



Intra-seasonal variability of soil chemical properties in paddy cultivation: A case study from Sri Lanka

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INTRODUCTION

- Chemical fertilizers have been widely used by Sri Lankan paddy farmers to increase crop yields
- Due to agrochemical import restrictions in Sri Lanka (April 2021) - Farmers tend to use alternative nutrient supply methods (eco-friendly and organic fertilizers)
- It is necessary to determine whether these alternatives can provide a sufficient amount of nutrients for paddy cultivation

MAIN OBJECTIVE

- To evaluate soil nutrient dynamics within the cropping cycle of paddy cultivation in the Mahaweli B system, Sri Lanka

SPECIFIC OBJECTIVES

- To determine the changes of soil chemical properties at different growth stages of paddy cultivation
- To assess the changes of soil properties at the top and subsoils at different stages of cropping cycle

METHODOLOGY

Site Selection and Soil Sampling

Four blocks were selected from dry zone of Sri Lanka

Two fields were selected from each block

Five representative points are selected for each field

Soil samples were taken at predefined two depth levels (0-5 cm and 5-15 cm) at following stages;

- Before ploughing stage (PS)
- Just after establishment stage (ES)
- End of the vegetative stage (VS)
- Just before the booting stage (BS)
- At the maturity stage (MS)

Fertilizers Applied by Farmers During the Study Period

- Compost** - Before ploughing
- Fish tonic** - 8, 28 and 38 days after transplanting
- Poultry manure** - 48 days after transplanting

Selected Blocks (farmer fields) and Soil Sampling Depth

Blocks	Soil Depth	Code
Aralaganwila	5 cm	AGD1
	10 cm	AGD2
Aselapura	5 cm	APD1
	10 cm	APD2
Bogaswewa	5 cm	BWD1
	10 cm	BWD2
Dimbulagala	5 cm	DBD1
	10 cm	DBD2



Soil sample collection

Soil Analysis

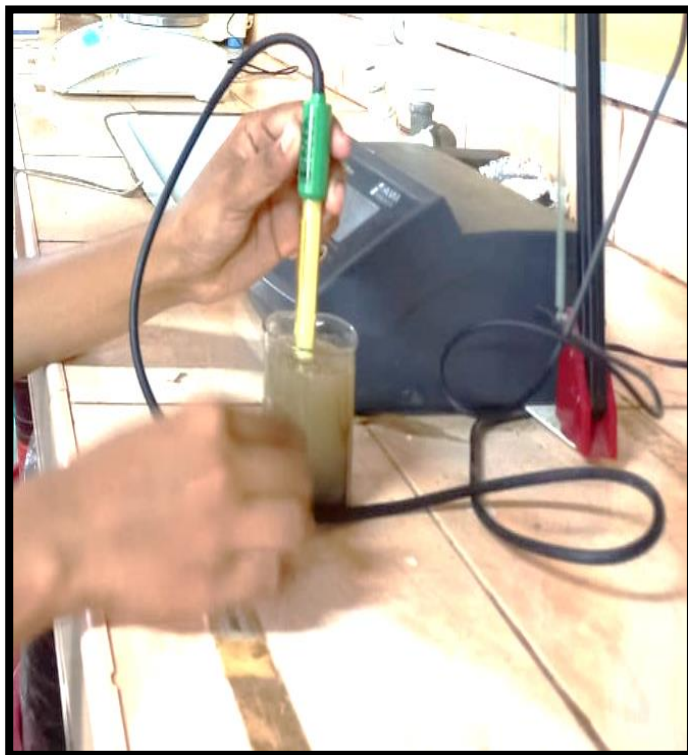
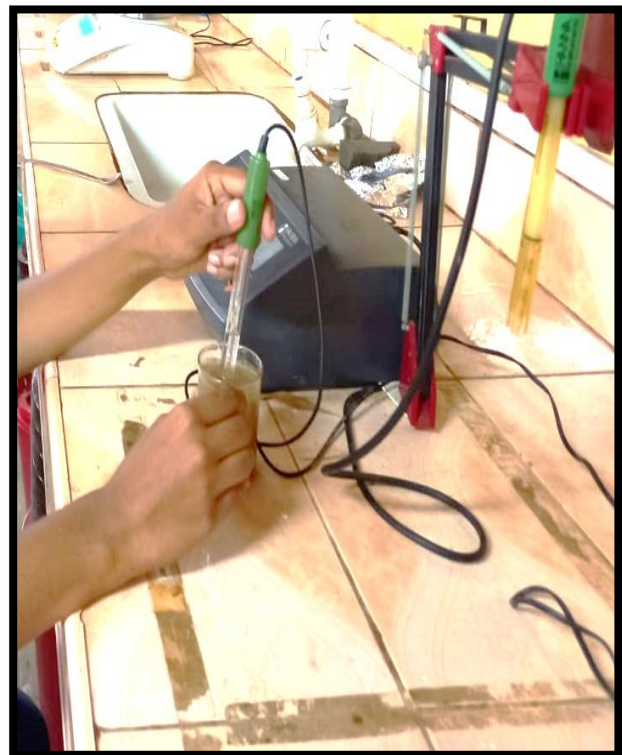
Soil samples were air-dried and sieved using a 2 mm sieve

Chemical analysis

Soil pH
1:2.5 soil/water
suspensions, using pH
meter

Soil EC
1:5 soil/water
suspensions,
using EC meter

Organic Matter
Walkley and Black
method



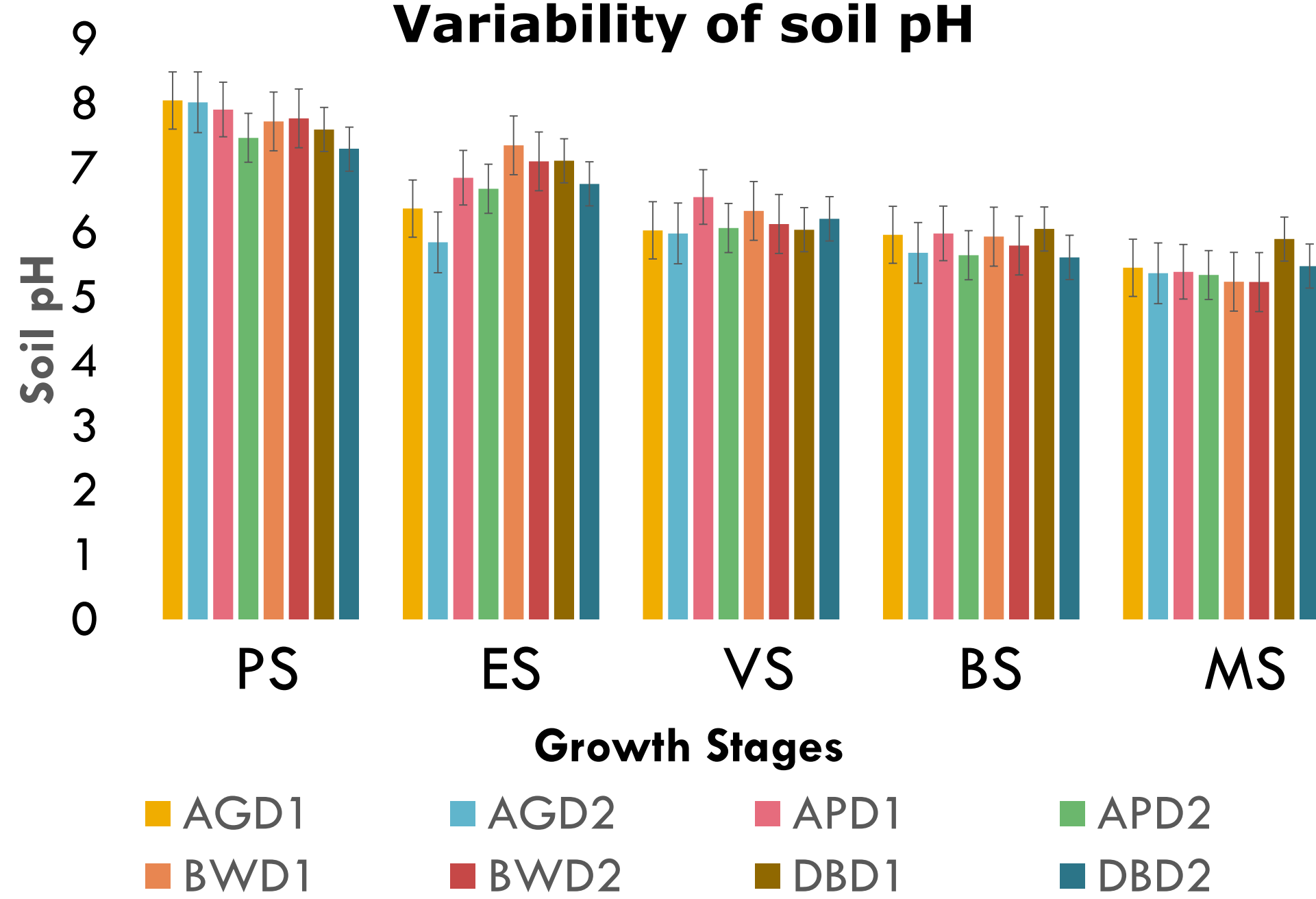
Available-Phosphorus
Olsen -Phosphorus method

Exchangeable- Potassium
1N NH4OAc extraction method

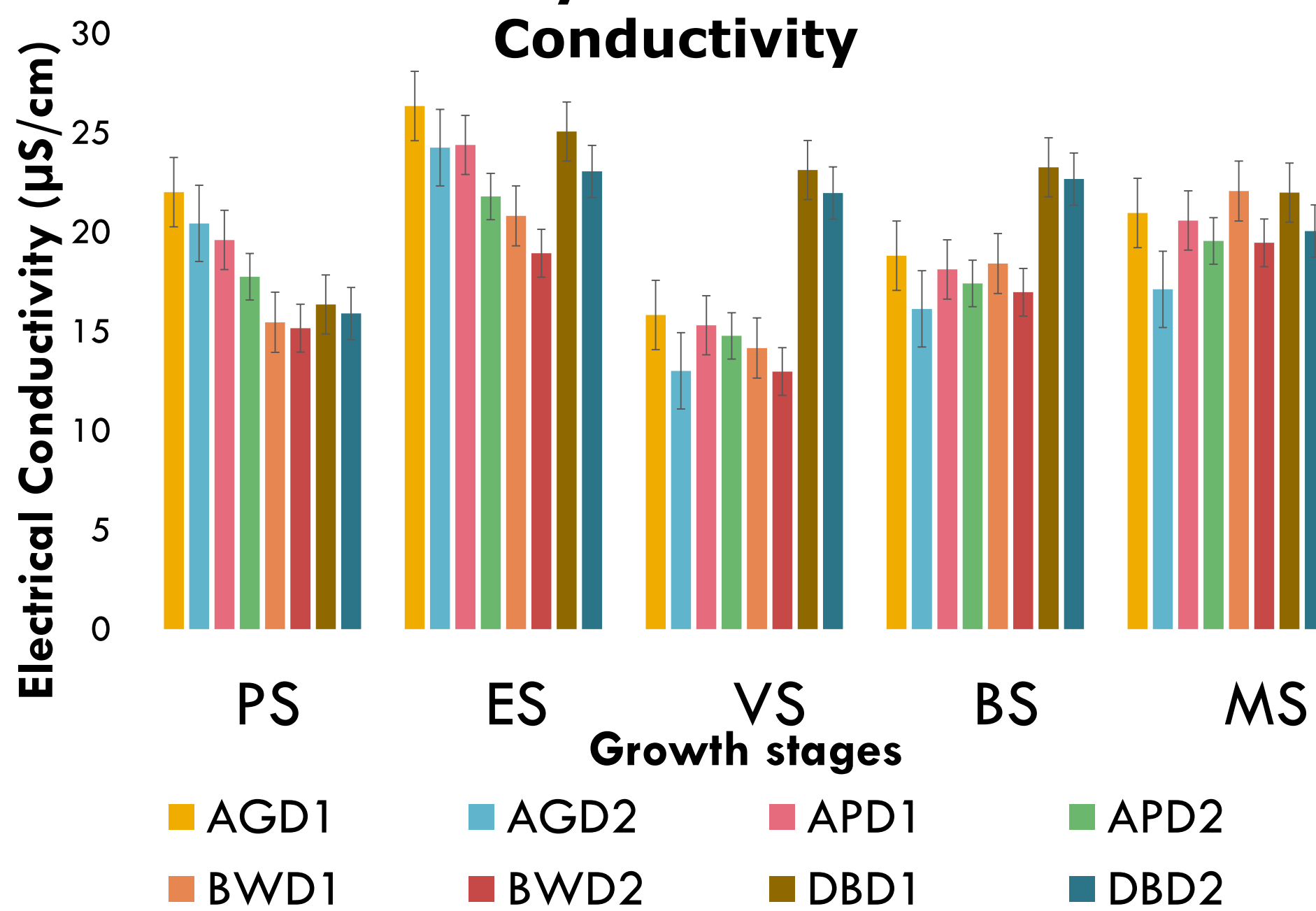


RESULTS AND DISCUSSION

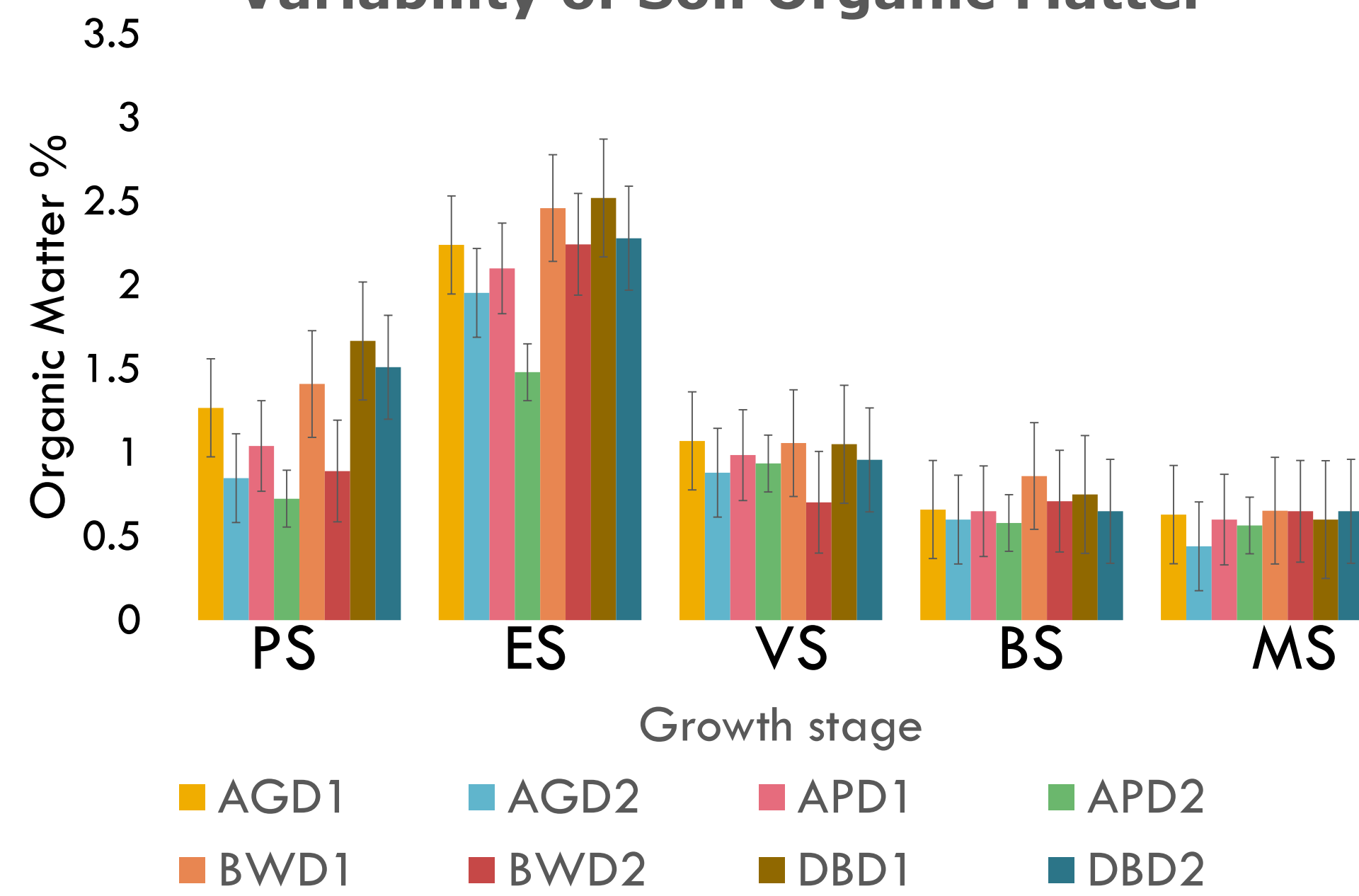
Variability of soil pH



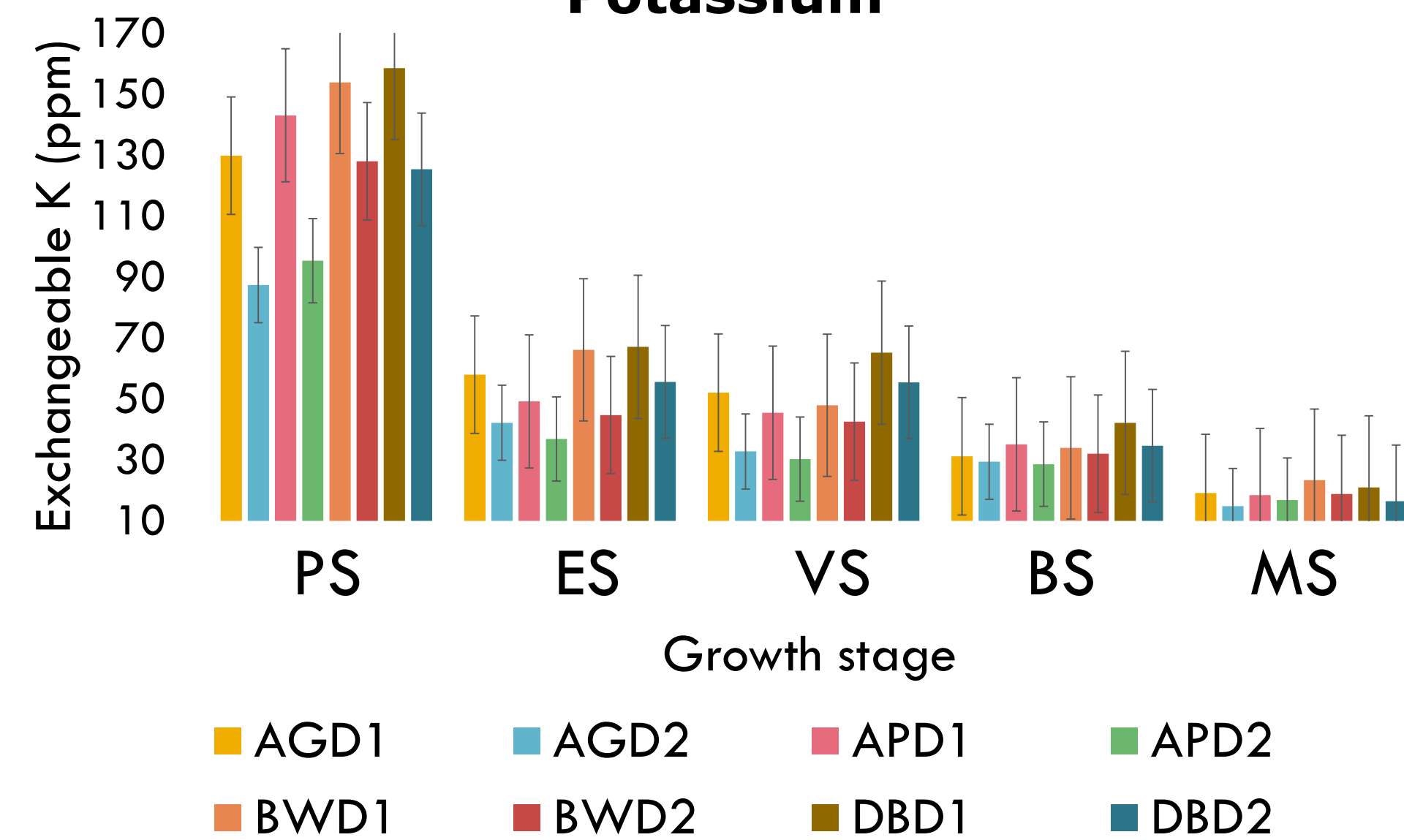
Variability of soil Electrical Conductivity



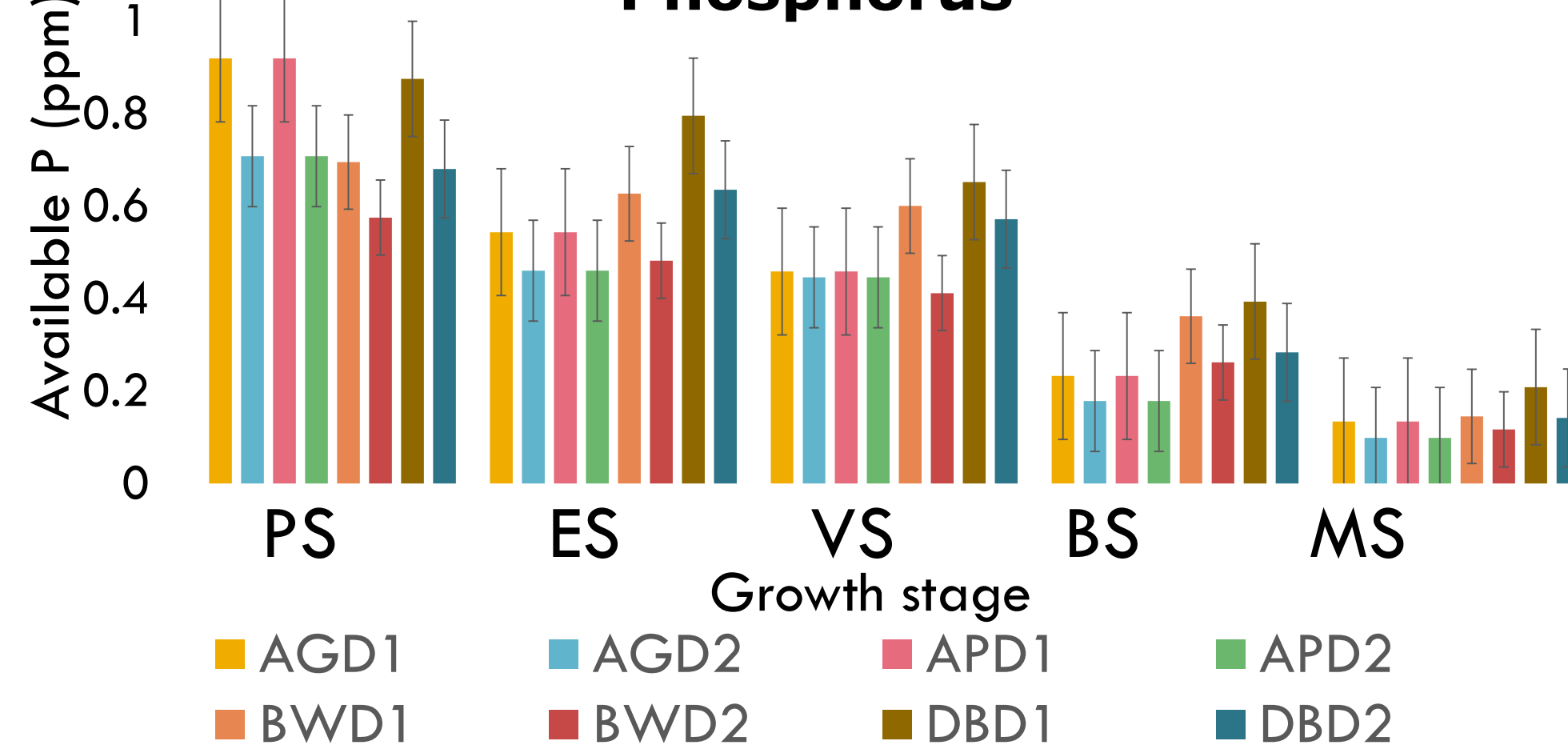
Variability of Soil Organic Matter



Variability of soil Exchangeable Potassium



Variability of soil Available Phosphorus



CONCLUSION

- All tested soil chemical properties varied with the cropping cycle of each block
- Soil organic matter, available Phosphorus and exchangeable Potassium also varied along the two-depth interval while pH and electrical conductivity did not vary among the two depths
- According to the obtained data in all four blocks soil pH and soil EC were at optimum level throughout the cropping cycle
- Soil Organic Matter and Available P were not at the required range throughout the cropping cycle
- Soil exchangeable K level before ploughing was acceptable

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