

# PACIFIC SENIOR SECONDARY CERTIFICATE

## AGRICULTURE

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# AGRICULTURE PRESCRIPTION

*Effective as of January 2004*

# AGRICULTURE

## Rationale

The study of Agriculture provides students with an understanding of animal and plant agricultural production systems and the importance of sustainable production techniques for the Pacific Island economy. Students will develop practical skills associated with the production of animal and plant products and apply scientific skills to investigate their production.

This prescription defines the requirements for assessment for PSSC Agriculture and is designed to assess a one year course of study at this level. The course is designed as a foundation course for further study of Agriculture or those who wish to develop an understanding of the principles involved in agricultural production.

## General Aims

The aims of agriculture are to:

1. To develop and foster an interest in, and inquiry into, the relationships existing among plants, animals and people within the agricultural environment.
2. To apply scientific methods to the study of agriculture by using the skills of observing, analysing, evaluating and drawing conclusions from various data encountered during personal involvement in activities, research or studies associated with the course.
3. To provide an opportunity for students to undertake practical investigations using local examples. These should include both field and laboratory-based investigations.
4. To develop an awareness of agricultural systems and their response to social, cultural, technological and economic change.
5. To develop an understanding of the need to apply sound scientific, ecological and economic principles to agriculture in order to achieve sustainability.
6. To stimulate positive attitudes by showing that farming can be both a beneficial and a rewarding occupation.
7. To acquire a suitable basis for further study or experience in agriculture and its related fields.

## General Objectives

The general objectives of the course are;

1. to develop the student's knowledge and understanding of the basic agricultural facts and principles through a study of
  - agriculture as a managed ecosystem;
  - soil as a physical, chemical and biological medium for growing plants;
  - the application of biological principles to the growth, development and production of plants and animals;
  - the ways in which human intervention and management of an agricultural enterprise influence production;
  - the importance of the roles of management and marketing in local and national agricultural production.
  
2. to develop the student's skills appropriate to agricultural science. The following skills provide a base for informed decision-making about managing plants and animals.
  - Scientific skills- The definition of the question or issue; the selection of relevant information; the design and conduct of investigations using appropriate materials and apparatus; the recording and analysis of data; and making deductions.
  - Management skills - The establishment and maintenance of conditions for efficient plant and animal production through familiarity with techniques of husbandry, careful observation, recognition of problems, determination of alternative courses of action, decision-making and marketing procedures.
  - Communication skills - The presentation of information in oral, written, tabular, graphic and diagrammatic form.
  - Practical skills - The safe and effective use and maintenance of agricultural related skills, equipment and chemicals.

## Time Allocation

The course is designed to be covered in a minimum of 30 weeks. The suggested time breakdown for the course is shown below. This breakdown is based on periods of 1 hour duration and 4 periods per week. Time for the internal assessment activities must be included within this allocation.

Section of Course	No. of hours
1. The Agricultural Ecosystem	8-10
2. Soils	20-25
3. Plant Production	20-25
4. Plant Protection	8-10
5. Animal Production	20-25
6. Animal Protection	8-10
7. Agricultural Management	8-10

8. Agricultural Marketing	8-10
Total Time	120

## Course Structure

### 1. The Agricultural Ecosystem

Students will compare one managed ecosystem with one natural ecosystem to emphasise the impact of the agricultural or horticultural practices.

Managed ecosystems include but are not restricted to: farms, plantations, greenhouses, orchards.

Natural ecosystems include but are not restricted to: natural woodlands, forests, beaches, marshes and swamps, atolls and lagoons

Students should be able to:

1. describe the component characteristics of an ecosystem.
2. describe the differences between a managed and a natural ecosystem.
3. describe the types of agricultural management systems (traditional, mixed farming/cropping [polycropping], monoculture, Organic, IPM, agroforestry).
4. use local and regional examples to discuss the impacts agricultural practices have on the natural ecosystem (eg. Pesticides, over fertilisation, overcultivation, deforestation)

## 2. Soil

Students are to consider the properties of soil and the effect management practices have on these properties. Soil is a physical, chemical and biological medium for growing plants. It has a variable and dynamic nature, which is to be illustrated through local examples. Students should investigate the properties of a range of local soils relevant to agricultural or horticultural production. Students should consider the effect that the origin of the soil has on its properties and usefulness for agriculture.

Students will consider ways in which soil can be improved for agricultural production as well as why soil conservation should be practised. The effect of management practices on soil properties should be illustrated through local examples.

Students are to consider the use of soilless media for potting mixes and seed raising mixes.

Students will be able to:

- 2.1 Describe the properties of soil in terms of the following:
  - a. physical (texture, structure, colour )
  - b. chemical (pH, nutrient status)
  - c. biological (micro and macro organisms; nitrogen fixing bacteria and legumes)
  - d. origin (volcanic, coral)
- 2.2 Describe the effect decomposers and earthworms have on soil texture and structure.
- 2.3 Explain how specified soil properties are affected by the management practices of:
  - a. Composting/mulching (organic content; structure; texture; nutrient status)
  - b. Liming (pH; structure; nutrient status)
  - c. Organic fertilizers eg. animal manure, green manure (nutrient status)
  - d. Inorganic fertilizers (nutrient status; micro/macro organisms)
  - e. Irrigation and drainage (nutrient status; structure)
  - f. Tillage (structure)
  - g. Crop rotation (micro/macro organisms; nutrient status)
  - h. Herbicides (micro/macro organisms; nutrient status)
  - i. Overgrazing/burning/deforestation (nutrient status; micro/macro organisms)
- 2.4 Explain, using local examples, why soil conservation should be practiced with reference to the growing system and the ecosystem.
- 2.5 Explain why soilless media are used in:

- a. Potted plants
- b. Seed raising

### 3. Plant Production

Students will consider the factors that influence the growth and development of plants and the germination of seeds. Students should investigate a range of ways in which these factors can be manipulated or controlled to affect the growth, development and sexual reproduction of plants to develop their understanding. Asexual reproduction is considered in terms of how it can be used to maintain the purity of line and to increase plant numbers; practise of propagation techniques is encouraged.

Students should be able to:

- 3.1 Describe how seed germination is affected by:
  - a. The environment (oxygen, water, temperature)
  - b. Dormancy and methods to overcome this (scarification, stratification, maturity)
  - c. Viability (storage, age, quality).
  
- 3.2 Describe how growth and development in plants is influenced by:
  - a. The role of macro-nutrients (N, P, K, Ca, Mg, S) and micro-nutrients (Zn, Mn, Fe, Mo, Cu, B, Cl)
  - b. Environment (water, light, temperature, humidity, day length)
  - c. Plant hormones (auxin, cytokinin) and growth regulators
  - d. Training (Pruning, training, stopping, disbudding, pinching, thinning)
  - e. Weeds (effect and control)
  
- 3.3 Explain how the growth, development and sexual reproduction of plants to produce a quality product is affected by:
  - a. Choice of cultivars (in relation to growing environment)
  - b. Light (light density, defoliation)
  - c. Water (irrigation, drainage)
  - d. Nutrient application (rate, time, method)
  - e. Pruning and training.
  - f. Pollination (insects as agents; hand pollination for some plants)
  - g. Plant hormones: (auxin, cytokinin) and growth regulators
  - h. Genetically modified organisms (GMOs)
  
- 3.4 Explain how methods of asexual reproduction are used to maintain purity of line and increase plant numbers. Methods include:
  - a. Marcotting/air layering
  - b. Grafting

- c. Budding
- d. Tissue culture

## 4 Plant Protection

Students will study the biology and behaviour of plant pests of the Pacific Islands region, and strategies for management and control of these pests. Students will identify a range of pests and relate their damage and control to their biology. The need for pest control is related to crop production and management to achieve a quality product, as well as considering the wider ecology of the Pacific Islands.

Students should be able to:

4.1 Identify and describe the main groups of pests and diseases and the effects they have on plants.

- i. Pest groups are limited to:
  - a. insects and mites (chewing, sucking, boring)
  - b. slugs and snails
  - c. vertebrates (rats, bats and birds)

- ii. Disease groups are limited to:
  - a. fungi
  - b. bacteria
  - c. viruses
  - d. nematodes.

4.2 Relate the behaviour of an insect pest at different stages of its life cycle to its control, damage and spread. Life cycle stages are those of:

- a. incomplete metamorphosis ( egg, nymph and adult)
- b. complete metamorphosis ( egg, larvae, pupa, adult).

4.3 Explain the economic reasons for controlling pest and disease in relation to product:

- a. quality
- b. quantity / yield
- c. Movement / trade

4.4 Describe pest and disease control measures and the impact they have on the target organisms and the wider production system.

Control measures are limited to:

- a. crop rotation
- b. pesticides
- c. cultural practices (eg time of planting, drainage, rogue and burn, mix cropping)
- d. physical control (eg manual killing, hand picking, trapping)
- e. biological control
- f. Integrated Pest Management (IPM)



## 5. Animal Production

Students will consider the factors that influence the growth and development of animals and associated reproduction strategies. Students should investigate a range of ways in which these factors can be manipulated or controlled to affect the growth, development and sexual reproduction of animals to develop their understanding. Asexual reproduction is considered in terms of how it can be used to maintain the purity of line and to increase productivity. Development and use of safe and effective husbandry techniques is encouraged.

**The objectives within this section are to be met in relation to cattle, pigs and poultry.**

Students should be able to:

- 5.1 Describe the characteristics of the local and commercial animal breeds. The characteristics are limited to:
  - a. Names
  - b. Colours
  - c. Conformation
  - d. Productive attributes
  - e. Digestive system (structures, names and functions of the parts)
  - f. Reproductive system ( structures, names and functions of the parts)
  
- 5.2 Describe the factors that influence the growth and development of animals. The factors are:
  - a Breeds (genetics)
  - b Nutritional value of feed stock (energy, protein, vitamins, minerals, water)
  - c Environment (water, light, temperature, humidity, day length,)
  - d Husbandry practices(eg castration, clipping – eye-teeth, claws, beak, tail)
  - e Hygiene (pest and disease control, design of appropriate structures such as feeders, drinkers, nest boxes))
  
- 5.3 Explain how the manipulation of selected factors affects the growth, development and production of animals to achieve a quality product. The factors are:
  - a Choice of breed (in relation to environment)
  - b Feed stock (types, quality, availability and quantity)
  - c Water (quality, availability and quantity)
  - d Environment (temperature, housing, ventilation, stocking rate/density)
  - e Feeding regime (stages of development)
  - f Animal behaviour (heat and cold stress, injury, disease)
  
- 5.4 Explain animal reproduction strategies in maintaining purity of line and increase of productivity. Reproduction strategies are:
  - a The management of oestrus in the reproductive cycle
  - b Breeding system (In-breeding; Out-breeding; Artificial insemination)
  - c Selection criteria for breeding stock (breeding habits, body conformation, feed converters)

d Genetic gain (heritability, line breeding, cross breeding and hybrid vigour)

## 6 Animal Protection

Students will study the biology and behaviour of animal pests, diseases and disorders of the Pacific Islands region, and strategies for management and control of these pests. Students will identify a range of pests and relate their damage and control to their biology. The need for pest control is related to crop production and management to achieve a quality product, as well as considering the wider ecology of the Pacific Islands.

Students should be able to:

6.1 Identify and describe the main groups of pests, diseases and disorders and the effects they have on animals. The pests, diseases and disorders are:

**i. Pests are:**

- internal and external parasites (ecto and endo)

**ii. Diseases are:**

- a Mastitis (cattle, pigs)
- b Brucellosis (cattle, pigs)
- c TB (cattle and Pigs)
- d Coccidiosis (poultry )
- e Chronic respiratory disease [C.R.D ] (poultry)

**iii. Disorders are:**

- a Lameness
- b Injury such as fracture
- c Nutritional starvation
- d Dehydration
- e Scouring
- f Prolapse
- g Calving / farrowing difficulties

6.2 Relate the behaviour of an external parasite and an internal parasite at different stages of its life cycle to its control, damage and spread in the host animal

6.3 Explain the economic reasons for controlling animal pests, diseases and disorders in relation to:

- a. product quality
- b. product quantity / yield
- c. movement / trade of the product.

6.4 Describe pest and disease control measures and the impact they have on the target organisms and production system. Control measures are limited to:

- a. stock grazing rotation
- b. use of pesticides (drenching, dipping, de-worming)
- c. cultural practices related to hygiene

- d. physical controls (eg separation, culling, slaughtering)
- e. biological control
- f. Integrated Pest Management (IPM)

## 7 Agricultural Management

Students will study the management of agricultural enterprises and the factors influencing the decisions made by manager(s) of local agricultural or horticultural enterprises. The influence and effect of relevant local, national and international regulations on management will also be considered. Students should understand the reasons for the safe handling of agricultural chemicals and equipment and develop their own skills associated to this. The importance of the role that quarantine regulations, processes and procedures play in the biosecurity of the student's country, within the Pacific region and with export countries will be developed.

Students should be able to:

- 7.1 Describe the role of record keeping in the management of agricultural enterprises.
- 7.2 Explain the influences that the following have on management decisions:
  - a. goals and aspirations of the manager
  - b. human resources
  - c. physical resources
  - d. financial resources and the roles of financial institutions (eg. Development Banks and Banks)
  - e. storage systems
  - f. sustainability (economic and environmental)
  - g. market opportunities
- 7.3 Describe safety procedure relating to the use of agricultural equipment and chemicals. Safety procedures are those related to:
  - a. Storage
  - b. Mixing procedures
  - c. Handling and equipment
  - d. Application time and method
  - e. Withholding period / time
  - f. First-aid
  - g. Disposal of chemical residue and containers
  - h. Use and maintenance of agricultural equipment
- 7.4 Identify how regulations affect management of the agricultural enterprise. Regulations are those relating to:
  - a. quarantine
  - b. land tenure
  - c. environmental laws
  - d. regulatory controls eg. tariffs, trade barriers, quotas etc
- 7.4 Use examples to discuss the role of biosecurity (quarantine procedures) in protecting

agricultural and natural environments.

## 8 Agricultural Marketing

Students will study the processing and marketing of an agricultural or horticultural product. The product selected should be local and provide the opportunity for students to directly observe some parts of the marketing process.

Students should be able to:

- 8.1 Describe the market opportunities available for the product.
- 8.2 Explain post-harvest handling steps used to meet local and/or export market requirements for the product. These requirements include:
  - a. quality control to meet regulatory requirements
  - b. quarantine requirements
  - c. pricing and market prices
  - d. consumer demands and grading criteria
  - e. economics of production.
- 8.3 Explain how processing can add value to a local primary product
- 8.4 Identify and describe the marketing roles of agricultural grower organizations

## **ASSESSMENT**

The assessment of this prescription is in two parts (internal and external assessment), and is made up of the following assessment components:

<b>EXTERNAL ASSESSMENT</b>	<b>50%</b>
Assessment Component: External Examination	
<b>INTERNAL ASSESSMENT</b>	<b>50%</b>
Major Task - Extended practical investigation	35%
Minor Task 1 - Research task	25%
Minor Task 2 - Short-term practical investigations	20%
Minor Task 3 - Practical skills	20%

### **External Assessment**

#### **The Examination**

The examination time will be 3 hours, and the examination paper will be consist of: multiple-choice questions, short answer questions and paragraph responses.

The examination will assess a range of knowledge and skill objectives specified in this prescription. All sections will be represented in the examination.

The weighting attributable to each section will be:

<b>The Agriculture Ecosystem</b>	<b>10 %</b>
<b>Soils</b>	<b>15 %</b>
<b>Plant Production and Plant Protection</b>	<b>30 %</b>
<b>Animal Production and Animal Protection</b>	<b>25 %</b>
<b>Agricultural Management and Agricultural Marketing</b>	<b>20 %</b>
<b>Total</b>	<b>100 %</b>

## Internal Assessment

The internal assessment component is designed to assess skills that cannot be examined externally and to recognise student performance in these aspects. Teachers need to provide students with ample formative tasks to enable them to fully develop their skills in each aspect prior to their being assessed.

Students will complete one major assessment activity, the Practical Investigation, and activities from three other sections, Research, Practical Skills, Short Term Practicals. These activities complement the development of student's understanding of agricultural processes and also provide students with specific skills to be used in further study or agricultural practice.

Teachers will assess the product of students' work resulting from these tasks using detailed marking schedules developed against the assessment criteria specified for each activity and provided in this prescription.

The tasks, weightings and suggested class-time are as follows:

<b>Task</b>	<b>Weighting %</b>	<b>Suggested Class Time</b>
Major Task - Extended practical investigation	35	5-10 hours
Minor Task 1 - Research task	25	5 hours
Minor Task 2 - Short-term practical investigations	20	8-10 hours
Minor Task 3 - Practical skills	20	8-10 hours

It is recommended that the assessment tasks are completed throughout the year, with the major task starting by 1 July.

Schools that intend enrolling students in PSSC Agriculture must submit for approval a completed "PSSC Internal Assessment Summary Form" by 1 March in the year of entry. These forms will be provided by SPBEA.

A PSSC Agriculture Internal Assessment Programme must include details of the assessment tasks and procedures, descriptions of within school moderation of internal assessments if there is more than one class and more than one school involved.

Clear records and documentation regarding the school's approved PSSC Internal Assessment Programme must be kept. All students' work that have been assessed under this programme must be available for verification by moderators and SPBEA officers during any one school year.

Students who will be enrolled in PSSC Agriculture must be given a copy of the school's Internal Assessment Programme for the subject as well as a copy of the marking scheme for each task. Each student must be informed of when assessment tasks are to be given, and be notified of the assessment result as soon as it is marked. Students should also be advised that such results are subject to further changes as a result of moderation.

Schools must submit a mark for each of the four assessment components:

Major Task - Extended practical investigation	out of 35
Minor Task 1 - Research task	out of 25
Minor Task 2 - Short-term practical investigations	out of 20
Minor Task 3 - Practical skills	out of 20

## **Moderation**

Moderation is a process to ensure fair, valid and consistent assessment. It is to ensure that the assessment of students' performance in the same subject is comparable between classes (in the same school) and between schools.

The moderation process is subject to the requirements and procedures of the Board.

The major task will be sample moderated by country moderators. This will be further moderated by an external moderator. The sample moderation will be taken from a list of students covering a range of marks. Details of how the sample is to be selected will be provided by SPBEA. The minor tasks will be statistically moderated against a combination of the external examination and the major task.

## **Internal Assessment Components**

### **Major Task - Extended Practical Investigation**

Each student must complete one extended practical investigation.

The investigation should

- require a period of investigation ranging from several days to several weeks.
- be planned, recorded and reported independently by the student.
- involve students in analysing and making deductions from their findings.

Teachers should provide supervision for students. This means that the teacher provides guidelines for the investigation such as the context of the investigation, equipment available or chemicals to use.

The extended practical investigation must be assessed against the following aspects using the criteria given in Appendix 1.

- Aim/Purpose
- Method
- Information gathering
- Processing data
- Discussion
- Conclusion
- Report

Teachers must ensure that this major task is completed by the end of July and samples sent to the external moderator by August 16.

Possible topics for investigation are given in the Teacher Notes. The investigation may be based on aspects of more than one prescription topic.

## Minor Tasks

- All three minor tasks are to be completed.
- The topics for the minor tasks must come from different sections of the prescription.

### Minor Task 1: Research Activity

Each student must complete one research activity and produce a report.

The research should

- include a period of investigation ranging from several days to several weeks
- be planned, recorded and reported independently by the student
- involve students in analysing and making deductions from their findings

Teachers should provide supervision for students. This means that the teacher provides guidelines for the investigation such as the context of the investigation, equipment available or references to use. The research will involve the collection and analysis of data/information from primary and secondary sources. Primary data/information is obtained by direct observation such as the use of surveys. Secondary data/information comes from another source, such as textbooks, internet sources or other publications.

The research activity must be assessed against the following aspects using the criteria given in Appendix 2.

- Purpose/Question
- Information gathering
- Processing information
- Interpretation
- Report

The research activity should

- be designed by the student.
- clearly identify the topic.
- report by presentation of tabulated data, graphs, photographs, pictures, text, as appropriate.
- include a general summary of conclusions.
- produce a written report within guidelines set by the teacher eg 2-4 pages, 800- 1000 words.

### Minor Task 2: Short-term practical investigations

These short term practical activities are designed to help students develop their practical skills and to reinforce their understanding of the agricultural system. Each student must complete **two** short term practical investigations for internal assessment.

Each practical activity should include all aspects of the scientific method. Each investigation should be capable of being completed within 1-2 hours. Teachers will provide students with the method. Within each practical activity students will be assessed on at least two of the following aspects:

- Information gathering
- Processing data

- Discussion
- Conclusion.

Assessment of these aspects must be made using the relevant criteria given in Appendix 3.

Included investigations must be

- common to all students within a school.
- equally weighted at 10% of the I.A. award.

### **Minor Task 3: Practical Skills**

There are a large number of practical skills that are important in agricultural production. Students should develop their skills for these activities as part of their learning programme.

Each student must be assessed on his/her competence with **four** varied techniques associated with agricultural practice.

The assessed techniques should be

- sufficiently different from each other to avoid overlap.
- equally weighted at 5% of the I.A. award.

Each technique is to be assessed using at least two of the criteria given in Appendix 4.

## Appendix 1

### Assessment Schedule for Major Task: Extended Practical Investigation

Aspect	Acceptable	Merit	Excellent
<i>Aim/Purpose</i>	Statement/prediction/question about a relationship or variable relevant to the context of the investigation.  <b>1</b>	Statement/prediction/question based on a quantitative relationship or a measurable variable.  <b>2</b>	Statement/prediction/question that can be investigated and is based on a quantitative relationship between two variables that can be measured  <b>3</b>
<i>Method</i>	<i>Method is feasible.</i> Method relates to the aim/purpose but lacks the details needed for repetition of the procedure by someone else, ie: <ul style="list-style-type: none"> <li>• how the dependent variable will be measured is evident</li> <li>• range is given for the independent variable</li> <li>• some procedures are stated</li> <li>• some controlled variables are identified.</li> </ul> <b>2</b>	<i>A valid method.</i> Method details procedures that can be followed to achieve similar results, ie: <ul style="list-style-type: none"> <li>• how the dependent variable will be measured is clear and appropriate</li> <li>• the range for the independent variable is appropriate</li> <li>• most procedures are stated</li> <li>• appropriate values are given for the controlled variables.</li> </ul> <b>4</b>	<i>A valid and reliable method.</i> Methods details procedures that can be followed to achieve similar and reliable results, ie: <ul style="list-style-type: none"> <li>• as for merit, and</li> <li>• how the dependent variable will be measured is clear and appropriate</li> <li>• the range given for the independent variable is appropriate</li> <li>• all key procedures are stated in detail</li> </ul> <b>6</b>
<i>Gathering Data</i>	Some quantitative data is collected which is relevant to the aim/purpose.  <b>2</b>	Quantitative data is collected and data is based on the manipulation of one variable over a range appropriate to the aim/purpose. Raw data can be accessed for processing.  <b>4</b>	Collected quantitative data is sufficient to enable a valid, reliable conclusion to be made. Data lies within typical limits of accuracy for the method used and the equipment available.  <b>6</b>

<b>Aspect</b>	<b>Acceptable</b>	<b>Merit</b>	<b>Excellent</b>
<b><i>Processing Data</i></b>	Data is presented in self-contained tables or graphs as appropriate for the data. Graphing conventions are followed; some minor errors are evident.  <b>2</b>	Data is processed and presented in a systematic and accurate format. Analysis is not completed to a point where a trend or relationship can be determined. Minor errors are acceptable.  <b>5</b>	Data is processed to enable a relevant trend or relationship to be accurately determined. All graphical/table conventions are accurately applied (minor errors acceptable).  <b>7</b>
<b><i>Discussion</i></b>	Discussion consists of only a description of the results (and/or the conclusion).  <b>2</b>	Discussion links the results to the context of the investigation.  <b>4</b>	Discussion provides an explanation of the relationship between the experimental results and the context of the investigation.  <b>6</b>
<b><i>Conclusion</i></b>	Conclusion is based on experimental data.  <b>1</b>	Conclusion is based on experimental data and is linked to the aim/purpose.  <b>3</b>	The conclusion is valid and based on the experimental data and linked to the aim/purpose.  <b>4</b>
<b><i>Report</i></b>	A report is presented.  <b>1</b>	Report is organised in an appropriate format.  <b>2</b>	Report is an appropriate format and is complete.  <b>3</b>

***Total: 30 marks***

*Notes: 1) Failure to reach acceptable level gains a zero mark.*

*2) Assessment judgement is to the best performance standard. No marks other than those given in each section of the assessment schedule should be awarded.*

**Appendix 2**

**Assessment Schedule for Minor Task 1: Research**

<b>Aspect</b>	<b>Acceptable</b>	<b>Merit</b>	<b>Excellent</b>
<b>Purpose/Question</b>	Purpose/question is relevant to the topic. <b>1</b>	Purpose/question that can be researched using primary or secondary information sources. <b>2</b>	Purpose/question that can be researched using primary and secondary information sources. <b>3</b>
<b>Information Gathering</b>	Some information is collected which is relevant to the purpose/question.. <b>1</b>	Information relevant to the purpose/question is collected from primary or secondary sources. <b>3</b>	Information relevant to the purpose/question is collected from primary and secondary sources. The information collected is sufficient for the purpose. <b>5</b>
<b>Processing Information</b>	Information from primary and/or secondary sources is presented. <b>2</b>	Information from primary and/or secondary sources is processed to address the purpose/question. Processing is not completed. <b>4</b>	Information from primary and secondary sources is fully processed to address the purpose/question. <b>6</b>
<b>Interpretation</b>	<i>Ideas presented.</i> The report presents relevant ideas based on the primary or secondary information sources. <b>3</b>	<i>Ideas described.</i> The report describes relevant ideas based on the primary and secondary information sources. <b>5</b>	<i>Ideas discussed.</i> The report discusses ideas based on the primary and secondary information sources. <b>7</b>
<b>Report</b>	The report is presented and can be read, but spelling and grammatical errors significantly affect overall understanding. Significant portions may be copied. <b>1</b>	The report is organised and complete, largely in the student's own words. A bibliography is provided. Errors in spelling and grammar do not affect understanding. <b>2</b>	Report is clear, concise and well organised. Bibliography follows accepted conventions. No repetition or irrelevant information. <b>4</b>

Notes: 1) Failure to reach acceptable level gains a zero mark.  
marks

**Total: 25**

2) Assessment judgement is to the best performance standard. No marks other than those given in each section of the assessment schedule should be awarded.

### Appendix 3

#### Assessment Schedule for Minor Task 2: Short term practical investigations.

Aspect	Acceptable	Merit	Excellent
<b>Gathering Data</b>	Some quantitative data is collected which is relevant to the aim/purpose.  <b>1</b>	Quantitative data is collected and data is based on the manipulation of one variable over a range appropriate to the aim/purpose. Raw data can be accessed for processing.  <b>3</b>	Collected quantitative data is sufficient to enable a valid, reliable conclusion to be made. Data lies within typical limits of accuracy for the method used and the equipment available..  <b>5</b>
<b>Processing Data</b>	Data is presented in self-contained tables or graphs as appropriate for the data. Graphing conventions are followed; some minor errors are evident.  <b>1</b>	Data is processed and presented in a systematic and accurate format. Analysis is not completed to a point where a trend or relationship can be determined. Minor errors are acceptable.  <b>3</b>	Data is processed to enable a relevant trend or relationship to be accurately determined. All graphical/table conventions are accurately applied (minor errors acceptable).  <b>5</b>
<b>Discussion</b>	Discussion consists of only a description of the results (and/or the conclusion).  <b>1</b>	Discussion links the results to the context of the investigation.  <b>3</b>	Discussion provides an explanation of the relationship between the experimental results and the context of the investigation.  <b>5</b>
<b>Conclusion</b>	Conclusion is based on experimental data.  <b>1</b>	Conclusion is based on experimental data and is linked to the aim/purpose.  <b>3</b>	The conclusion is valid and based on the experimental data and linked to the aim/purpose.  <b>5</b>

Notes: 1) Failure to reach acceptable level gains a zero mark.  
marks

**Total: 20**

2) Assessment judgement is to the best performance standard. No marks other than those given in each section of the assessment schedule should be awarded.

#### Appendix 4

#### Assessment Schedule for Minor Task 3: Practical Skills

Aspect	Acceptable	Merit	Excellent
<i>Preparation/ readiness</i>	Student needs direction to start task and/or to select suitable equipment/materials.  <b>1</b>	Student requires supervision to start task or guidance to select suitable equipment/material.  <b>3</b>	Student is self-directed and requires minimal supervision. Is able to select appropriate equipment/materials independently.  <b>5</b>
<i>Following procedures</i>	Student attempts the activity.  <b>1</b>	Student is able to complete the activity but requires direction/guidance with aspects of the procedures; aspects of safety may be an issue.  <b>3</b>	Student is able to complete the activity, following all procedures safely and independently  <b>5</b>
<i>Quality of outcome</i>	Some relevant products/outcomes produced.  <b>1</b>	Significant proportions of the products/outcomes are appropriate to the task.  <b>3</b>	The majority of the products/outcomes are appropriate to the task. As good as could be expected.  <b>5</b>

Notes: 1) Failure to reach acceptable level gains a zero mark.  
**marks**

**Total: 15**

2) Assessment judgement is to the best performance standard. No marks other than those given in each section of the assessment schedule should be awarded.

## **Teacher Notes**

### **Advice on extended practical research and survey.**

#### **Choice of topic**

Possible topics which might be suitable for the internal assessment and practical work components are given below. These lists provide possibilities only, the individual suggestions are not prescriptive.

#### **Guidance**

Students may require and receive guidance in the selection of an area for investigation. The design of the investigation should, however, largely be determined by the student, with teacher assistance being kept to a guiding minimum. Where students are being too ambitious in their design, teachers should give guidance before students actually begin the practical aspects of the investigation.

#### **Independent Work**

Wherever possible students should work independently on their investigations. It may well be that the same resources are being used by more than one student. Whatever the arrangement, the submissions of students should be compiled independently.

#### **Time demand**

It is envisaged that time spent on the **extended research project and research** should be split between work done "in school" and work done "at home".

## **POSSIBILITIES FOR INTERNAL ASSESSMENT AND PRACTICAL WORK**

### **Major topic: Extended practical investigation**

1. Production of compost by considering variables such as water content, layer order and thickness.
2. Comparison of crop yields in ploughed and unploughed land.
3. Tropic influences on post germination seedlings.
4. Influence of fertiliser application on crop growth. Variables could include, fertiliser rates, fertiliser types, timing of application, type of crop.
5. A comparison of soil profiles from different sites.
6. Influence of spacing densities on crop growth. Influence of various thinning regimes on crop growth.
7. Influence of sowing depth on crop growth.
8. A comparison of organic and inorganic fertilisers on crop growth.

9. Comparison of rationing and ad-lib feeding of livestock on production and feed costs.
10. Influence of nutritional composition of ration on live weight gain.
11. Monitoring crop damage due to pest or disease.
12. Comparison of crop yield/growth under varying weedkiller/pesticide regimes.
13. A comparison between a selected natural habitat and one under agricultural management.
14. A field study of a managed pasture.
15. Single nutrient deficiency trials on a particular crop.
16. Comparison of yield from alternative varieties of a crop.
17. Investigating the influence of the egg laying cycle on egg weight or egg production
18. Investigating the influence of daylight length on egg production.
19. Influence of stock density on growth-rate, egg production, or some other aspect of production.
20. Investigating the influence of daylight length on flowering.

### **Minor topic 1: Research**

1. Market trends relating to price and availability.
2. Soil conservation and management regimes.
3. Factors determining decisions made by small scale producers and commercial producers.
4. Land use for agricultural purposes.
5. The use of weedkillers or insecticides.
6. Soil types within a given location.
7. Commercial seeds and their use.
8. Adoption of fertiliser and cultural methods of crop nutrition.
9. Natural and artificial insemination.
10. Safety considerations given to farm equipment and its use.
11. The role of roadside markets by producers.
12. Insect pests of crops.
13. Sustainability of atoll agriculture.
14. The use made by producers of external advice from Ministry of Agriculture.
15. Subsistence Agriculture.
16. A farm study - presentation of an analysis of management considerations.
17. How farmers adjust to the market.
18. Farmers and their book keeping.
19. Use of fertilisers in a given location.
20. Agroforestry.

### **Minor topic 2: Short term Practical Investigations**

1. Examine and compare two dissimilar soil profiles.
2. Comparison of water retention/drainage properties of various soil types.

3. Determination of soil pH using a range of soil samples.
4. Determining percentage organic matter in soil samples.
5. Determining food nutrients by conducting food tests.
6. Comparison of weeds (numbers and/or species) between areas under different management programmes.
7. Comparison of seed germination under differing conditions of temperature, oxygen concentration or humidity.
8. Determination of soil air percentage in various soil samples.
9. Determination of seed viability.
10. Observation of aspects of behaviour in young chicks.
11. Investigation of crop damage by pest or disease, together with identification.
12. Investigating species composition of a pasture.
13. Recording observations of a herd or flock for the purposes of identifying disease or disability.
14. Identification of breed and breed characteristics.
15. Studying an ecto or endo parasite and determining influence on host animal.
16. Field trip investigation of weeds and weed types in a particular crop.
17. Investigate and compile a report on a single tractor-drawn farm tool in terms of construction, linkages and working edges, maintenance and working condition.
18. Estimating produce losses during storage of a crop, by sampling.
19. Timetabling management and husbandry activity for a single crop cycle.
20. Determine the composition of a range of soilless media..

### **Minor topic 3: Practical skills**

1. Set up brooder for day old chicks.
2. Determination of pH values of a range of soils.
3. Formulate a feed ration for a particular purpose.
4. De-beak a chick - or - castrate a pig - or disbud a calf.
5. Identifying three birds for culling from a flock.
6. Prepare a sow and her pen for farrowing.
7. Prepare a cow for machine milking, and milk her – or - prepare a cow (or goat) for hand milking, and milk her.
8. Prepare a seed bed and sow seeds.
9. Transplant seedlings out of nursery – or – mark out the spacing of plants for an area within an agroforestry block.
10. Grafting or layering or budding or marcotting or pruning.
11. Diagnosing pregnancy - or - a disease in livestock.
12. Demonstrate routine hygiene with chicks or piglets or calves.
13. Clean a backpack sprayer or diagnose and fix a faulty sprayer.
14. Pest identification of a particular crop – or – weed identification within a particular crop.
15. Grading produce.

16. Identifying nutrient deficiency symptoms in crops or livestock.
17. Maintain, for one week, records of egg production or milk yield or feed ration or growth rate.
18. Correctly dilute and apply disinfectant or weedkiller or pesticide.
19. Prepare milk substitute for a calf.
20. Drench for internal parasites.

## Compiling internal assessment marks

The marks awarded for the **three minor internal assessments** need to be brought together with their appropriate weighting into **a single mark out of 100**. It is this final mark that would be submitted to SPBEA when schools are asked to complete the appropriate form for internal assessment awards. Following is a blank form on which the school might gather together student Agriculture I.A. marks over the year.

Notice that the initial raw mark out of a particular activity total needs to be given the appropriate weighting.

Student \_\_\_\_\_

IA Task	Task No.	Raw Mark	Adjusted Mark	Cumulative Mark	Total IA Mark
<b>Minor Task 1:</b> Research		$\frac{\dots}{25}$	$\frac{\dots}{25}$	$\frac{a}{25}$	$\frac{a+b+c}{65} = \frac{\dots}{100} \%$
<b>Minor Task 2:</b> Short term practicals	1	/	$\frac{\dots}{10}$	$\frac{b}{20}$	
	2	/	$\frac{\dots}{10}$		
<b>Minor Task 3:</b> Practical skills	1	/	$\frac{\dots}{5}$	$\frac{c}{20}$	
	2	/	$\frac{\dots}{5}$		
	3	/	$\frac{\dots}{5}$		
	4	/	$\frac{\dots}{5}$		

**PSSC INTERNAL ASSESSMENT SUMMARY FORM**

**AGRICULTURE**

Country \_\_\_\_\_ School \_\_\_\_\_ Class \_\_\_\_\_

**Timing Schedule**

Included Task	Weighting	Start Date	End Date	Title and Description
<b>Major Task:</b> Extended Practical Investigation	35%			
<b>Minor Task 1:</b> Research	25%			
Minor Task 2: Practical Investigation 1	10%			
Minor Task 2: Practical Investigation 2	10%			
<b>Minor Task 3:</b> Practical Skill 1	5%			
<b>Minor Task 3:</b> Practical Skill 2	5%			
<b>Minor Task 3:</b> Practical Skill 3	5%			
<b>Minor Task 3:</b> Practical Skill 4	5%			
<b>TOTAL</b>	<b>100%</b>			

**Teacher:** .....

## **Selected Textbooks and References**

### **Student**

*Certificate Agricultural Science*

Akinsanmi

Longman

0582003407

*Agriculture for South Africa*

Elliot, Slout

Collins Education

0003222322

*The Tropical Vegetable Garden*

Messiaen

Macmillan

0333570774

*Understanding Farm Animals*

Sutherland

McGraw Hill

0070200335

### **Teacher**

*An Introduction to Animal Husbandry in the Tropics*

Payne

ELBS (Longman)

0582212758

*Fundamentals of Soil Science*

Foth

Wiley

0471883522

*The Science of Animals that Serve Humanity*

Cambell, Lasley

McGraw Hill

0070097003



*Plant Protection in the Pacific Islands –a course for senior high-schoolers*

Macpherson, Colin

SPC Plant Protection Services

*Pacific Agroforestry – An information kit*

Pacific Regional Agricultural Programme

SPC

982-343-038-1

*Agroforestry - A Way to Better Farming*

*Module 1 and Module 2*

I Ratukalou, T Nakalevu, J Waradi, H Hertel, H Raedler, E Reigber

MAFF Fiji

982-209-005-6

Animal Production (SPC Paravet)

*Farm Management Handbook*

Queensland Department of Primary Industries

Brisbane

0724217355

*Livestock Husbandry Techniques*

McNitt

Collins

0003831337

*Farm Machinery*

Hunt

(Publisher and ISBN not known)

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