

# **Response of *Zea mays* to the Residual Effect of Phosphorus Fertilizers in Latosolic Soil**

**Dwi Retno Lukiwati  
Migie Handayani  
Rinta Waluyanti**



**Faculty of Animal Agriculture  
Diponegoro University  
INDONESIA**

# INTRODUCTION

**Maize → grain for food and feed  
stalk for feed**

**Land for crops production → acid latosolic soil**



# Latosolic soil

Low soil pH (acid soil)

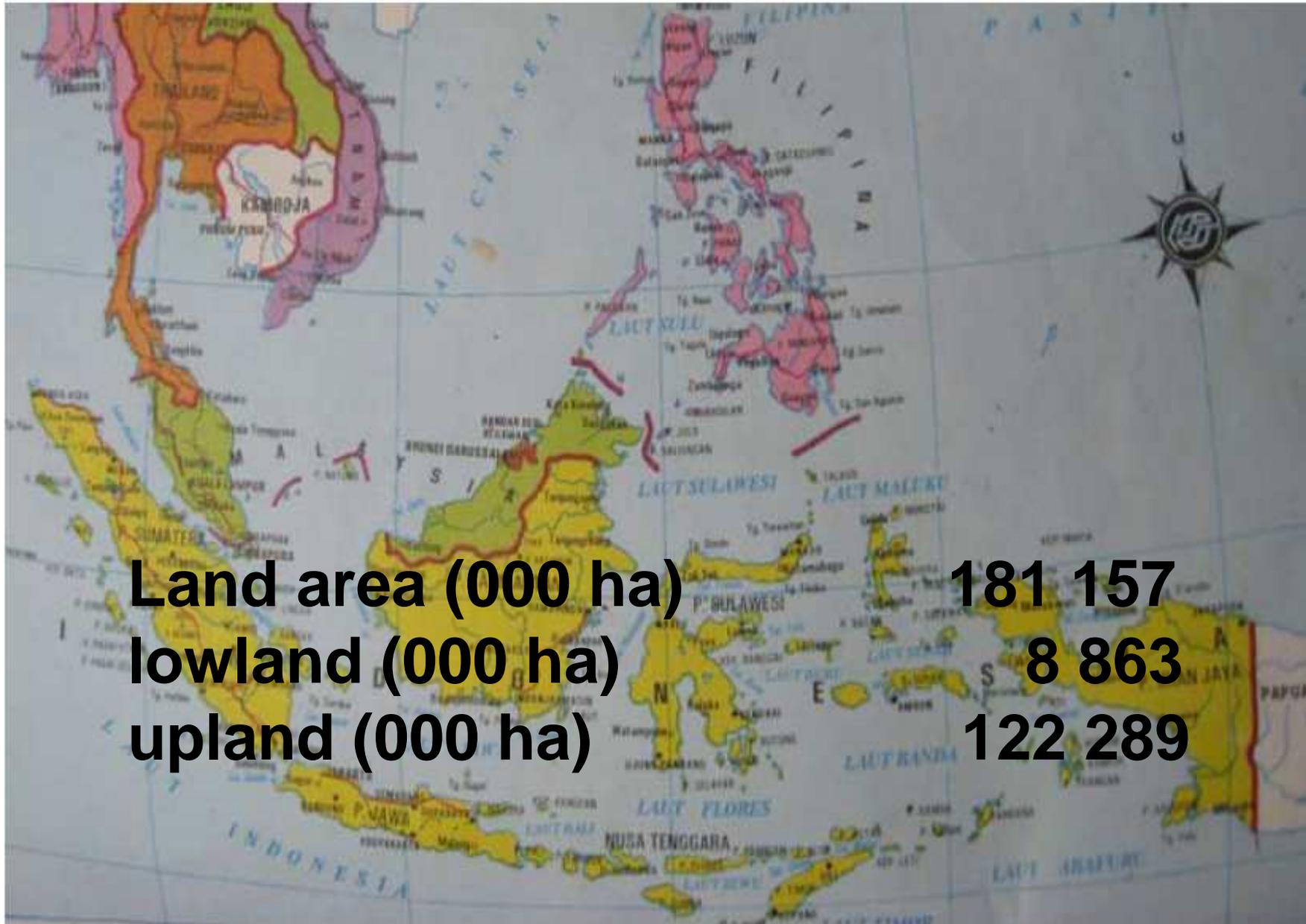
Phosphorus deficiency →

limiting crop production on acid soils

Solution → superphosphate (expensive,  
water soluble phosphate source)

phosphate rock

(cheap, slow release, acid soluble)





**CONSUMPTION AND  
PRODUCTION OF  
PHOSPHATE ROCK  
IN INDONESIA  
(1,000 tonnes)  
(Adiningsih *et al*, 1998)**

	<u>1980</u>	<u>1998</u>
Total P <sub>2</sub> O <sub>5</sub> consumption	274	360
PR consumption	13	69
PR production	1	?
(1988)		Java Island

# Question

Can we directly use phosphate rock as a cheap source of P fertilizer to improve crop production?

Can PR be used as a substitute for SP ?

Response to the residual effect of P fertilizers ?



# Objective

**To evaluate the effects of PR and SP fertilizer on the maize grain yield in acid latosolic soil on two periods of planting.**







Standard fertilization → 100 kg N ha<sup>-1</sup> (urea)  
83 kg K ha<sup>-1</sup> (KCl)

Plot size : 3.5 m x 2.5 m

2 plants / hole

Two periods of maize planting

Harvested on 3 months after planting

Analyzed → grain yield on 14 % moisture.

## Maize grain yield with P fertilizers and the residual effect

Level of P kg ha <sup>-1</sup> (once)	First Planting		Second Planting	
	PR	SP	PR	SP
	ton ha <sup>-1</sup>		ton ha <sup>-1</sup>	
0	4.02 d	4.08 d	2.85 d	3.57 cd
66	5.19 c	6.28 c	3.88 bcd	4.82 abc
132	5.88 bc	7.34 a	5.44 ab	5.63 ab
198	6.25 bc	7.59 a	5.74 a	5.91 a

Means followed by the same letters at the same period are not significantly different at DMRT 5 %



**Maize grain yield was increased by phosphorus fertilization (PR, SP) in two periods of planting.**

**Maize grain yield was lower with phosphate rock application compared to superphosphate in the first planting.**

**Residual effect on maize grain yield of phosphate rock and superphosphate was not different in the second planting.**

## Conclusions

**Phosphorus fertilizer could increase maize grain yield.**

**Maize grain yield was higher with superphosphate fertilizer than with phosphate rock in the first planting.**

**Maize grain yield in the second planting did not differ between superphosphate and phosphate rock.**



**Thank you**