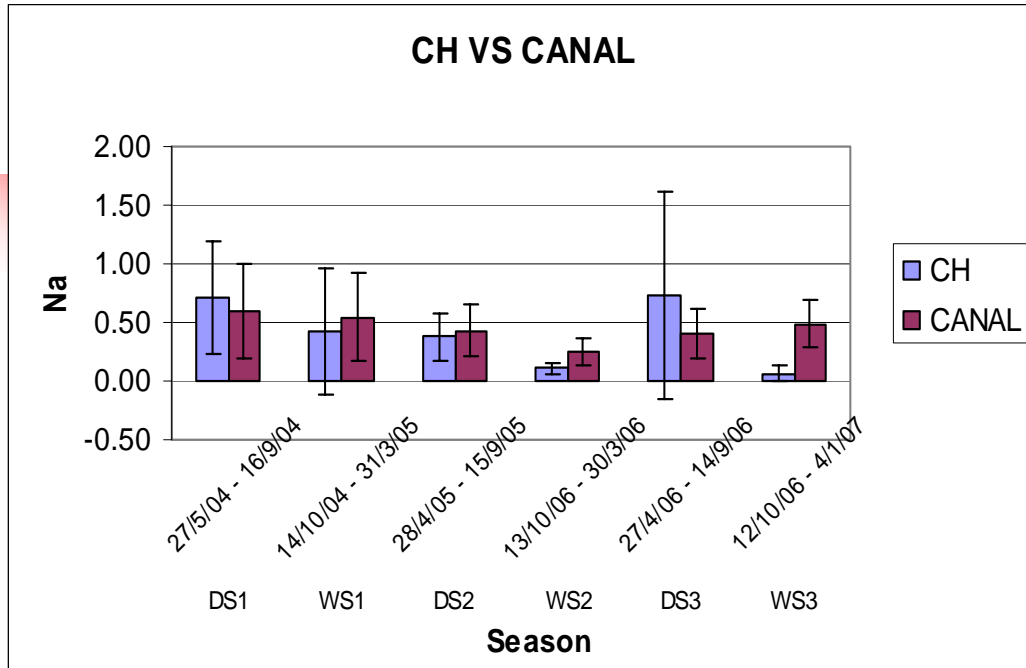
# Result of Magnesium (Mg)



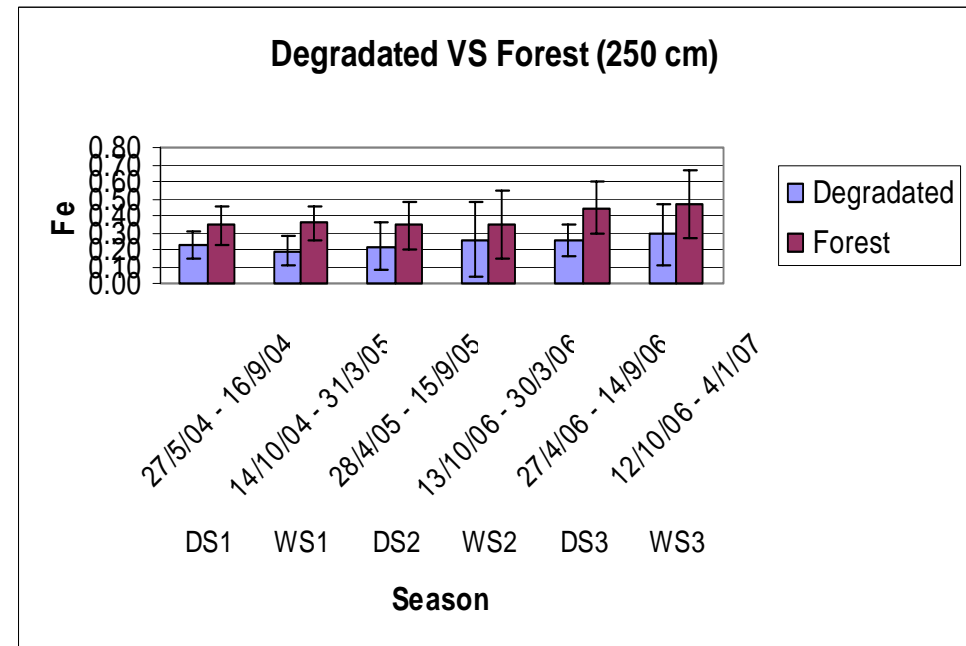
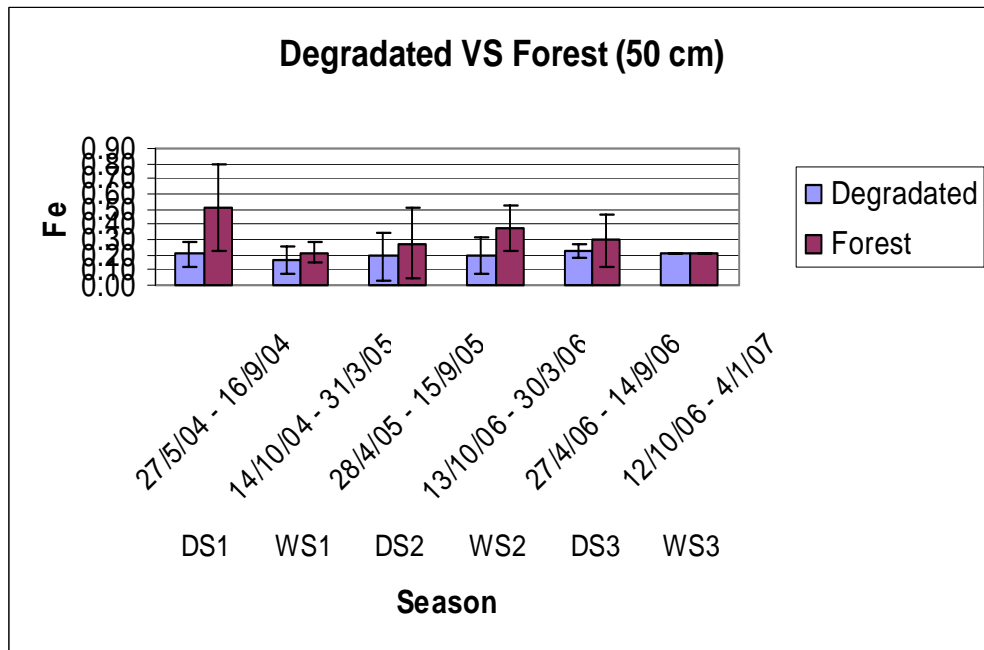
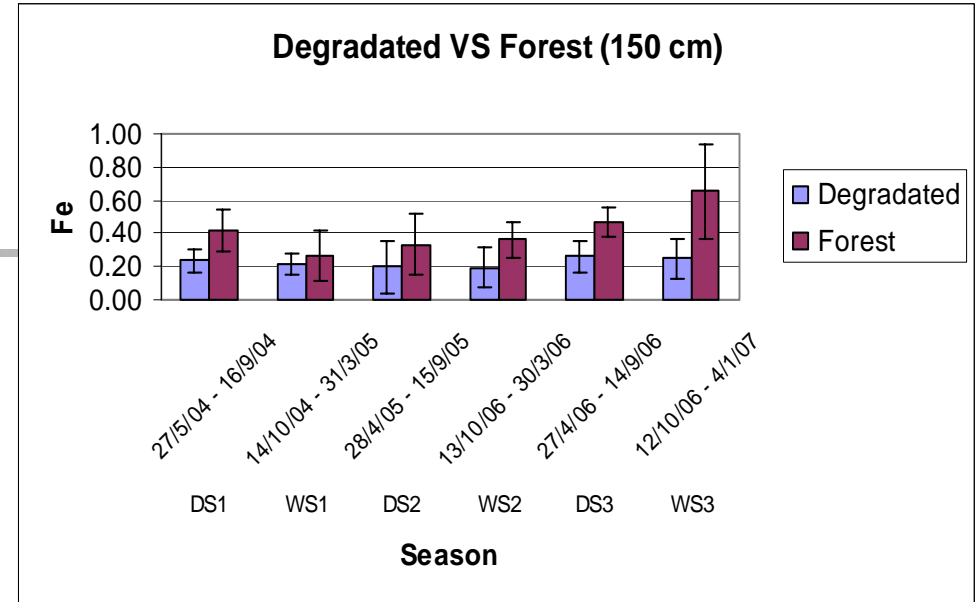
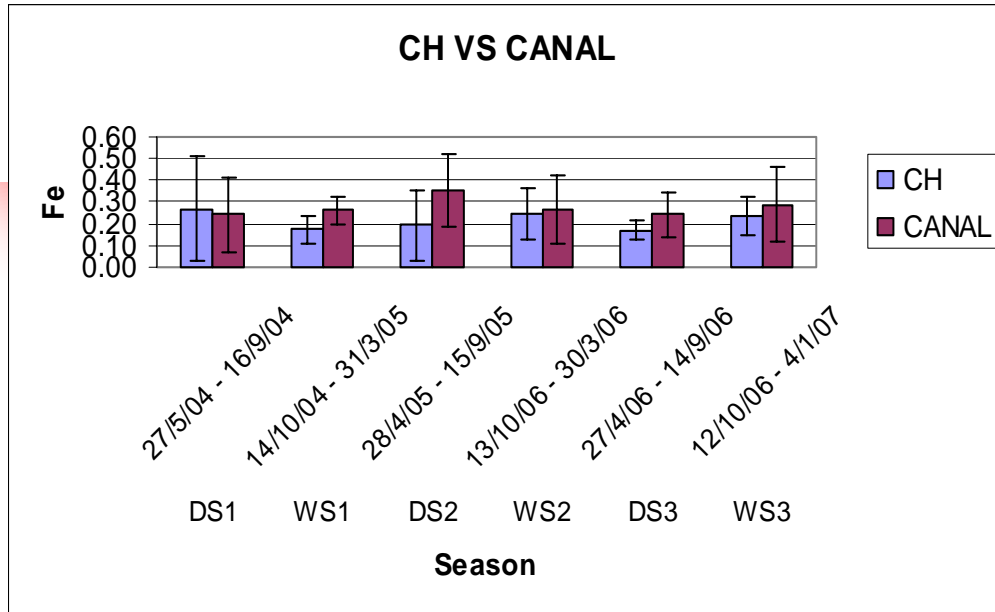
# Result of Potassium (K)



# Result of Sodium (Na)



# Result of Iron (Fe)



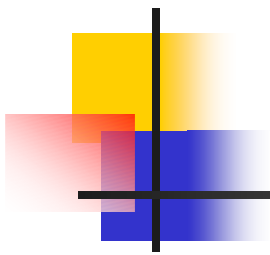


## DISCUSSION 1 (concentration of Ca, Mg, K, Na and Fe)

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- In general, calcium, magnesium, potassium, and sodium concentration in precipitation, canal water, deforested, and forest area show higher values during the dry than the wet season. During the dry season, peat burning may contain base cations (e.g. Ca, Mg, K) (Veneklass et al., 1990)
- In general, nutrient content (Ca, Mg, Na and Fe) of water in deforested area at 50 and 150 cm depth lower than forest area. This may result from leaching over more than 10 years since the canal was constructed.
- Majority of nutrient in precipitation, canal water, deforested, and forest area are Ca and K.

## DISCUSSION 2 (pH )



No	Location	.pH	Reference
1	Palangka Raya, Indonesia	5.12±0.55	This study
2	Chartley Moss, England	4.23	Ahmad-Shah (1984)
3	Selangor, Malaysia	5.77±0.26	Ahmad-Shah <i>et al.</i> 1992
4	Kuala Lumpur, Malaysia	4.37	Abas <i>et al.</i> , 1992
5	Klosterhede, Denmark	4.15	Hansen <i>et al.</i> , 1994
6	Speuld, Netherlands	4.08	Hansen <i>et al.</i> , 1994
7	Colombia	4.40	Veneklaas (1990)
9	Brunei Darussalam	5.91	Radojevic & Tan, 2000
10	Posadero, Spain	5.7±0.24	Amezaga <i>et al.</i> , 1997
11	Manzanal, Spain	5.4±0.19	Amezaga <i>et al.</i> , 1997
12	Yunnan, China	6.42±0.22	Liu <i>et al.</i> , 2002

The weak acidity in the rain falling on the study site could be caused by biomass burning produces inorganic N (Clark *et al.*, 1998) and basic cations such as Ca<sup>2+</sup>, Mg<sup>2+</sup> and K<sup>+</sup> (Radojevic & Tan, 2000)

In contrast, the low of pH value of rainwater in other area probably because near from industrial areas that produce sulphur and nitrous oxides.

## DISCUSSION 2 (pH value)

In general, pH value in precipitation, canal water, deforested, and forest area show higher values during the dry than the wet season.

Deeper water sample taken -----→ higher ph value

This Study				Dorien et al (2006 )			
Canal water	Depth	Deforest ed	Forest	Depth	Bagantung	Tuanan	DM + CD
3.71 ± 0.19	<b>0.5 m</b>	3.98 ± 0.6	3.68 ± 0.55	<b>0.5 m</b>	-	3.69 ± 0.03	-
	<b>1.5 m</b>	4.18 ± 0.36	3.70 ± 0.38	<b>1 m</b>	4.06 ± 0.53	3.73 ± 0.07	3.83 ± 0.11
	<b>2.5 m</b>	4.31 ± 0.35	3.92 ± 0.46.	<b>2 m</b>	4.67 ± 0.54	4.15 ± 0.42	4.06 ± 0.23



# CONCLUSION

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- **The lower of nutrient content of water in deforested area than forest area could be caused by drainage network in that area**
- **There is positive correlation between pH value and the depth of water sample taken. The deeper water sample taken higher pH value.**
- **SUGGESTION:**
- **Future work could also be carried out in an other area with the same topic**
- **Future work could also be carried out to know the mineral below peat to see the effect on peat.**



# ACKNOWLEDGEMENT

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THANK YOU FOR YOUR ATTENTION