



# Theme 1

## Status and trends of global soil nutrient budget



# Effect of simulated soil salinity conditions and varieties of pigeon pea (*Cajanus cajan* L.) on growth yield, and yield attributes

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## Introduction

Salinity is one of the major obstacles for increasing production in coastal areas. Salinity stress delays the onset, reduces the rate and increases the dispersion of germination events, resulting in reduced plant growth and crop yield. Soil salinity adversely affects plant growth and development. An excess of soluble salts in the soil leads to osmotic stress, which results in specific ion toxicity and ionic imbalances and the consequences of these can be plant demise. To avoid this problem we can use different techniques *i.e.* use of organic manure, use of tolerant crops and use of tolerant variety

## Methodology

The present experiment was conducted to determine the effect of saline soil on yield and yield attributes, which ultimately affects worldwide food production.

The experiment consists of 20 treatments comprising five levels of salinity and four varieties under the Factorial CRD design. The desired soil salinity was artificially prepared by dissolving pre-determined quantity of salt in a measured quantity of water (*i.e.* on the basis of saturation percentage of soil). The salts used were *viz.*, CaCl<sub>2</sub>, MgSO<sub>4</sub>, MgCl<sub>2</sub> and NaCl were used for preparing solution and required quantity of salts. The desired quantity of salt solution of different EC values were sprayed and soil in pot were covered with polythene sheet for two days. There were total 4 varieties GJP-1, Vaishali, BDN-2, AGT-2 and five salinity levels: Control, 40, 60, 80 and 100 meq l<sup>-1</sup>.

## Result

### Effect of salinity and varieties on seed yield and straw yield:

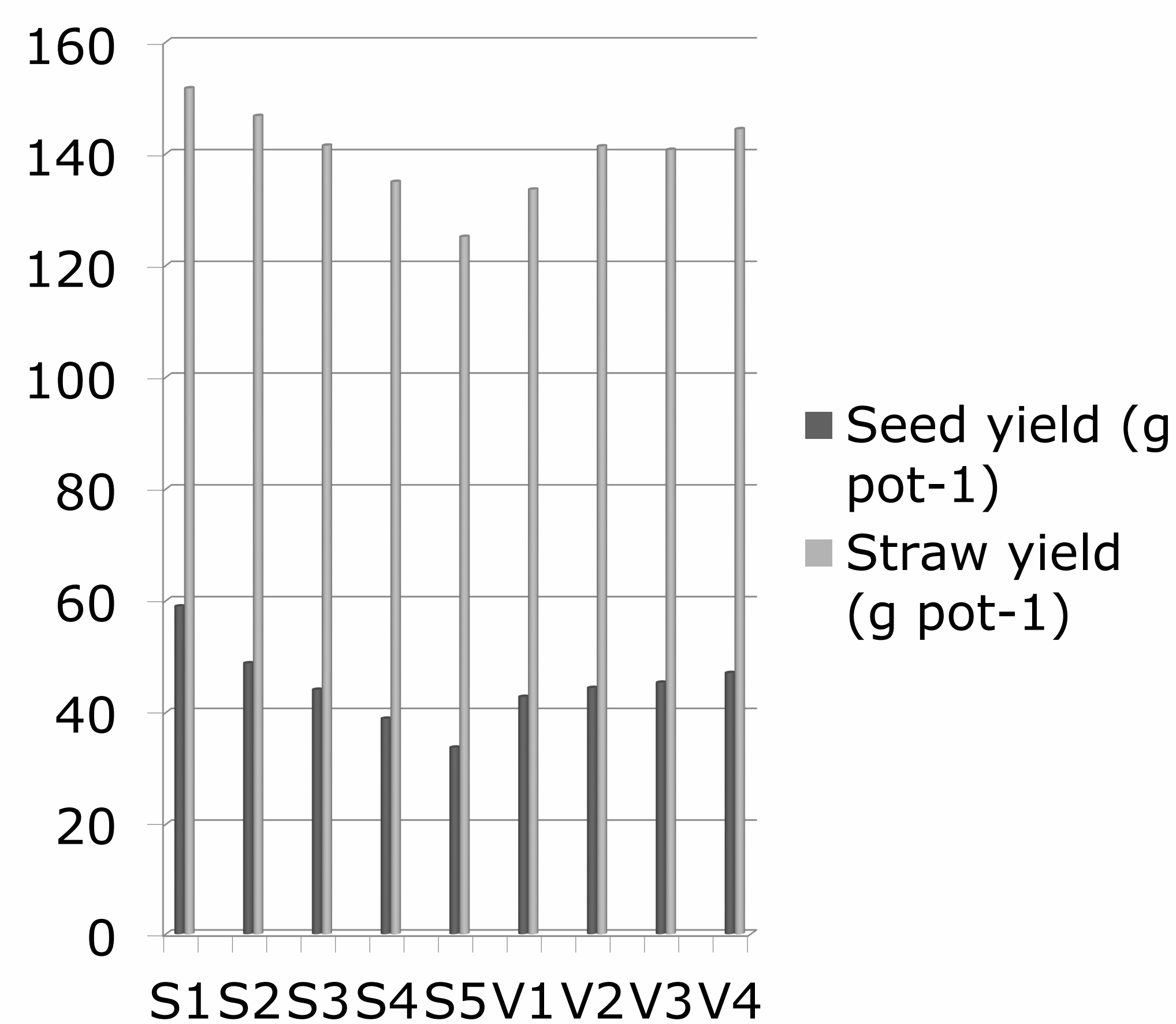
Seed yield and straw yield significantly affected by salinity levels and varieties, it reduced with increasing salinity levels. The highest seed yield and straw yield was obtained in control because there were no salts were applied. Among all the varieties AGT-2 performed best with highest seed and straw yield.

### Effect of salinity and varieties on growth and yield attributes:

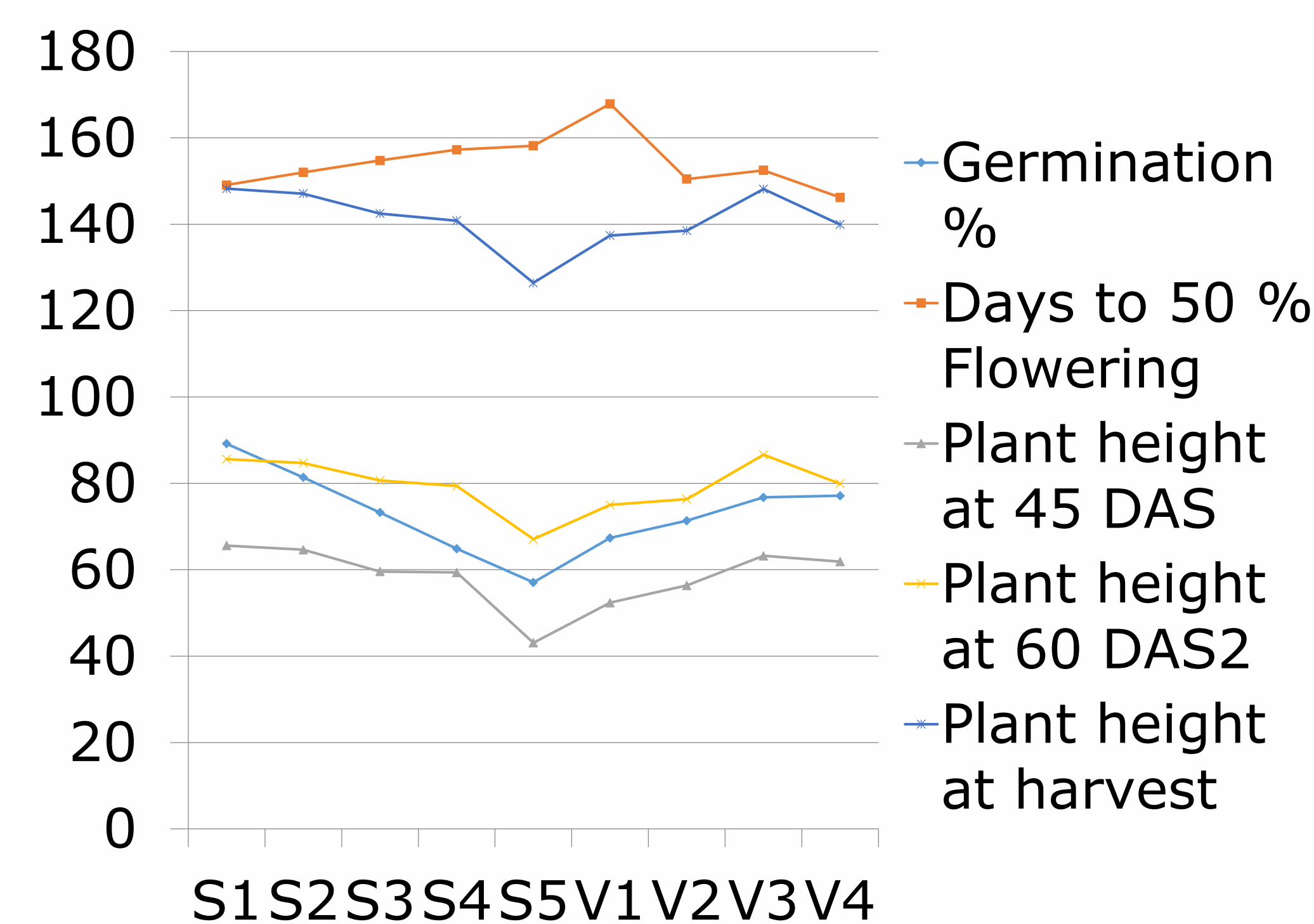
The salinity significantly affected growth and yield attributes. The highest germination %, plant height (at 45 DAS, 60 DAS and at harvesting stage),

number of branches plant<sup>-1</sup> at harvest, pod length, number of pods plant<sup>-1</sup>, number of seeds pod<sup>-1</sup>, test weight were found in salinity level S<sub>1</sub> (Control). The lowest days to 50 % flowering was attained at salinity level S<sub>1</sub> (Control).

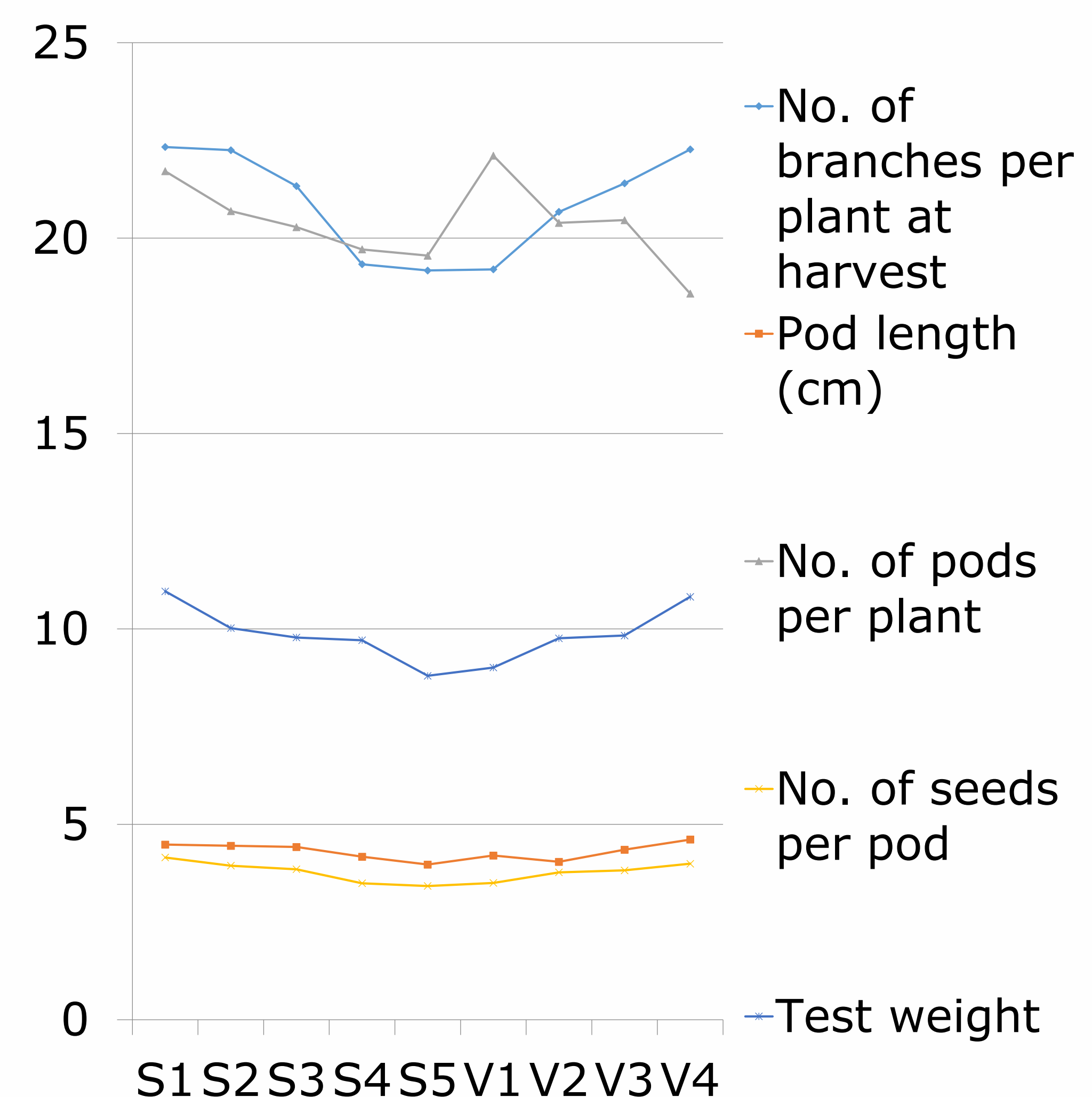
Varieties also significantly affected growth and yield attributes. The highest germination percentage, number of branches plant<sup>-1</sup> at harvest, pod length, number of seeds pod<sup>-1</sup>, test weight were attained in variety V<sub>4</sub> (AGT-2). While the highest plant height (at 45 DAS, 60 DAS and at harvesting stage), number of pods plant<sup>-1</sup> were recorded in variety V<sub>3</sub> (BDN-2). The lowest days to 50 % flowering was obtained in variety V<sub>4</sub> (AGT-2).



Graph 1: Effect of salinity and varieties on seed yield and straw yield of pigeon pea



Graph 2: Effect of salinity and varieties on growth parameters



Graph 3: Effect of salinity levels and varieties on growth parameters

## Conclusion

The soil salinity affected yield, growth and yield attributes. Among all the varieties AGT-2 was found more salt tolerant compared to other varieties with better result. Yield was obtained high in the lowest salinity level. The sequential order of salinity tolerance for pigeon pea varieties was observed AGT-2 > BDN-2 > Vaishali > GJP-1.

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