

PRACTICAL NO. 3

STATEMENT

TWO KINDS OF MANURE WERE APPLIED TO SIXTEEN ONE-HECTARE PLOT, OTHER CONDITION REMAINING THE SAME. THE YIELDS IN QUINTALS ARE GIVEN BELOW:

MANURE I	18	20	36	50	49	36	34	49	41
MANURE II	29	28	26	35	30	44	46		

IS THERE ANY SIGNIFICANT DIFFERENCE BETWEEN THE MEAN YIELDS? USE 5% LEVEL OF SIGNIFICANCE.

WORKING EXPRESSION

Hypothesis Setup:

1. Null Hypothesis H_0

$$\mu_1 = \mu_2$$

The average yield for both Manure I and Manure II is the same (i.e., there is no significant difference between the mean yields of the two types of manure).

2. Alternative Hypothesis H_1 :

$$\mu_1 \neq \mu_2$$

The average yield for Manure I is not equal to the average yield for Manure II (i.e., there is a significant difference between the two).

Test Statistics under H_0

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)}}$$

where,

\bar{x}_1, \bar{x}_2 is the sample means for Manure I and Manure II.

S_1 and S_2 are the sample standard deviations for Manure I and Manure II.

n_1, n_2 is the sample sizes for Manure I and Manure II.

Level of significance

The level of significance is $\alpha=0.05$.

Critical Region

Using the p-value approach:

- If $p < 0.05$, we **reject** H_0 .
- If $p \geq 0.05$, we **fail to reject** H_0 .

CALCULATION

Group Statistics					
	Manure	N	Mean	Std. Deviation	Std. Error Mean
Data	Manure I	9	37.0000	11.90588	3.96863
	Manure II	7	34.0000	8.02081	3.03158

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Data	Equal variances assumed	.756	.399	.571	14	.577	3.00000	5.25107	-8.26242	14.26242
	Equal variances not assumed			.601	13.797	.558	3.00000	4.99404	-7.72599	13.72599

IBM SPSS Statistics

DECISION

Since $p > 0.05$, we **failed** to reject H_0 . This means there is no significance difference between the mean yields.

RESULT

Hence the value of p is 0.577 which is greater than the value of level of significance. So we failed to reject Null Hypothesis.

CONCLUSION

So, by this way, we can resolve the hypothesis using SPSS.