

1st SEM.2010/2011



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

COURSE CODE: ABE 305

TITLE OF PAPER: - RESEARCH METHODS

BSc. AGRICULTURAL & BIOSYSTEMS ENGINEERING YEAR 3

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: CALCULATOR

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO
OTHER QUESTIONS.**

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GRANTED BY THE CHIEF INVIGILATOR**

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SECTION ONE: COMPULSORY

QUESTION 1

(a) A scientific paper should have a descriptive summary called an abstract among other major components. Discuss the purpose and main contents of an abstract. **(10 Marks)**

(b) Discuss the participatory rural appraisal (PRA) research methodology, highlighting the following components:

- (i) practical areas of PRA application,
- (ii) techniques used in PRA ,
- (iii) role and skills of researcher(s) in PRA,
- (iv) merits of PRA
- (v) shortfalls of the PRA practice.

(30 marks)

SECTION II: ANSWER ANY TWO QUESTIONS

QUESTION 2

A study was conducted to determine the effect of harvesting time on foliage biomass yield of four (4) sweet potato varieties (variety 1-Ligwalagwala, variety 2-Tia Nong 57, variety 3-Tia Nong 66 and variety 4-Kenya). Harvesting was done at three different times; 70, 90 and 110 days after planting.

The analysis of variance (ANOVA) of the foliage yield data showed the following results:

***** Analysis of variance *****					
Variate: Yield_t_ha					
Source of variation	d.f.	s.s.	m.s.	v.r.	F pr.
Blocks stratum	2	1260.1	630.0	5.14	
Blocks.*Units* stratum					
Variety	3	26552.0	8850.7	72.20	<.001
Harvesting_stage	2	15705.7	7852.8	64.06	<.001
Variety.Harvesting_stage	6	6508.4	1084.7	8.85	<.001
Residual	22	2696.9	122.6		
Total	35	52723.1			
***** Tables of means *****					
Variate: Yield_t_ha					
Grand mean 64.2					
Variety	1	2	3	4	
	38.7	44.4	65.8	107.9	
Harvesting_stage	1	2	3		
	36.2	70.2	86.3		
Variety	Harvesting_ stage				
	1	2	3		
1	27.8	36.0	52.4		
2	36.3	43.8	52.9		
3	23.8	77.7	96.0		
4	56.7	123.2	143.7		

*** Standard errors of differences of means ***			
Table	Variety	Harvesting_stage	Variety Harvesting_stage
rep.	9	12	3
d.f.	22	22	22
s.e.d.	5.22	4.52	9.04
*** Least significant differences of means (5% level) ***			
Table	Variety	Harvesting_stage	Variety Harvesting_stage
rep.	9	12	3
d.f.	22	22	22
l.s.d.	10.82	9.37	18.75

Using the ANOVA results presented above, answer the following questions:

- (i) Was there a significant difference in the foliage biomass yield among the four sweet potato varieties? Explain your answer. **(5 Marks)**
- (ii) Was there evidence that the stage of harvesting had an effect on foliage biomass yield? Explain your answer. **(5 Marks)**
- (iii) Do the results show any significant interaction between variety and stage of harvesting? Explain your answer. **(5 Marks)**
- (iv) Separate the variety /harvest stage means using the given LSD and present them in a hierarchical order using superscript low case letters ^{a b c} to show where there are significant mean differences. **(10 Marks)**

QUESTION 3

- (a) Succinctly discuss what you understand by research and why we have to spend money and time doing research. **(10 Marks)**
- (b) Briefly discuss five (5) key immoral practices that are strongly discouraged in research work. **(10 Marks)**
- (c) State five (5) sources of error in taking measurements **(5 Marks)**
- (d)
 - i. Differentiate reliability from validity as they are used in research **(2 Marks)**
 - ii. Discuss the double-coding method of checking reliability **(3 Marks)**

QUESTION 4

Giving examples, discuss how the following references should be listed at the end of a publication:

- i. Journal article, **(5 Marks)**
- ii. Article without an author, **(5 Marks)**
- iii. Book, **(5 Marks)**
- iv. Book chapter, **(10 Marks)**
- v. Article from internet **(5 Marks)**