## "Investing in Africa's Future"

# COLLEGE OF HEALTH, AGRICULTURE & NATURAL SCIENCES

## NACP 213 PRINCIPLES OF CROP PRODUCTION

## END OF SECOND SEMESTER EXAMINATIONS

## MAY 2021

### LECTURER:     Mr Larry Kies

## INSTRUCTIONS

This exam has three questions. Choose ONE of the questions, then answer ALL parts of the question that you choose.

**NACP213 PRINCIPLES OF CROP PRODUCTION**          **END OF SEMESTER EXAM**

It is important that you do your own work and use your own words. Copying and pasting from on-line sources or soft-copies of other resources (hand-outs, e-books, lectures, etc.), or from other student's work, will result in serious loss of marks. For questions involving calculations, show your work.

1
 a. Zimbabwe should reduce the amount of imported fossil fuel used for agriculture.
Use your understanding of farming systems in Zimbabwe and of how energy is used and produced in Agriculture to discuss the above statement.                                        (30 marks)

b. Use the principles involved in determining the Centers of Origins of crops to explain how scientists might prove that Rhodes grass is native to Zimbabwe.                          (20 marks)

c. Give the Latin (scientific/binomial) name for a crop that matches each of the following criteria. One example is given:

| Characteristics | Latin name |
| --- | --- |
| Solanaceous fruit crop | *Lycopersicon esculentum* |
| Pulse with seeds that develop underground, that is very drought resistant | i |
| Non-cereal energy crop that is not a root or tuber | ii |
| Cereal that often has yields of 13t/Ha | iii |
| Pulse that often yields over 4 t/Ha | iv |
| Legume that typically yields 10-20 t/Ha | v |
| Brassica that produces marketable flower buds | vi |
| Root crop in the Umbelliferae family | vii |
| Non-cereal energy crop with less than 1% protein | viii |
| Cereal that is often transplanted | ix |
| Temperate-area crop grown for sugar | x |

(10 marks)

2 A farmer named Blessing has a plot which is 30 m by 80 m. The soil is very sandy.
She planted maize with a *target* population of 45000 plants per Ha. Each plant yielded one cob per plant. The total harvested was 7200 cobs (grain+cob) which weighed a total of 810 kg.
She weighed a sample of 20 cobs, shelled them, and weighed the grain and came up with the following:
  Grain+cob= 2.6 kg;
  Grain only = 2.1 kg

 a. Calculate her yields and compare them to *typical* yields and *high* yields in Zimbabwe        (6 marks)

 b. Give the **most likely** reasons why her yields might be different from *typical* yields in Zimbabwe.
                                                                                (6 marks)

 c. Advise her concerning:
   i. Plant population-
        how her population compared with her target population                        (4 marks)
        how she might correct for an incorrect population the next time she plants        (6 marks)

   ii. Explain how the texture of her soil will affect the:                        (12 marks)
        depth of sowing
        base dressing fertilizer used
        frequency of nitrogen top dressing
        irrigation

   iii. How to use Integrated Pest Management to reduce pests in her plot.                (20 marks)

d. Using specific crops (including Latin names), give an example of a correct crop rotation in a garden,
and give reasons for placing each crop in its position in the rotation.                (6 marks)

3

a. Both sweet potatoes and potatoes were planted in the plots on campus. Discuss the differences between the two crops under the following headings: (18 marks)

- Latin name and botanical family
- Plant parts harvested
- Growth habits
- Comparison of potential yields and actual yields on the campus this season
- Suitability for low management systems in Zimbabwe, giving reasons

b. A village called Pamusha in Zimbabwe has the average rainfall in the graph below. Its elevation (900 m) is less than that of Old Mutare (1100 m).

**Pamusha average monthly rainfall (1977-2020)**
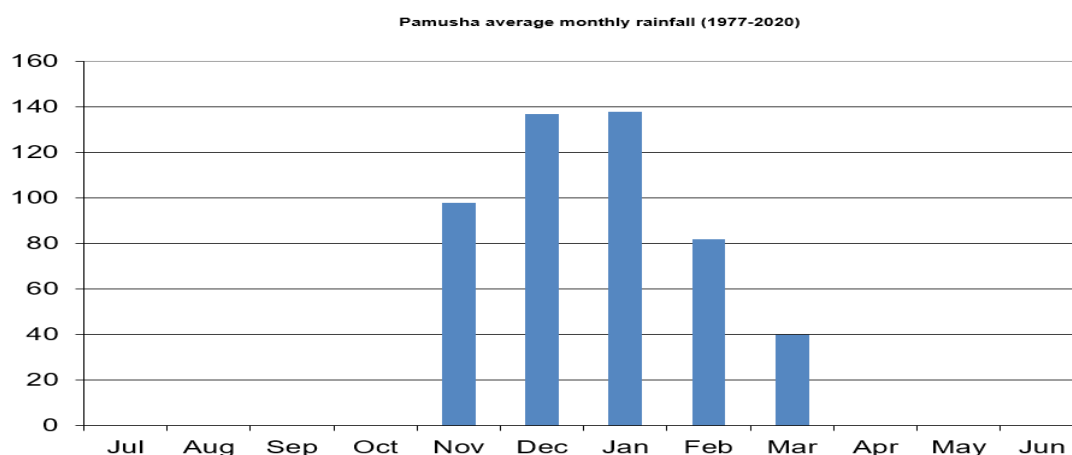


i. *Compare* the suitability of the following crops to this area, considering *both* temperature and rainfall: (18 marks)

- Taro
- Wheat
- Pearl Millet
- Different varieties of Seedco maize
- Rice

ii. Discuss other factors which must be considered when selecting which of the above crops to grow at this location. (8 marks)

iii. The Progene maize variety PGS65 matures in 135 days at the AU campus. How many days will it take to mature at Pamusha? Justify your answer. (2 marks)

**Q3 is continued on the next page.**

Q3 (continued)

c. Panashe planted a 15 Ha field of maize with rows spaced 90 cm apart. His target population was 42,000 plants per hectare.

- After the crop emerged, Panashe measured 12 meters of four separate rows, and then counted the number of plants in each with the results:
- Row1- 38 plants       Row2- 42 plants     Row3- 33 plants     Row4  35 plants


a. What can you tell him about how his actual population compared to his target population? Show your work.                                                                                      (6 marks)


b. What advice can you give him about how to improve the population the next time he plants, giving reasons why he should?                                                                         (6 marks)


c. How many total bags (50 kg) would be considered a very good yield for Panashe's field?    (2 marks)



# End of Exam