

EDUCATIONAL QUALITY AND ASSESSMENT PROGRAMME [EQAP]



Pacific
Community
—
Communauté
du Pacifique

SOUTH PACIFIC FORM SEVEN CERTIFICATE [SPFSC]

AGRICULTURAL SCIENCE PRESCRIPTION

GENERAL INFORMATION

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SOUTH PACIFIC FORM SEVEN CERTIFICATE

AGRICULTURAL SCIENCE

Contents

1.	Preamble	4
2.	Aims.....	4
3.	Objectives	5
4.	Content Components.....	5
5.	Unpacking Learning Outcomes.....	6
6.	LEARNING OUTCOMES	7
	Strand 1: Primary Production [External Assessment].....	7
	Sub-strand 1.1 Market Opportunities in Primary Production.....	7
	Sub-strand 1.2 Market Controls in Primary Production.....	9
	Sub-strand 1.3: Processing of a Primary Product (Internal Assessment)	11
	Strand 2: Sustainable Primary Production [External Assessment]	12
	Sub-strand 2.1: Analysis of Management Practices for Sustainable Primary Production	12
	Sub-strand 2.2: Husbandry/ Agronomy Practices	13
	Sub-strand 2.3: Global Issues Affecting Primary Production	14
	Strand 3: Production management [External Assessment]	15
	Sub-strand 3.1: Schedule of Operations in Primary Production	15
	Sub-strand 3.2: Factors Influencing Schedule of Operations	17
	Sub-strand 3.3: Analysis of Agricultural Production (Internal Assessment).....	19
7.	Assessment	19
	Assessment Blueprint	20
	External Assessment.....	20
	Internal Assessment	20
	Task 1: Practical Investigation (SS total = 15)	21
	Task 2: The Case Study (SS total = 15).....	22
8.	Appendices	24
	Appendix 1: Assessment Criteria for IA Task 1: Practical Investigation (SS Total = 15)	24
	Appendix 2: Assessment Criteria for IA task 2: Case Study (SS Total = 15)	25
	Internal Assessment Summary Form.....	26
9.	Advisory Section	27
	Practical Investigation	27

Investigation Guidelines.....	28
Case Study Guidelines	32
Useful References.....	34
Other Support Materials	35
Glossary.....	36

AGRICULTURAL SCIENCE

1. Preamble

This prescription defines the requirements for the South Pacific Form Seven Certificate Agricultural Science examination.

Each of the student outcomes for the course is to be read in conjunction with the Explanatory Notes given for each outcome in this prescription.

Students also require knowledge and understanding of outcomes from the national Year 12 or an equivalent certificate, which are related to the specific outcomes of this prescription.

This prescription is derived from the New Zealand University Entrance, Bursaries and Scholarships Agricultural and Horticultural Science as well as the NCEA Level 3 Agricultural and Horticultural Science Achievement Standards as published by NZQA.

The course is designed for students within the Pacific Islands who may undertake further studies in a tertiary institution as well as for those students who will complete their formal education at the end of Form 7.

2. Aims

This course of study in applied agriculture is designed to stimulate student interest in, and an enjoyment of, primary production in agriculture. This will be achieved by:

- understanding the relationships between consumer requirements and sustainable primary production;
- recognising and understanding the biological, environmental and economic principles involved in the production of marketable primary produce, and to apply these principles to selected examples;
- recognizing and understanding the value and importance of sustainable primary production principles to the Pacific Islands; understanding the regulatory controls that affect primary production; applying scientific methods in local field and laboratory studies of selected types of primary production;
- fostering a continuing interest in primary production and an awareness of the diversity of vocational opportunities.

3. Objectives

On completing this course of study students will be expected to:

- have a knowledge of the ways in which biological, environmental and economic factors can be manipulated to affect the sustainable production and supply of primary products to the consumer;
- have an understanding of the ways in which market forces determine the supply and quality of primary products;
- have a knowledge of the ways management and decision-making can influence the production and supply of primary products to the consumer at a profit;
- apply scientific methods to problems related to primary production conduct independent and cooperative investigations;
- make independent and logical decisions;
- communicate information logically, appropriately and accurately.

4. Content Components

The course content consists of the following five strands and Sub strands:

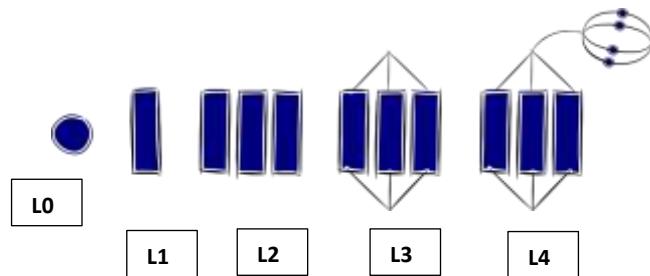
Strand Number	Strand Title	Sub strand number	Sub-strand title
1.	Primary production	1.1	Market opportunities
		1.2	Market controls
		1.3	Processing of a Primary Product
2.	Sustainable primary production	2.1	Analysis of Management Practices
		2.2	Husbandry/ Agronomy Practices
		2.3	Global issues affecting primary production
3.	Production management	3.1	Schedule of Operations
		3.2	Factors influencing Schedule of Operations
		3.3	Analysis of Agricultural Production

It is expected that examples of local plants and animals will be used to meet the outcomes of this course. Suggestions for suitable plants and animals are given in the Advisory Section.

5. Unpacking Learning Outcomes

In this prescription, Learning Outcomes are stated at three levels of generality: Major Learning Outcomes (MLOs) are stated at the strand level, Key Learning Outcomes (KLOs) are stated at the sub-strand level, and Specific Learning Outcomes (SLOs) are unpacked from the Key Learning Outcomes. Each SLO is a combination of a cognitive skill and a specific content component. Each SLO is given a skill level, level 1 – 4, and this skill level results from the categorisation of the cognitive skill that is embedded in the SLO using the SOLO taxonomy¹.

The SOLO taxonomy provides a simple, reliable and robust model for three levels of understanding – surface deep and conceptual (Biggs and Collis 1982).



At the **prestructural** level (L0) of understanding, the task is inappropriately attacked, and the student has missed the point or needs help to start. The next two levels, unistructural and multistructural are associated with bringing in information (surface understanding). At the **unistructural** level (L1), one aspect of the task is picked up, and student understanding is disconnected and limited. The jump to the multistructural level is quantitative. At the **multistructural** level (L2), several aspects of the task are known but their relationships to each other and the whole are missed. The progression to relational and extended abstract outcomes is qualitative. At the **relational** level (L3), the aspects are linked and integrated, and contribute to a deeper and more coherent understanding of the whole. At the **extended abstract** level (L4), the new understanding at the relational level is re-thought at another conceptual level, looked at in a new way, and used as the basis for prediction, generalisation, reflection, or creation of new understanding (adapted from Hook and Mills 2011).

[[http://pamhook.com/solo-taxonomy/..](http://pamhook.com/solo-taxonomy/)]

The progression from Level 1 to Level 4 is exemplified in the progression from *define* → *describe* → *explain* → *discuss* with each succeeding level indicating a *higher level of understanding*, as follows:

- **define** – to state a basic definition of a concept [Unistructural or L1]
- **describe** – to give the characteristics of, or give an account of, or provide annotated diagrams. [Multistructural or L2]
- **explain** – to provide a reason for a relationship – an event and its impact, a cause and an effect, as to *how* or *why* something occurs. [Relational or L3]
- **discuss** – this means *linking biological ideas* (descriptions, explanations) to make generalisations or predictions or evaluations. It may involve relating, comparing, analysing, and justifying.

¹ Structure of Observed Learning Outcomes by Biggs and Collis (1982)

6. LEARNING OUTCOMES

Strand 1: Primary Production [External Assessment]

Major Learning Outcome 1: Students are able to examine local and export primary production and analyse the influence of market controls.

In meeting this outcome students are expected to consider primary production in general and use specific examples where relevant.

Sub-strand 1.1 Market Opportunities in Primary Production

Key Learning Outcome 1.1 Students are able to demonstrate understanding of the range of local and export market opportunities and match these with primary products.

SLO N°	SPECIFIC LEARNING OUTCOMES	SKILL LEVEL	SLO CODE
1	Define seasonality in terms of primary production	1	agr1.1.1.1
2	Describe/graph the effects of seasonality on supply and demand in primary production	2	agr1.1.2.1
3	Explain how effects of seasonality influences the supply and demand in primary production	3	agr1.1.3.1
4	Discuss and recommend ways of managing the effects of seasonality on supply and demand in primary production	4	agr1.1.4.1
5	Define competition from imports in terms of primary production	1	agr1.1.1.2
6	Describe the effects of competition from imports on primary production	2	agr1.1.2.2
7	Explain how competition from imports influences primary production	3	agr1.1.3.2
8	Discuss and recommend ways of managing the effects of competition from imports on primary production	4	agr1.1.4.2
9	List market quality requirements in primary production	2	agr1.1.2.3
10	Describe the effects of market quality requirements on primary production	2	agr1.1.2.4
11	Explain how market quality requirements influence primary production	3	agr1.1.3.3
12	Discuss and recommend ways of managing the effects of market quality requirements on primary production	4	agr1.1.4.3
13	Define market access in terms of primary production	1	agr1.1.1.3
14	State the effects of market access on primary production	1	agr1.1.1.4
15	Explain how market access influences primary production	3	agr1.1.3.11
16	Discuss and recommend ways of managing the effects of market access on primary production	3	agr1.1.3.4
17	Define product storage/ shelf life in relation to primary production	1	agr1.1.1.5
18	Describe the effects of product storage/shelf life on primary production	2	agr1.1.2.6
19	Explain how product storage/shelf life influences primary production	3	agr1.1.3.5

20	Discuss and recommend ways of managing the influence of product storage/shelf life on primary production	4	agr1.1.4.4
21	State transport methods used in relation to primary production	1	agr1.1.1.6
22	Describe the effects of transport methods used on primary production	2	agr1.1.2.7
23	Explain how transport methods used influence primary production	3	agr1.1.3.6
24	Discuss and recommend ways of managing the influence of transport methods on primary production	4	agr1.1.4.5
25	State the market channels available in relation to primary production	1	agr1.1.1.7
26	Describe the effects of available market channels on primary production	2	agr1.1.2.8
27	Explain how the available market channels influence primary production	3	agr1.1.3.7
28	Discuss and recommend ways of managing the influence of market channels on primary production	4	agr1.1.4.6
29	Identify marketing systems in operation	2	agr1.1.2.9
30	Describe risks of marketing systems in operation	2	agr1.1.2.10
31	Describe the range of products produced for local markets	2	agr1.1.2.11
32	Identify the factors affecting supply of primary products by producers	2	agr1.1.2.12
33	Describe the influences that affect the range of products produced for local markets	2	agr1.1.2.13
34	Discuss and recommend ways of managing the influence of supply and demand on primary production	4	agr1.1.4.7
35	Describe the primary product changes during the year	2	agr1.1.2.14
36	Illustrate the primary product changes during the year	2	agr1.1.2.15
37	Explain the reasons for primary product changes during the year	3	agr1.1.3.8
38	Discuss and recommend ways of managing the effects of primary product changes during the year on export returns	4	agr1.1.4.8
39	Describe the market opportunities available for local primary products.	2	agr1.1.2.16
40	Match the range of local market opportunities available to selected primary products	2	agr1.1.2.17
41	State where primary products are marketed	1	agr1.1.1.8
42	Explain how needs of people and future prospects influence primary production	3	agr1.1.3.9
43	Explain how needs of people and future prospects influence primary production	3	agr1.1.3.10
44	Discuss and recommend ways of managing the needs of people and future prospects on primary production	4	agr1.1.4.9

Sub-strand 1.2 Market Controls in Primary Production

Key Learning Outcome 1.2 Students are able to demonstrate understanding of how market controls affect local and export primary production.

SLO N°	SPECIFIC LEARNING OUTCOMES	SKILL LEVEL	SLO CODE
1	Identify biosecurity regulations that are relevant to primary production	1	agr1.2.1.6
2	Describe the requirements of each biosecurity regulation that is relevant to primary production	2	agr1.2.2.2
3	Describe the effects of import/export controls and regulations on local primary production	2	agr1.2.2.3
4	Explain how import/export controls and regulations affect local primary production	3	agr1.2.3.1
5	Discuss and recommend ways to manage the impact of import/export controls and regulations on local primary production	4	agr1.2.4.1
6	Name grower organisations that exist for local primary products	1	agr1.2.1.1
7	Describe the effects of grower organisations on local primary production	2	agr1.2.2.4
8	Explain how grower organisations affect local primary production	3	agr1.2.3.2
9	Discuss and recommend ways to manage the influence of grower organisations on local primary production	4	agr1.2.4.2
10	Describe the effects of marketing organisations on local primary production	2	agr1.2.2.5
11	Explain how marketing organisations affect local primary production	3	agr1.2.3.3
12	Discuss and recommend ways to manage the influence of marketing organisations on local primary production	4	agr1.2.4.3
13	Name the regional/ international trade agreements that apply to local production	1	agr1.2.1.2
14	Describe the effects of trade agreements e.g. WTO, PICTA, bilateral trade agreements on local primary production	2	agr1.2.2.6
15	Explain how trade agreements e.g. WTO, PICTA, bilateral trade agreements affect local primary production	3	agr1.2.3.4
16	Discuss and recommend ways of managing the impact of trade agreements e.g. WTO, PICTA, bilateral trade agreements on local primary production	4	agr1.2.4.4
17	Describe the effects of local/national controls/regulations/policy on local primary production	2	agr1.2.2.7
18	Explain how local/national controls/regulations/policy affect local primary production	3	agr1.2.3.5
19	Discuss and recommend ways of managing the impact of local/national controls/regulations/policy on local primary production	4	agr1.2.4.5
20	Describe the effects of biosecurity regulations e.g. quarantine, on export primary production	2	agr1.2.2.8

21	Explain how biosecurity regulations e.g. quarantine, affect local primary production	3	agr1.2.3.6
22	Discuss and recommend ways of managing the influence of biosecurity regulations e.g. quarantine on export primary production	4	agr1.2.4.6
23	Name the regional/ international trade agreements that apply to export primary production	1	agr1.2.1.3
24	Describe the nature of trade agreements e.g. WTO, PICTA, bilateral trade agreements that apply to export primary production	2	agr1.2.2.9
25	Explain how trade agreements e.g. WTO, PICTA, bilateral trade agreements affect export primary production	3	agr1.2.3.7
26	Discuss and recommend ways to manage the impact of trade agreements e.g. WTO, PICTA, bilateral trade agreements on export primary production	4	agr1.2.4.7
27	Describe the effects of import/export controls and regulations on export primary production	2	agr1.2.2.10
28	Explain how export/national controls/regulations/policy affect export primary production	3	agr1.2.3.8
29	Discuss and recommend ways to manage the impact of export/national controls/regulations/policy on export primary production	4	agr1.2.4.8
30	Name grower organisations that exist for export primary products	1	agr1.2.1.4
31	Describe the effects of grower organisations on export primary production	2	agr1.2.2.11
32	Explain how grower organisations affect export primary production	3	agr1.2.3.9
33	Discuss and recommend ways to manage the influence of grower organisations on export primary production	4	agr1.2.4.9
34	Name marketing organisations that exist for export primary products	1	agr1.2.1.5
35	Describe the effects of marketing organisations on export primary production	2	agr1.2.2.12
36	Explain how marketing organisations affect export primary production	3	agr1.2.3.10
37	Discuss and recommend ways to manage the influence of marketing organizations on export primary production	4	agr1.2.4.10

Sub-strand 1.3: Processing of a Primary Product (Internal Assessment)

Key Learning Outcome 1.3: Students are able to demonstrate understanding and skills in investigating how a primary product is processed in the community.

SLO N°	SPECIFIC LEARNING OUTCOMES	SKILL LEVEL	SLO CODE
1.	State aim/purpose of the investigation	1	Agr1.3.1.1
2.	State question to be answered by the investigation	1	Agr1.3.1.2
3.	State the rationale of the investigation	1	Agr1.3.1.3
4.	State background information related to the investigation	1	Agr1.3.1.4
5.	State the hypothesis of the investigation	1	Agr1.3.1.5
6.	State the independent variable	1	Agr1.3.1.6
7.	State the dependent variable	1	Agr1.3.1.7
8.	Describe the dependent and independent variables	2	Agr1.3.2.1
9.	Describe the test for each variable	2	Agr1.3.2.2
10.	Describe the method to be used in the investigation	2	Agr1.3.2.3
11.	Collect wide range of information	2	Agr1.3.2.4
12.	Collect appropriate quantitative data	2	Agr1.3.2.5
13.	Organise and present data in meaningful form	2	Agr1.3.2.6
14.	Describe control experiment	2	Agr1.3.2.7
15.	Run test trial to determine the range of the independent variable or the best way to measure the effect on the dependent variable	2	Agr1.3.2.8
16.	Explain why the method to be used is selected	3	Agr1.3.3.1
17.	Maintain a logbook of all work carried out in the investigation	3	Agr1.3.3.2
18.	Process data with use of tables and graphs	2	Agr1.3.2.9
19.	Calculate required values using data from investigation	2	Agr1.3.2.10
20.	Analyse data to highlight relationship between variables	3	Agr1.3.3.8
21.	Interpret processed data to show trends, relationships and patterns	3	Agr1.3.3.3
22.	Discuss the relationship of the results to the background information	4	Agr1.3.4.4
23.	Draw conclusion that is relevant to the data and linked back to hypothesis	3	Agr1.3.3.5
24.	List bibliography/ references / acknowledgements	2	Agr1.3.2.12
25.	Evaluate findings in terms of reliability and validity of results and suggest improvements	4	Agr1.3.4.1
26.	Evaluate findings in terms of limitations and difficulties encountered in the investigation and suggest solutions for improvement	4	Agr1.3.4.2
27.	Evaluate the significance of findings in relation to the aspect of the production process studied	4	Agr1.3.4.3
28.	Acknowledge sources of information using appropriate referencing methods	3	Agr1.3.3.6
29.	Communicate the results of the investigation	3	Agr1.3.3.7

Strand 2: Sustainable Primary Production [External Assessment]

Major Learning Outcome 2: Students are able to analyse primary production practices that ensure sustainable primary production

In meeting this outcome students are expected to consider the use of selected primary production practices and illustrate these with specific primary products where relevant.

Sub-strand 2.1: Analysis of Management Practices for Sustainable Primary Production

Key Learning Outcome 2.1: Students are able to demonstrate understanding of how management practices are used to maintain sustainable production.

SLO No	SPECIFIC LEARNING OUTCOMES	SKILL LEVEL	SLO CODE
1	Name management practices that are used in primary production	1	agr2.1.1.1
2	Define the term sustainable production	1	agr2.1.1.2
3	Identify waste management practices used to maintain sustainable production	1	agr2.1.1.3
4	Identify genetic resource management practices used to maintain sustainable production	1	agr2.1.1.4
5	Describe the key features of specific management practices that contribute to maintaining sustainable production	2	agr2.1.2.1
6	Explain how management practices contribute to maintaining sustainable production	3	agr2.1.3.1
7	Evaluate how a particular management practice contributes to maintaining sustainable production and suggest ways of improvement.	4	agr2.1.4.1
8	Describe the features of soil management practices used in maintaining sustainable production	2	agr2.1.2.2
9	Explain how soil management practices maintain sustainable production	3	agr2.1.3.2
10	Discuss the advantages of soil management practices and suggest ways of improving sustainable production	4	agr2.1.4.2
11	Describe the features of water management practices are used to maintain sustainable production	2	agr2.1.2.3
12	Explain how water management practices are used to maintain sustainable production	3	agr2.1.3.6
13	Describe how water management practices are used to maintain sustainable production	2	agr2.1.2.4
14	Discuss and recommend ways to improve water management practices to enhance sustainable production	4	agr2.1.4.3
15	Describe the features of waste management practices used to maintain sustainable production	2	agr2.1.2.5
16	Explain how waste management practices are used to maintain sustainable production	3	agr2.1.3.3
17	Discuss the benefits of and suggest improvements to waste management practices used to maintain sustainable production	4	agr2.1.4.4

18	Describe features of labour availability or requirements related to sustainable production	2	agr2.1.2.6
19	Explain how labour availability issues impact sustainable production	3	agr2.1.3.4
20	Discuss how labour availability issues can be resolved and suggest suitable strategies to enhance sustainable production	4	agr2.1.4.5
21	Describe the features of genetic resource practices management used to maintain sustainable production	2	agr2.1.2.7
22	Explain how genetic resource management is used to maintain sustainable production	3	agr2.1.3.5
23	Discuss the advantages and disadvantages of genetic resource management and propose a sustainable production plan that is suited to the situation.	4	agr2.1.4.6

Sub-strand 2.2: Husbandry/ Agronomy Practices

Key Learning Outcome 2.2: Students are able to demonstrate understanding of how husbandry/agronomy practices ensure the capability of long term primary production.

SLO N°	SPECIFIC LEARNING OUTCOMES	SKILLS LEVEL	SLO CODE
1	Name the key issues affecting long term primary production	1	agr2.2.1.1
2	Describe the nature of pests, diseases and weeds that need to be controlled in long term primary production	2	agr2.2.2.1
3	Describe the control mechanism used for each pest, disease and weeds in primary production	2	agr2.2.2.2
4	Explain how pest, disease and weed control measures used are suited to the problems they are meant to deal with in enhancing long term primary production	3	agr2.2.3.1
5	Discuss the issues of pest, disease and weed control and recommend viable and sustainable alternatives that ensure the capability of long term primary production	4	agr2.2.4.1
6	Describe the practice of crop rotation cultivation in long term primary production	2	agr2.2.2.3
7	Explain how crop rotation cultivation ensures the capability of long term primary production	3	agr2.2.3.2
8	Discuss the advantages and disadvantages of crop rotation cultivation and recommend cost-effective ways of ensuring the capability of long term primary production	4	agr2.2.4.2
9	Describe the steps in fertiliser/feed application in ensuring the capability of long term primary production	2	agr2.2.2.4
10	Explain how fertiliser/feed application ensure the capability of long term primary production	3	agr2.2.3.3
11	Discuss the advantages and disadvantages of fertiliser/feed application and suggest with reasons more sustainable alternatives that ensure the capability of long term primary production	4	agr2.2.4.3
12	Describe the ways in which hygiene ensures the capability of long term primary production	2	agr2.2.2.6

13	Assess the cost-effectiveness of hygiene practices that ensure the capability of long term primary production	3	agr2.2.3.4
14	Justify the choice of particular hygiene practices and provide evidence to support its effectiveness in ensuring the capability of long term primary production	4	agr2.2.4.4
15	Describe the key features of genetic selection in ensuring the capability of long term primary production	2	agr2.2.2.7
16	Explain how genetic selection contributes to enhancing capability of long term primary production	3	agr2.2.3.5
17	Discuss how genetic selection ensures the capability of long term primary production and provide a strategy that enhances the advantages while minimising the disadvantages.	4	agr2.2.4.5
19	Describe the merits of using certified seeds to ensure the capability of long term primary production	2	agr2.2.2.8
20	Explain how certified seeds ensure the capability of long term primary production	3	agr2.2.3.6
21	Discuss the comparative advantage of using certified seeds and suggest ways to resolve issues related to long-term usage of seeds in long term primary production	4	agr2.2.4.6

Sub-strand 2.3: Global Issues Affecting Primary Production

Key Learning Outcome 2.3: Students are able to demonstrate understanding of how global agricultural issues affect local primary production.

SLO N°	SPECIFIC LEARNING OUTCOMES	SKILL LEVEL	SLO CODE
1	Identify invasive species that affect local primary production	1	agr2.3.1.1
2	Describe the problems caused by invasive species for local primary production	2	agr2.3.2.1
3	Analyse how invasive species affect local primary production	3	agr2.3.3.1
4	Describe the nature of biodiversity and genetic resource conservation and sustainable use in relation to local primary production	2	agr2.3.2.2
5	Explain how biodiversity and genetic resource conservation and sustainable use enhances local primary production	3	agr2.3.3.2
6	Discuss and recommend ways to minimise the disadvantages of biodiversity and genetic resource conservation and sustainable use in local primary production	4	agr2.3.4.1
7	Describe the effects of introduction of new species on local primary production	2	agr2.3.2.3
8	Assess the advantages and disadvantages of the introduction of new species in local primary production	3	agr2.3.3.3
9	Discuss and recommend ways of minimising the negative impact of new species in local primary production	4	agr2.3.4.2
10	Define genetic engineering as related to local primary production	1	agr2.3.1.3
11	Describe the features of genetic engineering used in local primary production	2	agr2.3.2.5

12	Assess the advantages and disadvantages of genetic engineering in local primary production	3	agr2.3.3.4
13	Discuss and recommend viable alternatives to genetic engineering in local primary production	4	agr2.3.4.3
	State the features of organic husbandry in local primary production	1	agr2.3.1.4
14	Describe the features of organic husbandry in local primary production	2	agr2.3.2.4
15	Explain how organic husbandry contributes to local primary production	3	agr2.3.3.5
16	Discuss the factors that influence the application of organic husbandry and suggest ways of maximising the benefits for local primary production	4	agr2.3.4.4
17	Name the main types of pollution that affect local primary production	1	agr2.3.1.5
18	Describe how a specific type of pollution affects local primary production	2	agr2.3.2.8
19	Describe control mechanisms used to deal with specific pollution problems in local primary production.	2	agr2.3.2.9
20	Analyse the advantages and disadvantages of each pollution control mechanisms	3	agr2.3.3.6
21	Recommend with reasons the most cost-effective pollution control for different pollution problems	4	agr2.3.4.5
22	List global agricultural issues facing local primary production	2	agr2.3.2.10
23	Describe actions taken to prevent or minimise the negative influence of global agricultural issues.	2	agr2.3.2.11
24	Compare the strength and weakness of specific actions taken to prevent the negative influence of global agricultural issues	3	agr2.3.3.7
25	Recommend with reasons your choice of action to be taken to prevent the negative influence of specific global agricultural issues	4	agr2.3.4.6

Strand 3: Production management [External Assessment]

Major Learning Outcome 3: Students are able to demonstrate understanding of production management of a locally produced animal primary product and of a locally produced plant primary product.

In meeting this outcome students are expected to study in depth one specific animal, and one specific plant, that each produce local and/or export primary product(s). Both the animal and the plant should be available to the students and are able to be grown/studied during the teaching period.

Sub-strand 3.1: Schedule of Operations in Primary Production

Key Learning Outcome 3.1: Students are able to demonstrate understanding of the steps in the schedule of operations.

SLO Nº	SPECIFIC LEARNING OUTCOMES	SKILL LEVEL	SLO CODE
1	Name a management practice in production management	1	agr3.1.1.1
2	State the key difference between one management practice from another	1	agr3.1.1.2
3	State/identify a particular management practice used in the production process of selected primary product	1	agr3.1.1.3
4	Name a post-harvesting process.	1	Agri3.1.1.5
5	Describe a particular management practice used in the production process of selected primary product	2	agr3.1.2.13
6	Describe the process of site selection as a step in the schedule of operations	2	agr3.1.2.1
7	Describe the desirable outcomes in site selection within the schedule of operations	2	agr3.1.2.14
8	Explain how a selected site meets the requirements for site selection within the schedule of operations	3	agr3.1.3.2
9	Discuss the significance of site selection as a step in the schedule of operations and suggest ways of improving a selected site that does not meet particular requirements	4	agr3.1.4.1
10	Describe management practices that must be carried out throughout the management period	2	agr3.1.2.2
11	Compare different management practices carried out throughout the management period in terms of their effectiveness	3	agr3.1.3.3
12	Discuss the effectiveness of a management practice and recommend strategies for improvement. Justify your recommendations.	4	agr3.1.4.2
13	Describe the importance of timing in production management	2	agr3.1.2.3
14	Explain how timing of management practice enhances productivity in animal/plant product	3	agr3.1.3.4
15	Explain why one management practice contributes more to production of animal/plant product than another	3	agr3.1.3.5
16	Describe what cultivar/breed selection is as a step in the schedule of operations	2	agr3.1.2.4
17	Explain the significance of cultivar/breed selection production management	3	agr3.1.3.6
18	Discuss the implications of cultivar/ breed selection on the biodiversity of animal/ plants concerned and recommend appropriate strategies for minimising the negative impacts	4	agr3.1.4.3
19	Describe post-harvest processes, including: quality control/grading and sorting; packaging and handling; storage as steps in the schedule of operations	2	agr3.1.2.5
20	Explain the significance of post-harvest processes (quality control/grading and sorting; packaging and handling; storage) in the schedule of operations	3	agr3.1.3.7
21	Assess the contribution of post-harvest processes (quality control/grading and sorting; packaging and handling; storage) to production quality and suggest ways of minimising negative impacts	4	agr3.1.4.4

22	Describe what planting material availability means as a step in the schedule of operations	2	agr3.1.2.6
23	Explain the significance of planting material availability as a step in the schedule of operations	3	agr3.1.3.8
24	Discuss the impact of various levels of availability of planting material and suggest optimal conditions for production	4	agr3.1.4.5
25	Identify/describe the establishment process (soil/crop preparation; planting/rearing) as a step in the schedule of operations	2	agr3.1.2.7
26	Describe the significance of the establishment process (including: soil/crop preparation; planting/rearing) as a step in the schedule of operations	2	agr3.1.2.8
27	Explain the significance of management (e.g. irrigation/water; pest and disease control; weed control; fertility/nutrition; light/temperature) as a step in the schedule of operations	3	agr3.1.3.13
28	Discuss and recommend optimal conditions for the establishment process (including: soil/crop preparation; planting/rearing) as a step in the schedule of operations	4	agr3.1.4.9
29	Discuss and recommend optimal conditions for management (e.g. irrigation/water; pest and disease control; weed control; fertility/nutrition; light/temperature) as a step in the schedule of operations	4	agr3.1.4.10
30	Describe management practice (e.g. irrigation/water; pest and disease control; weed control; fertility/nutrition; light/temperature) as a step in the schedule of operations	2	agr3.1.2.10
31	Identify harvest/slaughter timing and method as a step in the schedule of operations	1	agr3.1.1.4
32	Describe harvest/slaughter timing and method as a step in the schedule of operations	2	agr3.1.2.11
33	Explain the significance of harvest/slaughter timing and method as a step in the schedule of operations	3	agr3.1.3.11
34	Discuss and recommend optimal conditions for harvest/slaughter timing and method as a step in the schedule of operations	4	agr3.1.4.6
35	Describe marketing as a step in the schedule of operations	2	agr3.1.2.12
36	Explain the significance of marketing as a step in the schedule of operations	3	agr3.1.3.12
37	Discuss and recommend optimal conditions for marketing as a step in the schedule of operations	4	agr3.1.4.7

Sub-strand 3.2: Factors Influencing Schedule of Operations

Key Learning Outcome 3.2 Students are able to demonstrate understanding of how specific factors influence selected steps of the schedule of operations. Each factor needs to be considered against at least one step of the schedule of operations.

SLO Nº	SPECIFIC LEARNING OUTCOMES	SKILL LEVEL	SLO CODE
1	Name a factor that influences the schedule of operations in production	1	agr3.2.1.1

2	List factors that influence the schedule of operations in production	2	agr3.2.2.1
3	Describe the influence of the land availability factor on a particular step in the schedule of operations	2	agr3.2.2.2
4	Assess the effect that a particular land availability issue has on the schedule of operations	3	agr3.2.3.1
5	Evaluate the impact of land availability issues on the schedule of operation and suggest ways of minimising the effects	4	agr3.2.4.1
6	Describe recent technological development in the factors that influence steps in the schedule of operation in plant production	2	agr3.2.2.3
7	Describe the effect technology has on various steps in the schedule of operation in plant production	2	agr3.2.2.4
8	Explain how technology influences specific steps in the schedule of operation in plant production	3	agr3.2.3.2
9	Evaluate the impact of technology on specific steps in the schedule of operation and suggest ways of improving use of technology in plant production	4	agr3.2.4.2
10	Define market demand	1	agr3.2.1.3
11	Name an example of a primary product	1	agr3.2.1.4
12	Name an example of a secondary product	1	agr3.2.1.5
13	Give examples of primary and/or secondary products	2	agr3.2.2.5
14	List the advantages of increasing international markets to local producers	2	agr3.2.2.6
15	Describe how capital influence steps in the schedule of operation	2	agr3.2.2.7
16	Explain how capital influences various steps in the schedule of operation	3	agr3.2.3.3
17	Evaluate how capital influences various steps in the schedule of operation and suggest ways of maximising return for capital invested in the various steps	4	agr3.2.4.3
18	Describe the effect of market demand in plant production	2	agr3.2.2.8
19	Describe the influence of market demand on the various steps in the schedule of operation	2	agr3.2.2.9
20	Explain how market demand influences various steps in the schedule of operation	3	agr3.2.3.9
21	Evaluate how market demand influences steps in the schedule of operations and suggest ways of effectively responding to market demand	4	agr3.2.4.4
22	Describe the effect on yield of various steps in the schedule of operation	2	agr3.2.2.10
23	Explain how yield is influenced by conditions in the various steps in the schedule of operation	3	agr3.2.3.4
24	Evaluate how yield is influenced by various steps in the schedule of operation and suggest ways of improving yield	4	agr3.2.4.5
25	Describe the issues in labour availability in production	2	agr3.2.2.11
26	Explain how labour availability issues influence the various steps in the schedule of operation	3	agr3.2.3.5
27	Evaluate how labour availability influences different steps in the schedule of operation and suggest ways of minimising its impact on production	4	agr3.2.4.6
28	Identify the steps in the schedule of operation that would benefit most from specialist/technical information/advice	2	agr3.2.2.12
29	Illustrate how specialist/technical information/advice would benefit steps in the schedule of operation	3	agr3.2.3.6
30	Evaluate the benefits of specialist/technical information/advice on various steps in the schedule of operation and recommend options for enhanced and cost-effective production.	4	agr3.2.4.7

31	Explain the relationship between profitability (farm production function/marginal analysis) and the various steps in the schedule of operation in animal production.	3	agr3.2.3.7
32	Explain how profitability (farm production function/marginal analysis) is influenced by various steps in the schedule of operation in animal production.	3	agr3.2.3.8
33	Analyse how profitability (farm production function/marginal analysis) is influenced by various steps in the schedule of operation in animal production and suggest optimal conditions for profitability.	4	agr3.2.4.8

Sub-strand 3.3: Analysis of Agricultural Production (Internal Assessment)

Key learning Outcome 3.3: Students are able to demonstrate understanding and skills in analyzing case studies involving the management of a product

SLO N°	SPECIFIC LEARNING OUTCOMES	SKILL LEVEL	SLO CODE
1.	State purpose of the case study	1	Agr3.3.1.1
2.	Formulate a question for investigation	1	Agr3.3.1.2
3.	Collect agricultural information from primary or secondary sources	1	Agr3.3.1.3
4.	Present relevant information for the study from primary sources	2	Agr3.3.2.1
5.	Present relevant information for the study from secondary sources	2	Agr3.3.2.2
6.	Process data/ information to show trends, relationships or patterns	2	Agr3.3.2.3
7.	Explain trends, relationships or patterns to address the purpose of the study	3	Agr3.3.3.2
8.	Calculate required values using data from the study	2	Agr3.3.2.4
9.	Interpret and present ideas gathered from the case study	3	Agr3.3.3.3
10.	Compare case study results and agricultural standards	3	Agr3.3.3.4
11.	Acknowledge sources of information using appropriate referencing	2	Agr3.3.2.5
12.	Evaluate findings in terms of purpose of the study	4	Agr3.3.4.1

7. Assessment

The assessment of the Agricultural Science course has two components (external and internal assessment).

1	External Assessment:	70%
2	Internal Assessment:	30%

The School Principal, or his/her nominee, will certify that the prescription requirements have been fulfilled.

Assessment Blueprint

The assessment blueprint for Agriculture Studies is given below. The weighting for each strand and skill level is to be noted as these will be adhered to for assessment.

Strand	Assessment Type	SKILL LEVEL/ SCORE				Weight
		1	2	3	4	
1. Primary production	EA					15
	IA					15
2. Sustainable Primary Production	EA					22
3. Production Management	EA					33
	IA					15
Total number of items		20	15	10	5	50
Total skill score		20	30	30	20	100

External Assessment

This will be a **three-hour written examination**, with a total of 70, which will assess the following strands:

- | | |
|-----------------------------------|-------|
| 1. Primary Production | (15%) |
| 2. Sustainable Primary Production | (22%) |
| 3. Production Management | (33%) |

Questions may require students to give objective, sentence or short paragraph answers or to draw and interpret diagrams, tables and graphs, or complete calculations. Questions may be resource based; some questions will require reference to specific plants or animals studied during the year.

All questions are COMPULSORY.

Internal Assessment

The internal assessment will focus on Sub-strands 1.3 and 3.3 as follows:

- | | |
|--|-------|
| Practical investigation (Sub-strand 1.3) | (15%) |
| Case study (Sub-strand 3.3) | (15%) |

a) Practical Investigation

- The investigation must be carried out independently.
- Students must maintain a logbook that should be submitted together with the completed report.
- The investigation must produce quantitative data and use simple statistical procedures (e.g. mean, standard deviation).
- A list of suggested topics is provided in the Advisory Section (students are not restricted to these topics).
- Assessment will be made using the criteria specified in the Scoring Rubric for Task 1: Practical Investigation in the Appendix.

b) Case Study

It is expected that the case study would require about 6 - 8 hours of class time. A list of suggested topics is provided in the Advisory Section (students are not restricted to these topics). Students need to have access to a range of sources of information on the topic. Assessment will be made using the criteria specified in the Assessment Schedule: *Case Study* in the Appendix.

Task 1: Practical Investigation (SS total = 15)

Major Learning Outcome 4: Students are able to carry out and report on a practical investigation with guidance to determine the effect of altering one aspect of the production process for a primary product

The Specific Learning Outcomes that guide this task are listed in **Sub-strand 1.3**.

Explanatory Notes

1. An investigation is an activity covering the complete process from planning to reporting, and will involve students in the collection of primary quantitative and qualitative data.
2. Students will select a primary product, in consultation with the teacher, and investigate one aspect of the production process that influences the supply/demand/profitability of the primary product. (A possible structure for the investigation is provided in the Advisory Section.)
3. The investigation will be conducted with teacher guidance. This means the teacher is supporting the student throughout the investigation but the whole process is student driven. Teacher's support gives general information only e.g. broad questions, resource suggestions or possible new directions.
4. Students should be provided with the opportunity to undertake research into their primary product and some form of trialling or checking before developing their plan into a method.
5. At the completion of the investigation, students are required to produce a written research report. The report is to include:
 - a. Introduction: brief information on the plant or animal and its production process.
 - b. Hypothesis/Aim
 - c. Method used.
 - d. Results: Recorded observations, measurements and data. The data needs to be systematically recorded using tables and/or graphs. Processing of data is expected to involve use of simple statistical procedures.
 - e. Interpretation of processed data to show trends, relationships and patterns.
 - f. Conclusions relevant to data and linked back to the hypothesis.
 - g. Discussion of the relationship of the results to the background information

- and the experimental results.
- h. Evaluation of the investigation which considers:
- i. Validity and reliability of the results
 - ii. Limitations and difficulties encountered in the investigation and suggested solutions
 - iii. Significance of the findings in relation to the aspect of the production process being studied.
- i. Bibliography/references/acknowledgements.
6. Logbooks must be kept by all students and must contain all rough data and notes. Logbooks are a working record of all the work students do, and are used for authenticity. Logbooks should be regularly checked by the teacher. The logbook is a necessary component of this task. It must be checked regularly and then submitted together with the final report in order for the report to be assessed. A final report that is submitted without the log book should not be assessed.
7. Students are expected to have carried out formative work before attempting the practical investigation. The practical investigation is to be completed individually over a period of time e.g. 4 to 6 weeks. A typical time period would include 10 - 12 hours of classroom time. Students would also be expected to do work outside of school hours.

Task 2: The Case Study (SS total = 15)

Major Learning Outcome: By the end of this strand, students are able to complete and report on a study of a case; the case being a specific aspect of agricultural production.

The Specific Learning Outcomes that guide this task are detailed in **Sub-strand 3.3**

Explanatory Notes

1. Students are to complete one case study that is based on a specific aspect of agricultural production in the country.
2. Each case study will be conducted with teacher guidance. This means the teacher is supporting the student throughout the investigation but the whole process is student driven. Teacher's support gives general information only e.g. broad questions, resource suggestions or possible new directions.
3. The case study will focus on a specific aspect of agricultural production. This may include a judgement about the appropriateness or effectiveness of a practice or procedure. The judgement must be supported with referenced or quoted information from more than one secondary source.
4. Ideas for the Case Studies are given in the Advisory Section. The topic may be set by the teacher or agreed by negotiation with the student. The student is required to develop the question related to the topic.
5. The case study will be a structured written document that shows evidence of information gathering, information processing and interpretation.

6. In a case study, a student may collect and interpret information from secondary sources and from primary sources. Students are expected to appropriately record citations for their sources of information and must acknowledge these sources of information in their research report.
7. The case study is to be completed individually and would include about 6 - 8 hours of classroom time. Students would be expected to also do research and writing outside of school time.

8. Appendices

Appendix 1: Assessment Criteria for IA Task 1: Practical Investigation (SS Total = 15)

Item and SLO code	Skill Level 1	Skill Level 2	Skill Level 3	Skill Level 4
1. State the aim of the investigation Agr1.3.1.1	Aim is stated correctly			
2. State the hypothesis of the investigation Agr1.3.1.5	Hypothesis is stated correctly			
3. Describe the method Agr1.3.2.3	Method is outlined but not complete	Method is complete and accurate		
4. Process data into tables Agr1.3.2.9	Data tables not complete, or not all accurate	Data tables complete and accurate		
5. Interpret processed data Agr1.3.3.3	Data described in one line/idea	Data trends described but not related	Interpretations complete with good linking of relationships	
6. Evaluate findings Agr1.3.4.1	Findings listed in one line/idea	Findings are described but not related	Findings are related to interpretations and related to one of the following: validity, reliability and limitations, but no recommendation given	Findings are related to interpretations and related to two or more of the following: validity, reliability and limitations, and recommendation provided
7. List bibliography, references, acknowledgements Agr1.3.2.12	Only one reference or acknowledgement found in report	More than one source found in in-text and end of text reference list		

Note that the weight of the Practical investigation is 15% which is to be distributed among the skill levels as stipulated in the blueprint. Hence there should be 2 x Level 1, 3 x Level 2, 1 x Level 3 and 1 x Level 4 items included in this assessment. Although the investigation may involve more than these skills, only a combination of skills will be included in the internal assessment score.

Appendix 2: Assessment Criteria for IA Task 2: Case Study (SS Total = 15)

Item and SLO code	Skill Level 1	Skill Level 2	Skill Level 3	Skill Level 4
1. Purpose of the study Agr3.3.1.1	Purpose of the study is stated correctly			
2. Information from Primary sources Agr3.3.2.1	One relevant piece of information from a primary source is provided	More than one relevant piece of information from primary sources provided		
3. Information from Secondary sources Agr3.3.2.2	One relevant piece of information from a secondary source is provided	More than one relevant piece of information from secondary sources provided		
4. Process data for trends Agr3.3.2.3	Data tables are provided but trends are not shown	Data tables are complete and graphs given where necessary		
5. Calculate required values Agr3.3.2.4	One required value is calculated	More than one required value is calculated		
6. Explain trends Agr3.3.3.2	One relevant idea only is provided	A list of relevant ideas are provided but not linked to show trends	Linking of relevant ideas that show trends and causes or impacts are linked	
7. Interpret ideas gathered from the study Agr3.3.3.3	One main idea is given, but may just be repeated	A number of ideas are provided, but not well linked to data	Interpretations are linked well to data	

Note that the weight of the Case Study is 15% which is to be distributed among the skill levels as stipulated in the blueprint. Hence there should be 1 item in Level 1, 4 items in Level 2 and 2 items in Level 3 for this internal assessment. Although the case study may involve more than these skills, only a certain combination of skills will be included in the internal assessment score.

Appendix 3

AGR-IA

SOUTH PACIFIC FORM SEVEN CERTIFICATE

Internal Assessment Summary Form

AGRICULTURAL SCIENCE

Country: _____ School: _____

Task	Brief Description	Start Date	End Date	Weighting
1. Practical Investigation				15%
2. Case Study				15%
Total				30%
<i>List of topics for Case Study</i>				
1.				
2.				
3.				
4.				
5.				
6.				

- Note:**
1. Be specific about dates, not just Week 3 Term 1, etc.
 2. Assessment schedules for the 2 tasks are provided in the prescription. Teachers must use these.
 3. All IA Score Capture Sheets will be provided by EQAP to schools.

Teacher's Name and Signature:

Principal's Name and Signature:

A full IA program is to be submitted together with this IA Summary Form.

9. Advisory Section

Practical Investigation

Teacher Guidelines:

The following guidelines are supplied to enable teachers to carry out valid and consistent assessment.

This study is designed to be an investigation of a specific plant or animal.

This investigation requires students to:

Process information from background reading and observations to briefly describe relevant aspects of the production process for the plant or animal. This will form the introduction section of the student report and should be brief (about one page in length). It is not intended to be a major part of the study but to provide the background from which the student will select an aspect for further investigation.

Investigate in detail one particular aspect of the production process and determine the effectiveness of a manipulation. The manipulation needs to have an impact on the attributes of the primary product. Students should focus on one aspect of: *environment* e.g. wind, light, temperature, soil, space; *cultivar or breed selection*; *crop or livestock production techniques* e.g. fertiliser rates, pasture composition, fruit thinning, grazing or planting density, pest or disease control; *post-harvest* e.g. chemical treatment, storage, heat treatment, drying method

Students are required to keep a logbook in which all ideas, rough notes, brainstorming, possible investigations, collection of data and observations, research and planning, failure, successes, tentative conclusions should be kept. It is a working document and its neatness is not important – its function is to record all findings and show the student's investigative skills.

It is from this that students will write the formal report and it will be used to ensure authenticity as well as support the students' final assessment for this achievement.

Suggested Plants and Animals

The following list contains suggestions only. Other plants or animals locally available can be used. Suggestions of other suitable plants or animals should be made to EQAP.

Plants

Vegetables: e.g. Beans, Peanuts, Cabbage, Tomatoes, Cucumber

Crops: e.g. Kumala (sweet potato), Maize, Squash

Non-food: e.g. Kava, Vanilla

Forestry

Animals

Meat: e.g. Beef, Poultry, Pork, Goat

Animal product: e.g. Poultry, Dairy

Marine/Aquatic

Any shellfish, Prawns, Fish (farmed), Crabs

Ideas for Investigation

The following list contains ideas that could be used or modified for the investigation. Teachers are free to use other ideas.

- a. The effect of plant spacing on the yield of a vegetable
- b. The effect of different rates/types of fertilisers on the yield of a plant Comparison of growth rates for different pasture species/cultivars Comparison of an animal's growth rate with different feeds
- c. Effect of stocking rate on production (eg milk volume, eggs)
- d. Effect of an aspect of housing on egg production
- e. Comparison of the moisture content of copra using different drying methods
- f. Comparison of storage life of taro under different conditions
- g. Effect of pruning on fruit size/yield
- h. Effect of different mulching practices on crop growth
- i. Comparison of the effect of different treatments on the propagation of cassava
- j. Comparison of the effectiveness of different pest or disease controls
- k. Comparison of fruit fly species and/or numbers collected over a period of time

Investigation Guidelines

The following guidelines are provided for teachers to carry out valid and consistent assessment and are to be modified for specific investigations.

Teacher Guide notes:

Context/setting:

Students may choose their own practical investigation or choose from a list given by the teacher. Students must have their topic approved by the teacher to decide if the topic is feasible or workable.

Conditions:

This investigation is to be done individually over a period of time. A typical time period would include 5-6 weeks in total and 10-12 periods of classroom time. Students will be expected to do work outside of class time.

Additional information:

Students will need to submit a logbook with their report. Logbooks are a working record of all a student does to complete the investigation. Logbooks should be substantially hand-written and students must put into their logbook any notes, research and photocopies they collect. Logbooks should be checked by the teacher at regular intervals throughout the investigation to assist authenticity.

Student Guide notes

1. Choose your topic for your practical investigation. This work will take about 5-6 weeks including 10-12 hours of class time. You will be expected to do work in your own time. You will be provided with a suggested list of topics to choose from but you may include a topic of your own. Have your topic checked and approved by your teacher. You must work independently.
2. You are to investigate one aspect of the production process that influences the supply/demand/profitability of one primary product.
3. You **must** keep a logbook. This logbook must contain all your rough notes. You should put photocopied material into it or an accompanying folder. This logbook will be checked by your teacher at regular intervals and is part of the authentication process. **The logbook must be handed in along with your case study report.** It does not have to be neat.

The stages of the task:

Planning the investigation:

1. Do some initial research to determine the suitability of your topic. Collect any relevant background information. Record this in your logbook. Decide the purpose of your investigation.
2. Work out the key variables for your investigation, that is, an independent and dependent variable (the key factors to be compared).
3. Write a hypothesis/prediction – a statement describing what you predict the relationship / pattern between the chosen variables for your investigation will be.
4. Now design a method for your investigation. The method needs to detail the procedures to follow. It needs to produce sufficient, appropriate and consistent data to produce a valid and reliable conclusion, e.g. by repeated measures, considering sample sizes, eliminating errors, etc.

Your method needs to specify:

- a. The independent variable and how it will be controlled. The range for the independent variable.
 - b. The dependent variable and how it will be measured.
 - c. Fixed values for and ways of controlling other variables or factors that could influence the investigation.
5. Start trialling your plan to see if it will work. This will also help you to refine your method. Record evidence of trialling and any changes you make to your plan in your logbook.

Collecting Data

1. Follow your plan and start collecting data. Your raw data should be put into your logbook in a systematic way, e.g. tables. It does not have to be tidy. Record everything that you do.
2. Your plan may need modifying. Record any modifications in your logbook, explaining why you changed your plan. You may need to trial your method first.
3. Indicate and record any trends you see developing in your data.
4. Make sure that you have sufficient, accurate and valid data to meet the purpose of the investigation. Review your data as you progress. You may need to collect more by repeating your method, increasing the range of key variables or factors, and/or eliminating extremes. Processing your data will indicate what is needed.
5. Record any changes to your method in your logbook.

Processing data:

After you have gathered all your raw data you now process it. This will help you to identify patterns and trends in your data.

1. Process your data - Make sure that you have collected
 - the right data for your investigation, that is, **valid** data.
 - enough data – that is, **sufficient** data. If you don't, go back and gather some more.
 - **accurate** data.

To indicate any trends, patterns or relationships – these should relate back to your hypothesis or aim but they may show you something that you hadn't thought of.

2. Data is processed to ensure sufficient, accurate and valid interpretations by some or all of the following techniques:
 - Averaging of repeated measurements.
 - Exclusion of extreme/odd data.
 - Statistical analysis e.g. mean and standard deviation, using relevant calculations.
 - Drawing relevant graphs.

Interpreting your data:

1. Now look at your processed data and identify any trends, patterns or relationships that you can see. These should relate back to your hypothesis or aim. Describe these in your logbook.
2. This may mean that you have finished your data collecting and processing or that you need to go back and collect some more data.
3. If you have enough **sufficient, accurate and valid data** it is time to write up the report.

Writing up the report:

1. You are to present your investigation as a scientific report. Your report will need to communicate information clearly.
2. Your report must include the following sections:
 - a. **Introduction/background** – brief information on the plant or animal and its production process, and any relevant background information.
 - b. **Hypothesis/aim/prediction** – a statement describing what you think the relationship between the chosen variables or factors for your investigation will be.
 - c. **Method** – The method written up here is the final method that you used after all the modifications. This explains how you collected and recorded sufficient, accurate and valid data. Your method should be clear and concise so that another person exactly repeating your procedures could produce the same results. Include the key variables or factors and their ranges and how you controlled for other variables or factors.
 - d. **Results** – The report only needs to contain the processed data, recorded in a systematic format, e.g. the raw data should have been put into clear tables showing the averages etc, graphed or statistically analysed where appropriate.
 - e. **Interpretation** – Any trends patterns or relationships shown by your results.
 - f. **Discussion** –This will include the interpretation, conclusion and the evaluation of the investigation.
 - g. **Conclusion:** This summarises what you have found out and relates back to the hypothesis/prediction or the aim/purpose, background information and experimental results.
 - h. **Evaluation:** This includes
 - The limitations and reliability of the investigation.
 - Why your initial method was modified.
 - Errors that may have affected the results
 - Suggestions for improvements that may have made the conclusions more valid.
 - Comments on the accuracy of the method
 - Comments on the validity, accuracy and sufficiency of the data.
 - Suggestions and justifications for further investigation.
 - i. **References** – All references must be listed using an approved system.

Case Study Guidelines

Teacher Guidelines:

The following guidelines are supplied to enable teachers to carry out valid and consistent assessment. The case study is designed to be an open context as long as information is available to the student.

The study is designed to be individually researched and completed over a period of time. A typical time period would include about 5-8 hours of classroom time. Students need access to a library, and internet if possible.

Teachers should note that students are expected to have done some formative research before attempting something of this magnitude. Teachers could provide a list of approved topics from which the students can choose. Students may choose their own topic, but must have their topic approved by the teacher to decide if the topic is feasible or workable.

The format of the case study is open, but could be a survey, cost analysis, scrap book, research task, poster/pamphlet, schedule of operations, power point presentation, audio-visual presentation, or annotated model.

Suggested Topics:

- a. Consumer survey e.g. consumer preference for different cultivars/attributes
- b. Market analysis e.g. comparison of profitability of different market opportunities
- c. Pest Control e.g. the extent of use of organic husbandry techniques in different crops/islands
- d. Quarantine controls e.g. the effect these have on pest/disease occurrence in different islands
- e. Analysis of a schedule of operations for the production of a particular primary product
- f. Sustainability e.g. the effect on long term productivity of an aspect of atoll agriculture
- g. Genetically Modified Organisms e.g. a scrap book on the pros and cons of the introduction of GMO organisms within the Pacific Islands
- h. Conservation of biological diversity in an aquatic environment
- i. Interview and analysis of a successful farmer
- j. Pest/Disease control e.g. survey on the attitude to, and use of, safety equipment by farmers
- k. Analysis of the attributes of different breeds/cultivars
- l. Analysis of the effect of trade agreements on local export production
- m. Research on the impact of fruit flies on primary production within the Pacific Islands

Authenticity

Authenticity is very important in internal assessment. This can be determined by:

- Regular checking of logbooks
- Interviewing the student
- Signed agreements with the student and / or parents or caregivers.

General:

The internal assessment tasks, weightings, requirements, assessment criteria or scoring rubrics and due dates must be given to students and clearly explained at the beginning of the year. Results must be clearly recorded and maintained by teachers so that accurate information on each student's progress is readily available.

At the beginning of each year, each school presenting students for the South Pacific Form Seven Certificate Agricultural Science assessment must complete an Internal Assessment Summary Form (**AGR-IA**) and forward to EQAP by the indicated due date.

The assessment statement and copies of all assessment tasks and assessment schedules used, as well as a sample of student responses to all internal assessment work undertaken, must be available for verification on request until 30 November of the year of the examination.

The moderation of Internal Assessment will be done in accordance with EQAP policy as specified from time to time.

Useful References

1. Henry D Foth 8E, *Fundamentals of Soil Science*, John Wiley & Sons
 2. J. A. Sutherland, *Understanding Farm Animals*, McGraw-Hill Book Co, Sydney
 3. *Plant Protection in the Pacific Islands – a course for senior high-schoolers*, Macpherson, Colin, SPC Plant Protection Services
 4. Brown L, Hindmarsh R, McGregor R, *Dynamic Agriculture Book 1, 2, 3, &4*
 5. *An Introduction to Animal Husbandry in the Tropics*, Payne, ELBS (Longman) 0582212758
 6. *Pacific Agroforestry – An information kit*, Pacific Regional Agricultural Programme, SPC, 982-343-038-1
 7. *Agroforestry – A Way to Better farming Module 1 and Module 2*, I Ratukalou, T Nakalevu, J Waradi, H Hartel, H Raedler, E Reigber, MAFF Fiji, 982-209-005-6
 8. Animal Production, SPC Paravet
 9. *Pacific Kava – A Producer's Guide*, SPC 982-203-810-0
 10. *Farm Management Handbook*, Queensland Department of Primary Industries, Brisbane, 074217355
 11. *Livestock Husbandry Techniques*, McNitt, Collins, 0003831337
 12. *An Introduction to Economics for Students of Agriculture*, Berkeley Hills, Pergamon Press
 13. Jarvis S 2000 Biotechnology Techniques and Issues New House
 14. Jones RN, Karp A and Giddings G 2001 The Essentials of Genetics Advanced Biology Readers John Murray
- Student
15. *Certificate Agricultural Science*, Akinsanmi, Longman 0582003407
 16. *Agriculture for South Africa*, Elliot, Slout, Collins Education 0003222322
 17. *The Tropical Vegetable Garden*, Messiaen, Macmillan 0333570774

Other Support Materials

1. Pacific Community (SPC)

A wide range of support material and specialist information and advice for teachers and students is available. Contact the Librarian. **Private Mail Bag**
Suva
FIJI
www.spc.int

2. Internet Resources

www.spc.int
www.usp.ac.fj
www.biozone.co.nz
www.nzqa.govt.nz

3. Scientific Periodicals / Magazines / Journals

South Pacific Agricultural News
Pacific Pest Info (SPC) Pest Alert (SPC)
Pest Advisory Leaflet (SPC) New Scientist
Scientific American
National Geographic

4. Video

Video Education Australia
P.O. Box 4390
Shortland St, Auckland, NZ

BBC
Endeavour / Roadshow Entertainment
Private Bag 56905
Dominion Road, Auckland

Educational Media Australia
7 Martin St
South Melbourne, Victoria 3205

SPC
Private Bag
Suva
FIJI

Glossary

Experimental terms:

Hypothesis	a prediction/statement which can be tested by experimentation.
Dependent variable	variable whose value is determined by one or more other (independent) variables.
Independent variable	variable whose value is set over a range to produce a measured effect on the dependent variable.
Controlled variables	variable whose values are set throughout an experiment to prevent any effect on the dependent variable.
Validity	measures what is intended.
Reliability	probability that the same result can be produced again.
Primary data	original data obtained by direct measurement or observation of the event.
Secondary data	data from another source.

Assessment terms:

Describe	requires the student to recognise, name, state the features or characteristics (of an object or process).
Explain	requires the student to show an understanding by stating what happens or giving reasons for an event or observation.
Discuss	requires the student to show an understanding by linking ideas. Usually an extended answer that explores concepts and issues and uses examples in the explanation.
Informed judgement	opinion based on an understanding of the facts/information.
Reasoned judgement	opinion based on an analysis of the facts/information.
Critically evaluate	form an opinion by comparing and contrasting information/opinions/viewpoints.
Concise	information presented clearly in few words. Systematic (record) record that follows a set plan or system.

Other terms:

<i>Attribute</i>	property of the primary product normally present in the product at harvest.
<i>Export product</i>	any locally produced primary product which is exported.
<i>Genetic engineering</i>	any process that modifies or alters the genetic makeup of an organism
<i>GMO</i>	genetically modified organism: an organism that is modified by the transfer of specific genes to a new host organism

<i>Local product</i>	any primary product produced within the students local region.
<i>Market opportunity</i>	any point of sale of the primary product. This covers a wide range, including: gate sales, local retailer, export wholesaler, processing, direct selling.
<i>Marketing technique</i>	any practice used by the producer to influence supply or demand for the primary product.
<i>Primary product</i>	unprocessed plant or animal crop produced by the grower from the land.
<i>Production process</i>	the complete process for production of the primary product from establishment to the market.
<i>Resources</i>	includes the physical environment as well as the availability of labour and technical/specialist advice. This includes the role of government and non-government agencies.
<i>Schedule of operations</i>	identifies the husbandry practices used in the production process and identifies when they occur within the process.
<i>Sustainable production</i>	Production that is able to meet consumer demand without affecting the long term ability of the environment to produce (no environmental degradation).