



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,  
RISET DAN TEKNOLOGI  
UNIVERSITAS LAMBUNG MANGKURAT  
LEMBAGA PENELITIAN DAN PENGABDIAN KEPADA MASYARAKAT  
PANITIA SEMINAR NASIONAL LAHAN BASAH  
Jl. Brigjen H. Hasan Basry Kotak Pos 219 Banjarmasin 70123  
Telp/Fax : (0511) 3305240



Banjarmasin, 10 November 2021

Nomor : 661/UN8.2/PG/2021  
Lampiran : 2 berkas  
Perihal : *Letter of Acceptance* (LoA) Seminar Nasional Lahan Basah 2021

Kepada Yth.  
**Sdr(i) Nilna Amal**  
**(Universitas Lambung Mangkurat)**  
Di  
Tempat

Dengan Hormat,

Sehubungan dengan pelaksanaan Seminar Nasional Lahan Basah Tahun 2021 dengan tema "**Membangun Penelitian dan Pengabdian Terapan yang Bersinergi dengan Dunia Usaha dan Industri dalam Meningkatkan Daya Saing Produk P2M**" di Banjarmasin, Kalimantan Selatan, kami selaku Panitia Pelaksana seminar telah menerima pendaftaran Saudara(i) sebagai berikut:

Status Peserta : Pemakalah Oral (Bidang Penelitian)  
Judul Makalah : Analysis of hydrology parameters in a tropical wetland as an early approach to identify a drought risk in a peatland area  
Tim Penulis : Nilna Amal, Noordiah Helda, Achmad Rusdiansyah, M. Ramadhani Wijayanto, Fadhiil Muammar

Selanjutnya kami mengundang untuk mempresentasikan makalah tersebut pada:

Hari/Tanggal : Senin - Selasa / 15 - 16 November 2021  
Waktu : 08.00 Wita – Selesai  
Tempat : Zoom Cloud Meeting

- Hari 1 : Meeting ID: 299 991 0100  
Passcode : LPPM2021
- Hari 2 : Meeting ID: 975 9861 8549  
Passcode : LPPM2021

Demikian disampaikan, atas perhatian dan partisipasinya diucapkan terima kasih.



Ketua Panitia Pelaksana,

Dr. Leila Ariyani Sofia, S.Pi., M.P.  
NIP. 19730428 199803 2 002



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**Catatan:**

- Link Hari 1:  
<https://lambungmangkurat.zoom.us/j/2999910100?pwd=TGHDMHZlaWpjTEYxWkFNNXptdmRvQT09>
- Link Hari 2:  
<https://lambungmangkurat.zoom.us/j/97598618549?pwd=Mk5PcG96bHAwVnJCM1VQRtM1ckdHUT09>
- Template full paper dapat di-unduh melalui link:  
[https://drive.google.com/drive/folders/1M7jr69qKRnF94HttAR\\_H46LJFxCKslv?usp=sharing](https://drive.google.com/drive/folders/1M7jr69qKRnF94HttAR_H46LJFxCKslv?usp=sharing)
- Power Point dapat diunggah melalui laman:  
<https://bit.ly/PowerPointSemnasLB>
- Waktu pemasukan power point hingga tanggal 13 November 2021
- Full paper dapat di-unggah melalui laman: <https://bit.ly/PaperSemnasLB>
- Waktu pemasukan full paper hingga tanggal 27 November 2021

# SEMINAR LAHAN BASAH TAHUN 2021

Lembaga Penelitian dan Pengabdian Masyarakat LPPM

## Analisis Parameter Hidrologi Lahan Basah

Nilna Amal

15-16 November 2021

# Introduction

Several important things as a background

Important roles of wetlands and peatlands



hydrology condition in a wetland

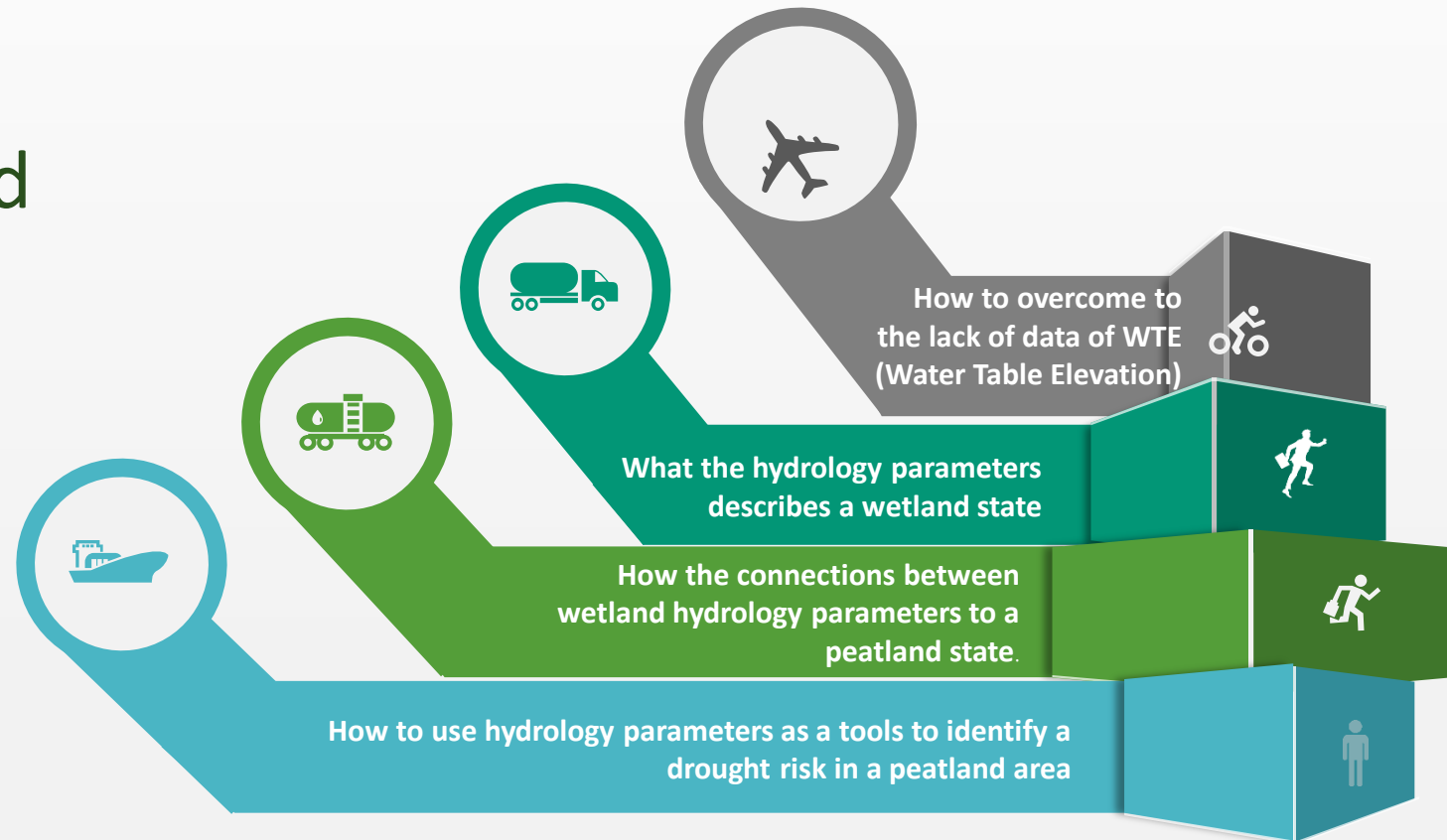
wetland and peatland relationship

wetland hydrology condition as a identify tools for peatland drought

hydrology condition in a wetland

# Research questions

There are several questions that need to be answered



# Previous Study

1

## Finlayson 1996; Fennecy et al., 2004; Mitsch and Gosselink, 2015

The wetland condition can be determined by hydrologic condition, vegetation, and chemical presence

2

## Mitsch and Gosselink, 2015; Acreman and Holden, 2013

One of the wetland classifications is peatland, recognized by the unique soil characteristics. Peatland is defined by either its chemical compositions or hydrology conditions

3

## Binet., et al., 2013; Bertrand, et al., 2021; Amal, et al., 2021;

Hydrology parameters were used to determine wetland conditions to identify peatland drought possibility as an approach.

Method 1

## Several model had been applied

Peatland conditions are defined by drought index (Huang *et al.*, 2015; Rajsekhar, Singh and Mishra, 2015; Novitasari *et al.*, 2019)

Method 2

Peatland conditions are defined by physical properties and human activities (Van Loon and Laaha, 2015; Taufik *et al.*, 2019; Amal, et al., 2019)

Method 3

Peatland conditions are defined by hydrology parameters and the connection to WTE (Binet, et al., 2013; Amal *et al.*, 2021; Bertrand *et al.*, 2021)

# Study purposes

This part explain the aim of the study intended to answer the research questions

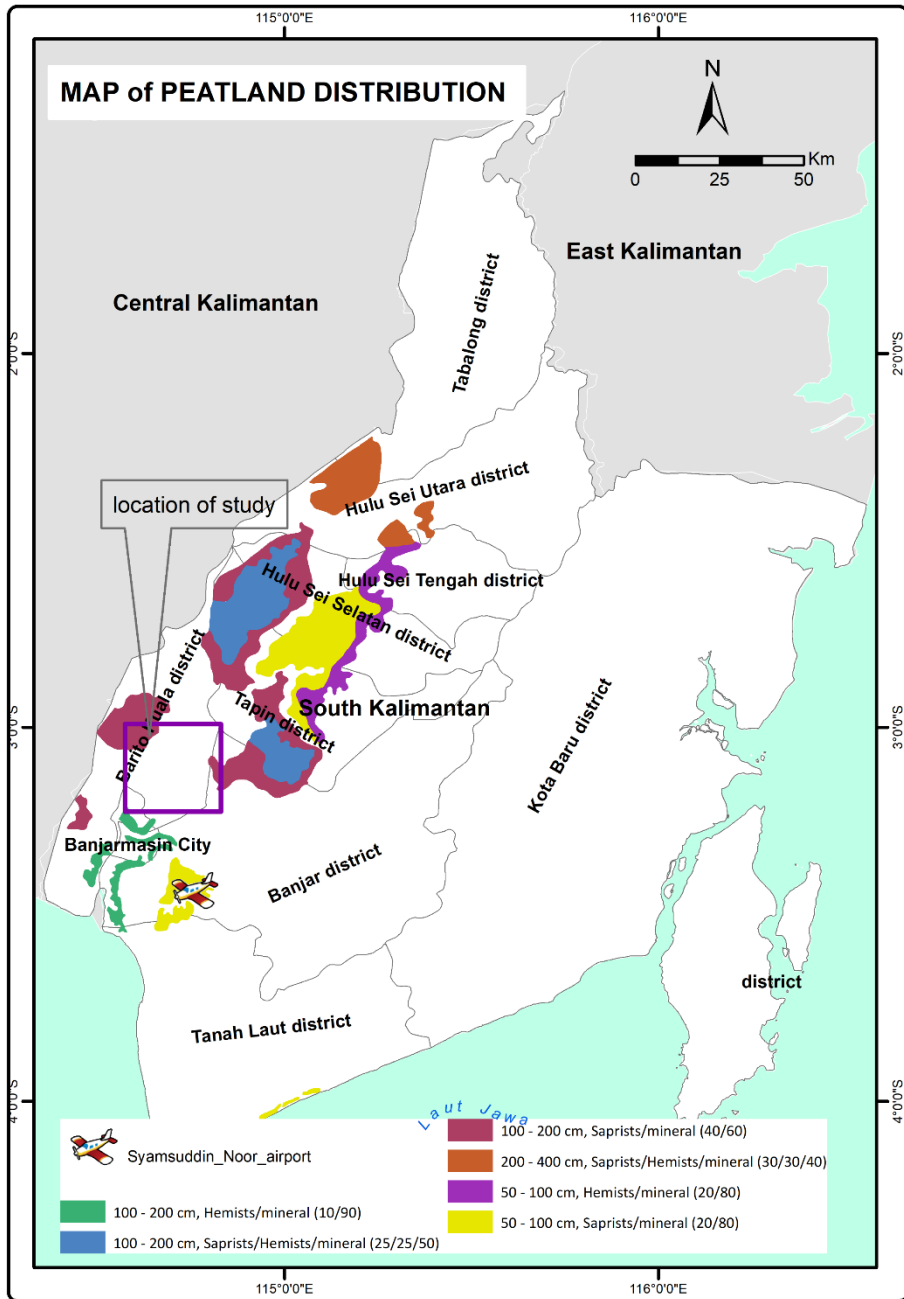
to observe the water table elevation in a particularly peatland area

to analyze the hydrology parameters (rainfall, evapotranspirations)

To see the connection between the two and try to identify the drought risk by analyzing the relation between them.

# Materials and Methods

## Location of study and data availability



The primary data were obtained from installed equipment

The secondary data were obtained from satellite data (local and regional)

Local (Agency of Meteorology, Climatology and Geophysics of Indonesia lays in Syamsuddin Noor airport)

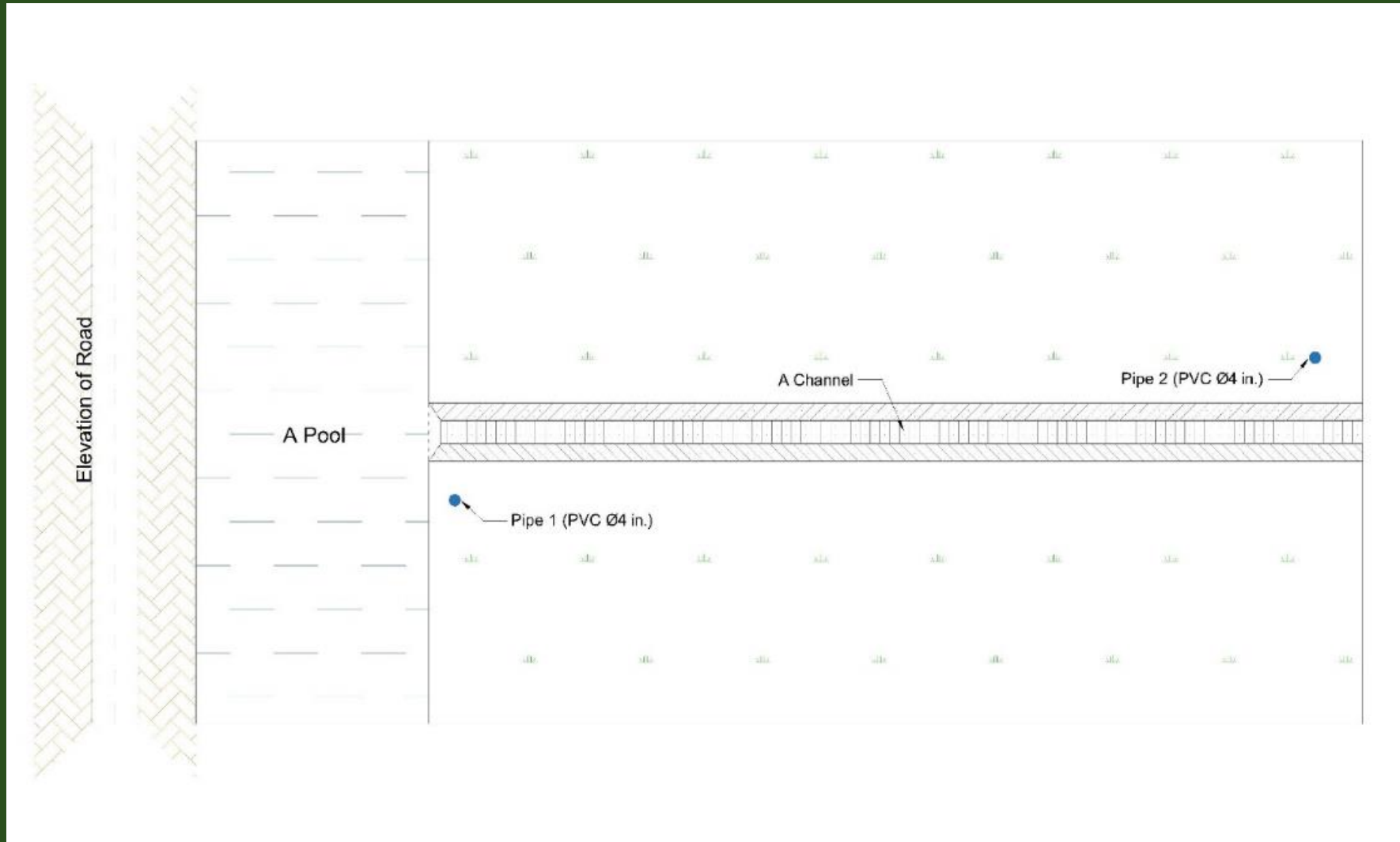
Regional (satellite from the Jaxa website)



# Materials and Methods

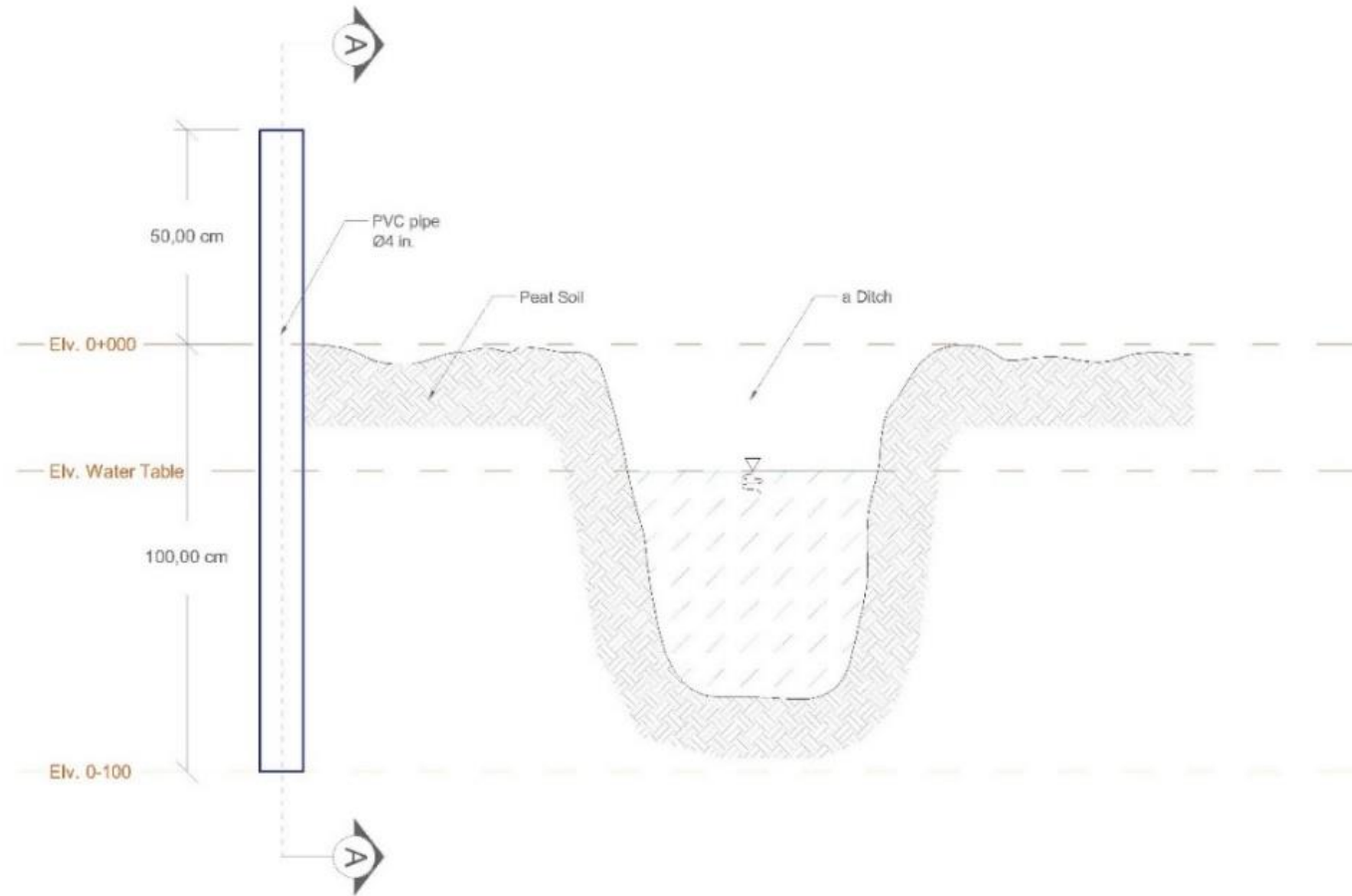
## Research field study

The equipment had been installed for one and half months and been conducted to collect daily water table elevation



# Materials and Methods

## Research field study



# Materials and Methods

To collect the secondary data and to analyze them



The secondary data were downloaded for 2016-2020

The data are rainfall, and other climatological data related to evapotranspiration analysis

# Methods of analysis

Evapotranspiration was analyzed by Modified Blaney-Criddle method

$$ET_o = a + b[p(0.46T_{mean} + 8.13)] \quad \rightarrow (1)$$

$$a = 0.0043RH_{min} - \frac{n}{N} - 1.41 \quad \rightarrow (2)$$

$$b = 0.82 - 0.0041RH_{min} + 1.07\frac{n}{N} + 0.066U - 0.006RH_{min}\left(\frac{n}{N}\right) - 0.0006RH_{min}(U) \quad \rightarrow (3)$$

- $ET_o$  : daily evapotranspiration (mm/day),
- $a$  and  $b$  : the coefficients depended on  $U$ ,  $RH_{min}$  and  $n/N$ ,
- $p$  : the ratio of mean annual percentage of daytime hours,
- $T_{mean}$  : mean daily temperature for a given month in degree Celsius,
- $RH_{min}$  : minimum relative humidity (%),
- $n/N$  : ratio of possible to actual sunshine hours,
- $U$  : mean daytime wind speed (m/s)

# Methods of analysis

## Rainfall Analysis Methods

$$RMSE = \sqrt{\frac{\sum_{i=1}^N (x_i - y_i)^2}{N}}$$

*R.M.S.E.* : root mean square error

$x_i$  : satellite data from the Jaxa web (mm)

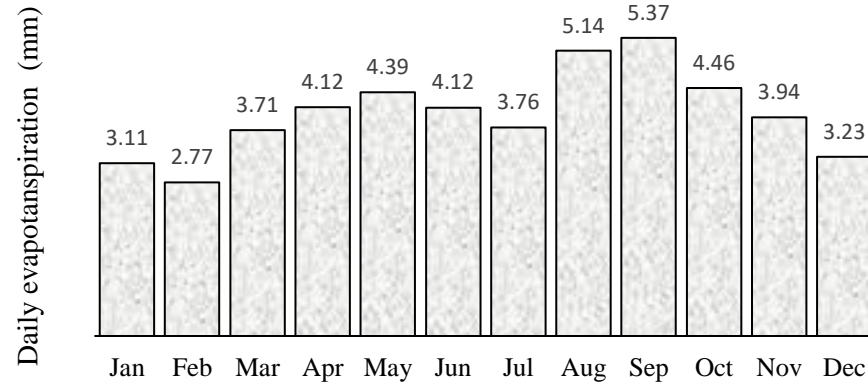
$y_i$  : ground data from Syamsuddin Noor gauge (mm)

$N$  : number of data according to total of days in a month





# Results and Discussion



## Evapotranspiration analysis

Evapotranspiration is one of the hydrology parameters that are counted in all types of wetlands (Mitsch and Gosselink, 2015). It is crucial to analyze to assess the condition of a wetland, including a peatland area

evapotranspiration is divided into four periods that are December-January-February (D-J-F), March-April-May (M-A-M), June-July-Aug (J-J-A), and Sept-Oct-Nov (S-O-N)

# Results and Discussion



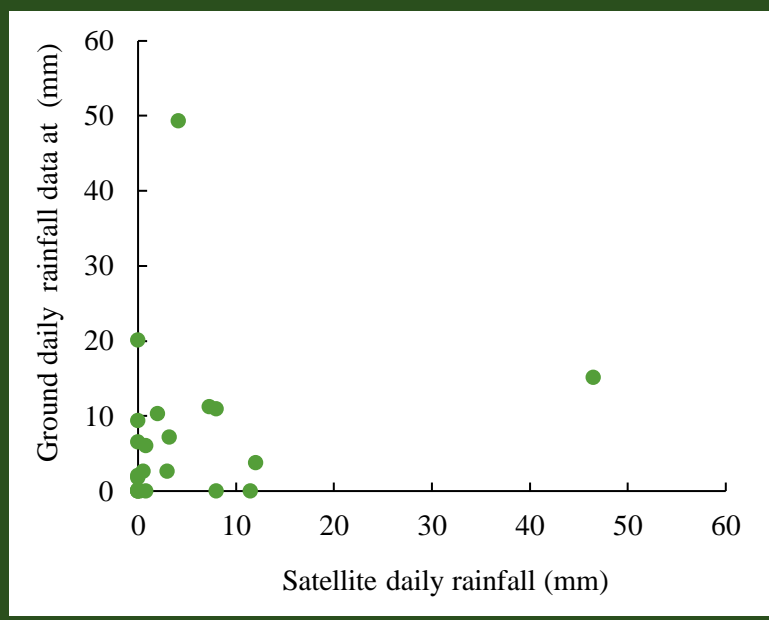
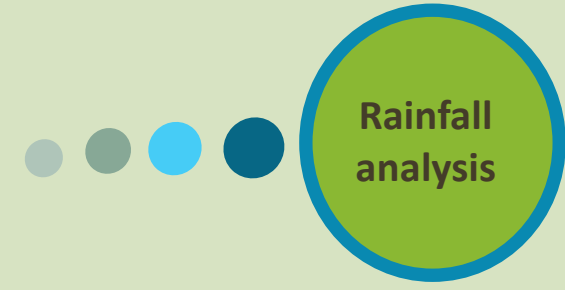
The highest evapotranspiration took place in the M-A-M periods (Susanti, et al., 2018) Different from this study that is the most increased evapotranspiration occurred in J-J-A and S-O-N periods (this study)

The differentiation may come from the cover of the study in this research, which is a tiny area compared to Susanti et al. (2018), which covers the whole of Indonesia.

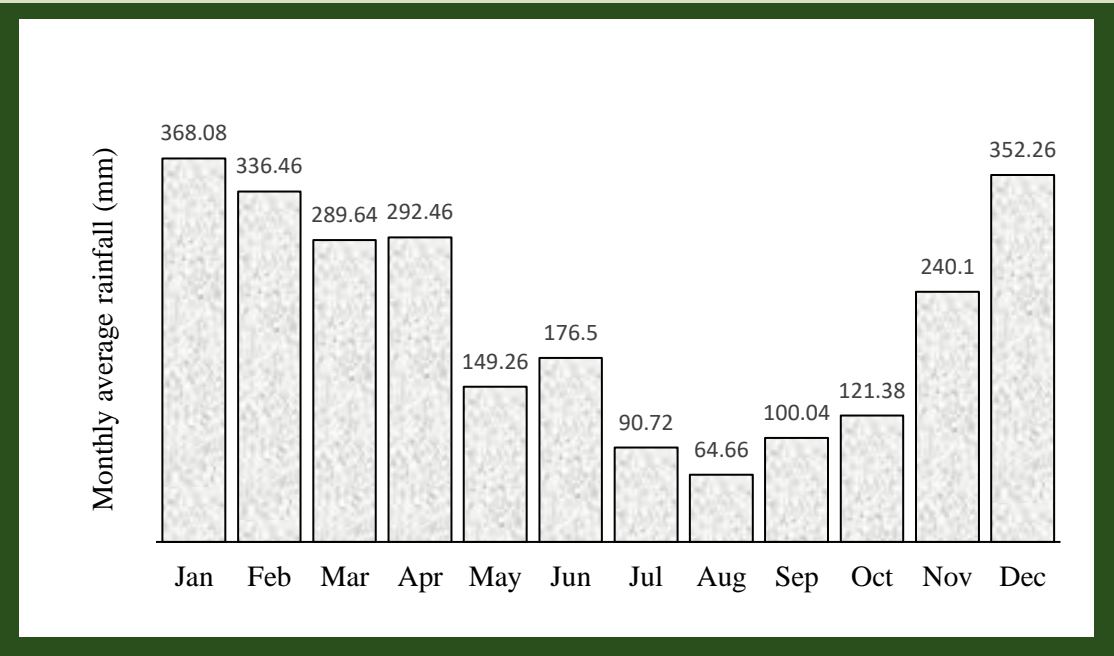
The water table elevation analysis showed that the elevation in July is relatively high and bear to occur above 40 cm, which is the limit of government regulation



# Results and Discussion

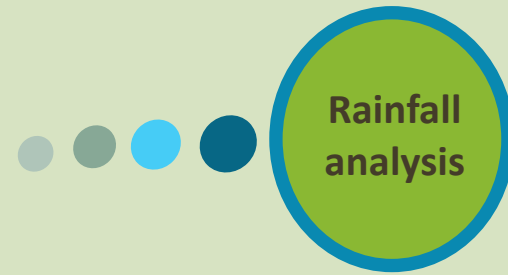


The relationship between the ground and satellite daily rainfall in July



Average rainfall data 2016-2020 in Syamsuddin Noor gauge

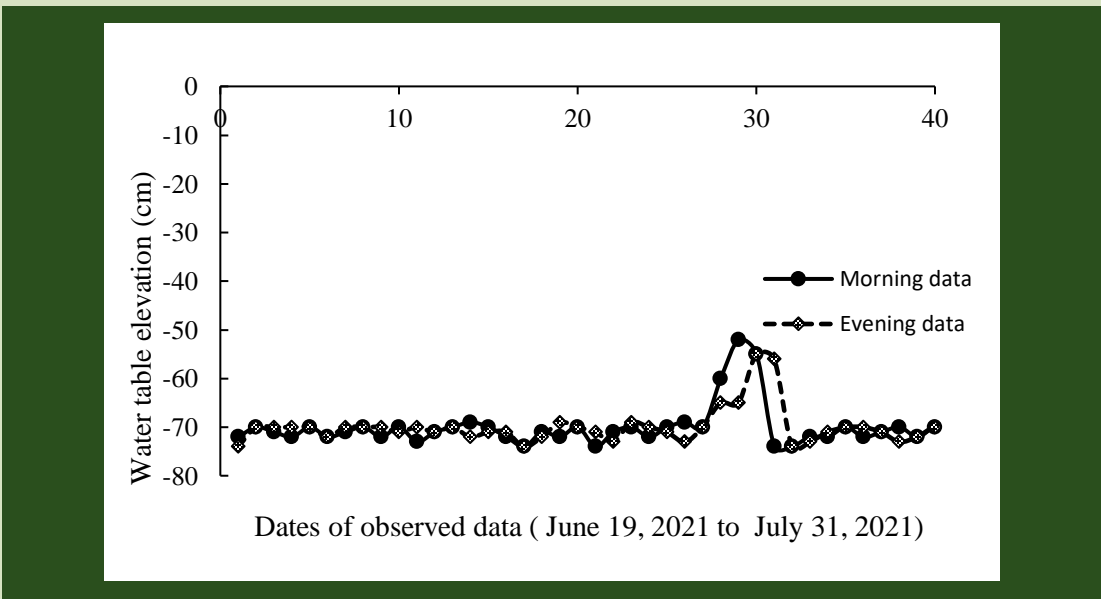
# Results and Discussion



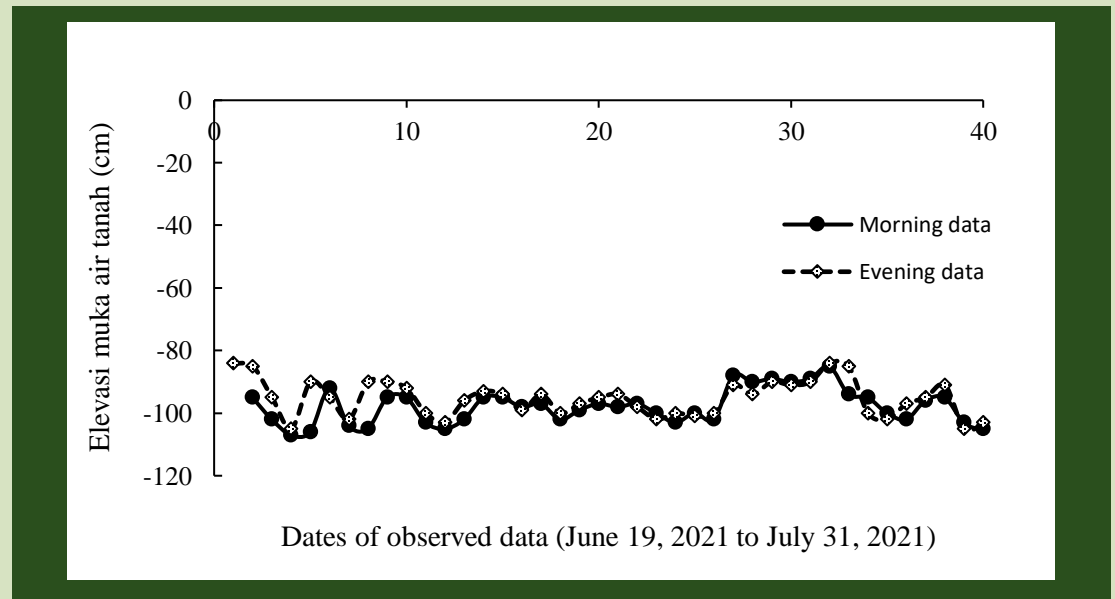
- It can be concluded that rainfall takes place almost all the year the maximum rainy months are from December to February
- The minimum occurs in August
- The peak took place in December, January, and February.
- Rainfall availability will have a distinct effect on water table elevation due to avoiding drought to mitigate the fire risk
- The relationship between rain and groundwater level needs to be investigated to see if the presence of rain can guarantee the occurrence of groundwater levels from drop off the elevation that can lead to drought in peat soils.

# Results and Discussion

## Water table elevation analysis

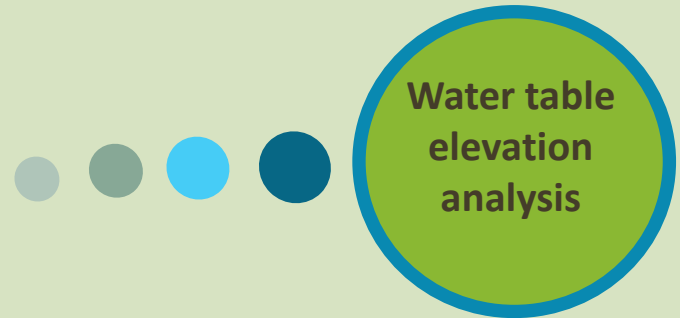


Daily water table elevation observed in point 1 at the study site



Daily water table elevation observed in point 2 at the study site

# Results and Discussion



The results showed that there was no significant alteration during the observation

The distinct difference value of water table elevation in point 1 and point 2 is likely point 2 deeper in general.

The phenomenon might happen because point 2 is further from the ditch compared to point 1 → confirmed the previous study (Amal et al., 2021)

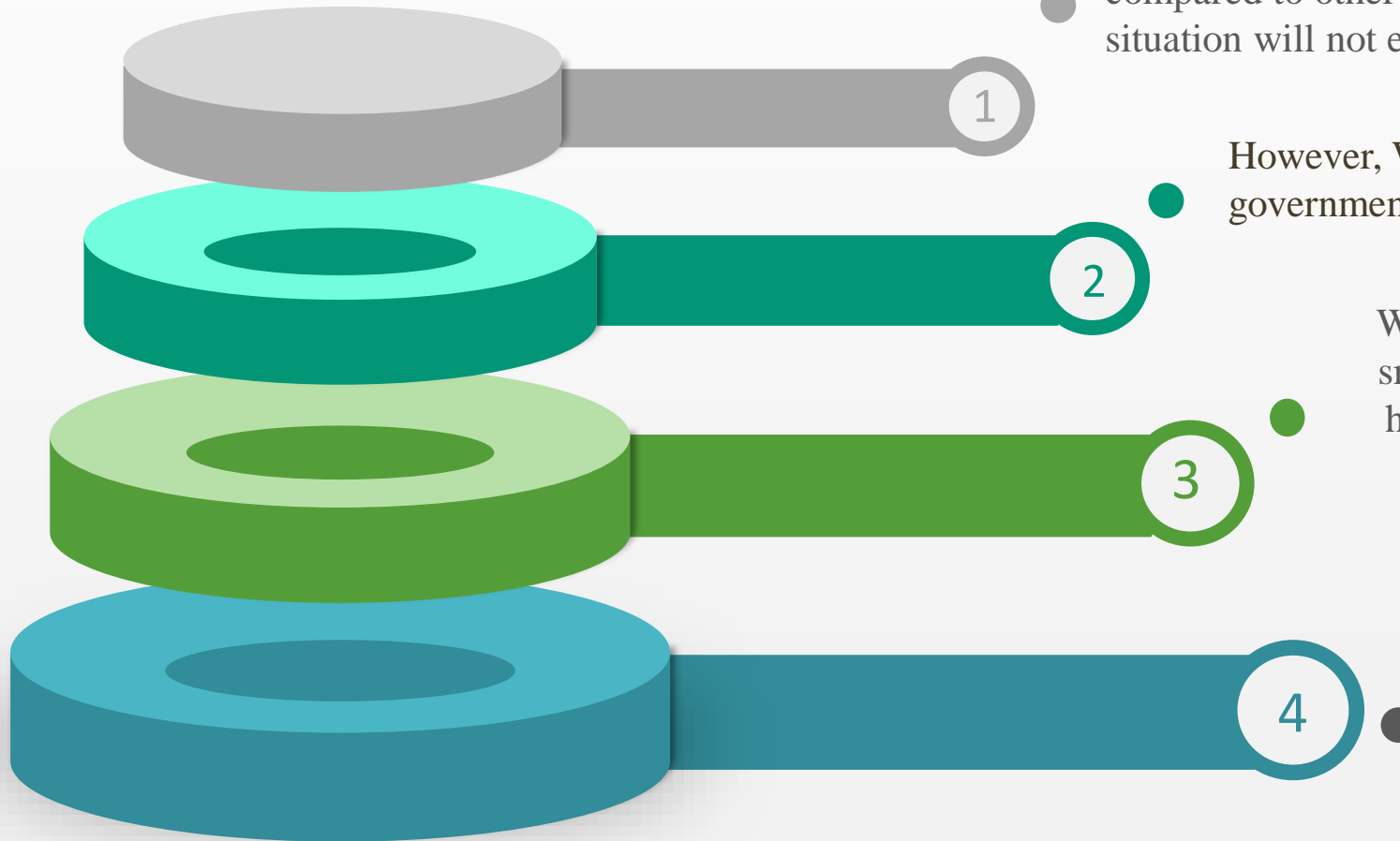
# Conclusion



the value of the WTE is relatively high even though the evapotranspiration was low



# Conclusion



● The  $ET_0$  in July that potentially happens will be pretty low compared to other months which means when the drying situation will not expect to happen

● However, WTE tend to be deeper than the government regulation (40 cm).

● When the evapotranspiration occurs relatively in a small portion, but the water table elevation state is high enough, it will derive that the situation could be worse in other months, and it is required to mitigate the severe conditions

● The correlation between those parameters can be used as an early approach to determine whether the particular area has a potential fire risk due to the drought possibility

# How to improve this study

to have more extended observation data of Water Table Elevation

related to time of study

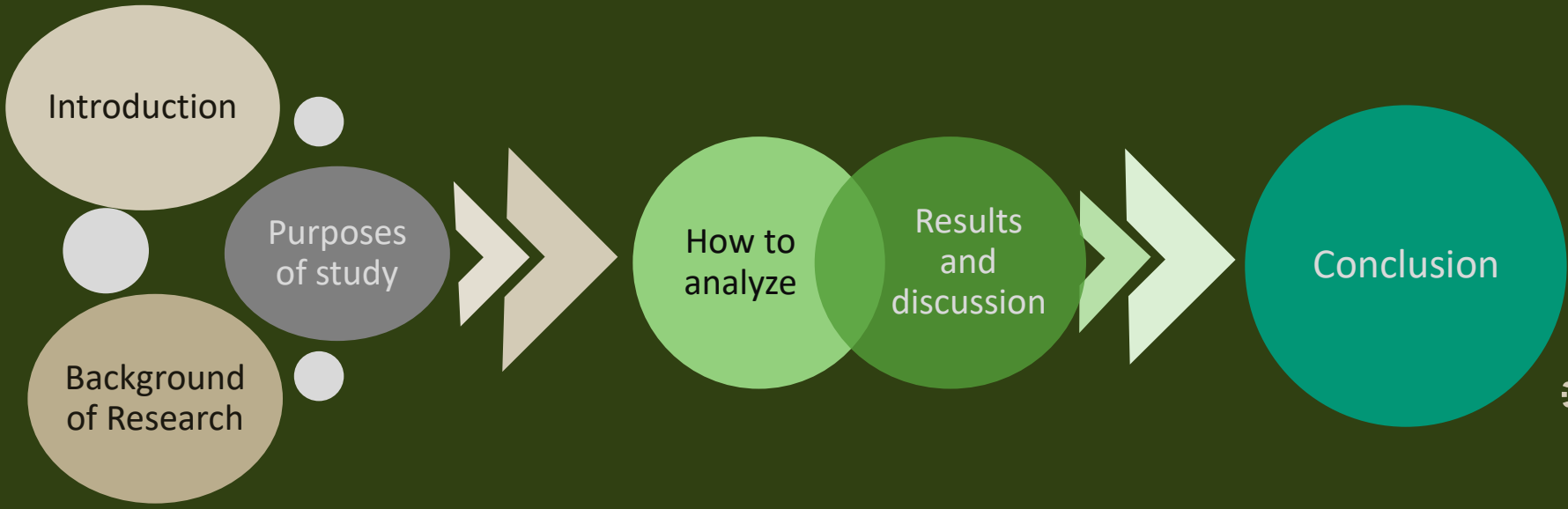
to compare the peatland situation to another peatland area to recognize the similarity and differentiation

related to location and characteristics of peatland hotography

to have another hydrology parameter represent the land response that is runoff

related to land response to the rainfall

Thanks



for

Listening



# SERTIFIKAT

No: 823/UN8.1.2/PG/2021

Kampus  
Merdeka  
INDONESIA JAYA



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LEMBAGA PENELITIAN DAN PENGABDIAN MASYARAKAT

DIBERIKAN KEPADA: ***Nilna Amal***

SEBAGAI: **Pemakalah Oral (Penelitian)**

Pada kegiatan **Seminar Nasional Lahan Basah Tahun 2021** dengan tema “Membangun Penelitian dan Pengabdian Terapan yang Bersinergi dengan Dunia Usaha dan Industri dalam Meningkatkan Daya Saing Produk P2M” oleh Lembaga Penelitian dan Pengabdian Masyarakat Universitas Lambung Mangkurat pada tanggal 15 - 16 November 2021 di Banjarmasin secara virtual

Banjarmasin, 16 November 2021



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