COURSE CODE:	WMA 507
COURSE TITLE:	Agrometeorology IV
NUMBER OF UNITS:	3 Units
COURSE DURATION:	3 hours per week

COURSE DETAILS:

Course Coordinator: Prof N.J. Bello. B.Sc., M.Sc., PhD

Email: njbello2003@yahoo.com

Office Location: Room B209, COLERM

Other Lecturers:

COURSE CONTENT:

Quantitative characterization of plants climatic environment. Statistical concept in plant climate relationship. Assessment of moisture and thermal Agro-meteorological indices for agriculture: predicting the onset, cessation and duration of the rains, rainfall variability, rainfall seasonality and precipitation effectiveness. Climatological assessment of water resources and soil loss. The concept of potential Evapo-transpiration, crop moisture requirements and irrigation need: methods of improving water use efficiency. Concept of photosynthetic active radiation (PAR) and efficiency of energy conversion. Measurement of photosynthesis in the field, Quantification of crop yield-climate relationships under different management inputs; Pearson product moment correlation, simple linear regression analysis, principle component and factors analysis. Elementary stochastic models.

Pre-requisite: WMA 411

COURSE REQUIREMENTS:

This is a required course for students in the Department of Water Resources Management and Agrometeorology (Agrometeology Option). The students are also expected to passed WMA 411 which is a basic requirement before auditing WMA 507. As a school regulation, a min

READING LIST:

examination

- Meteorology Source Book (2004) 6th Edition (Ed) S. P. Parker. Science Reference Series Mc Graw-Hill New York

- Webster C. C. and Wilson, P. N. (1966) Agriculture in the Tropics. Longman, London
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- Norman M.T.J., Pearson, C.J., and Searle P.G.E (1995)Tropical Food crops in their Environment. 2nd Edition Cambridge University Press
- Mangala Rai (2006). A Handbook of Agriculture 5th Edition Indian Council of Agricultural Research, New Delhi.
- Parry, M. (1990) Climate Change and World Agriculture. , Earthscan, London
- Rees, D.G.(2001) Essential Statistics Fourth Edition Chapman & Hall. New York.
- Bluman A. G. (1998) Elementary Statistics –A Step- by Step Approach . Mc Graw-Hill New York
- Graham Sumner (1988) Precipitation processes and analysis. John Wiley & Sons., New York.
- Edward Linacre (1992) Climate. Data and Resources- a reference Guide Routledge, London
- WMO (2002) Applications of Climate Forecasts for Agriculture. Agm No7/ WCAC No 1; WMO/TD-No 1223. World Meteorological Organization.
- Stringer (1972) Techniques in Climatology. W.H Freeman and Co., San Francisco

LECTURE NOTES

INTRODUCTION

THE NEED FOR QUANTITAT IVE ASSESSMENT OF THE PLANT S ENVIRONMENT

Plants are relatively immobile but the environment about the plants changes markedly and frequently too. The plant environment is made up of the soil, physiography, and the biotic and climatic factors. The magnitudes of the variation of each of these components are not the same. For instance the variation in the climatic component is more marked both in terms of its variation, over time and space.

Generally, the climatic parameters involved in the assessment of the plants environment are rainfall, relative humidity, evaporation, evapotranspiration, radiation photoperiod and to a lesser extent wind and pressure and also depending on latitudal location, snow, frost, hail and fog.

The xeritation of an area in terms of the climatic attributes rests on routine and accurate measurement of the climatic elements mentioned above. Different instruments are used for such measurements and for some parameters, rearming highly sophisticated equipment that may not be easily acquired. For use empirical formulae are used to derive estimates.

The various climatic elements and the instruments used can now be itemized

CLIMATIC ELEMENTS

- Rainfall
- Temperature
- Relative humidity
- Radiation
- Photoperiod
- Evaporation
- Evapotranspiration
- Potential evaporation
- Wind pressure

Method of analysis in agro meteorological research is statistical or in some cases mathematical – statistical.

Statistics have been divided into the following main types:

- Sampling statistics
- Descriptive statistics
- Inferential statistics

  Each of these types has a different purpose but each is applicable to many different kinds of data. Some methods are suitable for data on the nominal or ordinal scales while others are applicable for data.

  Dispersion and further moment measures describe the spread of the values in a sample.

  SAMPLING

  One of the objectives of sampling is to obtain a representative group of the total population often with the smallest group that will give the desired reliability in the results.

  SAMPLING PLAN

  The main principle of which sampling plans are set is that bias should not be allowed to enter the sampling procedures.

  SAMPLING METHODS

  The following sampling methods have been used extensively

  i. Probability or random sampling
     - Simple random sampling
     - Stratified random sampling
  ii. Systematic sampling
  iii. Nested or multistage sampling

  NUMBER IN SAMPLE

  We can calculate the number of values in a sample to give a specific confidence level from the results obtained by taking an experimental sample.

  INFERENTIAL STATISTICS

Inferential statistics involves formulation of hypotheses concerning the data collected and testing the validity of the hypothesis by various statistical methods.

Two types of error can occur in this procedure. These are Type I Error and Type II Error. Type I Error occurs when the hypothesis is rejected when it is true.

Type II Error occurs when the hypotheses is accepted when It is false.

ASSESSMENT OF AGROMETEOROLOGICAL INDICES FOR AGRICULTURE

- Definition of the agro metrical indices
- Moisture – based indices
- Thermal – based indices