
Tools for Agriculture

Basic pieces of gardening equipment required by each school in order to carry out its programme effectively are:

- 2 forks
- 2 picks/mattocks
- 2 spades
- 2 yam spades
- 2 rakes
- 1 crowbar

C. Diary Records:

- This Assessment mainly assesses a skill to be reinforced.
- The skill of keep records is assessed with the total of 5 marks.
- “Keep records” is a needed skill to be acquired before students leave Year 10.

The Evaluation part of the Course will eventually assess the whole course once all the topics have been developed into good teachers resource materials.

1. Theory Paper:

The break down of the theory to cater for the 60 % of the total assessment percentage of 100 % is as follows.

Topics	Multiple choices	Short answers	Total
1. Soil	3	12	15
2. Plant biology	2	8	10
3. Vegetable growing	2	8	10
4. Coconut	3	12	15
5. Cocoa	3	12	15
6. Beef cattle	3	12	15
7. Improving village poultry	2	8	10
8. Understanding farm animals	2	8	10
Total weightings	20	80/2 = 40	100 60%

2. **Practical Assessment:** There are 3 parts to practical assessments with marks allocated as shown :

a. Continuous Assessment	15
b. Practical test	20
c. Diary Records	<u>5</u>
	40 %

A. **Continuous Assessment:** Teachers Continuous record of students performance in class practical sessions based on 3 main criterias :

• Responsibility	5
• Initiative	5
• Effort	<u>5</u>
	15

B. **Practical test:** The practical test involves an Animal test and a Crop test which each student must do. This paper is set externally but carried out and moderated in the school's own situation. The Chief examiner and the moderator take turns in the Moderation.

• Animal test	10 %
• Crop test	<u>10 %</u>
	20 %

(See practical test for more information).

- Tests undertaken are the practical skills learned during the whole period of year 7 - 10 Agriculture Course in line with the Agriculture Syllabus.

Years 7 to 10 Agriculture syllabus evaluation

Year 7 to 10 Assessment is based on the course syllabus as outlined by the May 1992 Revised Edition of the Syllabus.

Due to the present development of teacher's resource material, only those topics for which course materials have been already published and those easily taught with existing resources in schools are being examined or assessed.

These topics include:

1. Soil
2. Vegetable growing
3. Coconut
4. Cocoa
5. Plant Biology
6. Beef Cattle
7. Improving Village Poultry
8. Studying Farm Animals

Those topics that are being taught but not assessed, though could be assessed using any school based assessment scheme are :

1. Another Animal Option (Pig & Goat)
2. Agriculture in Vanuatu
3. Managing the Whole Farm

Two main methods of Assessment are being employed here :

- | | | |
|-------------------------|---|------|
| 1. Theory Paper | - | 60 % |
| 2. Practical Assessment | - | 40 % |

An integrated approach to the Year 8 course

Improving Village Poultry

Points of the rooster and the hen

Our poultry

Why do we keep poultry?

Village hens in Vanuatu

How do we care for our hens?
(beginning of student projects)

Recording: egg laying

Feeding poultry:
a balanced diet

Digestion in the hen

Feeding for growth

Keeping our hens healthy

Housing

Breeding up:
stock selection

The egg: formation
laying
composition
brooding

Rearing chicks

Preventing broodiness

Costings

Summary: improving poultry in Vanuatu

Understanding Farm Animals

The animal's body

Food groups
Examples of food types

Digestion

Muscle

Disease and health

Reproduction:
the male
the female

Another Animal Option e.g. Goat

Points of a goat

Our goats

Why do we keep goats?

How do we care for our goats?
(beginning of student projects)

Recording: observation of goats

What do goats eat?

Ruminant digestion

Feeding for meat
Assessing conformation

Keeping our goats healthy

Pasture

Breeding up:
stock selection

Oestrus cycle
Pregnancy
Lactation
Colostrum

Rearing kids

Castration

Costings

Summary: improving goats in Vanuatu

An integrated approach to the Year 7 course

Vegetable growing	Soil	Plant biology
Subsistence and cash crops		
Traditional farming patterns		
Choosing a garden site	Soil type; soil constituents Soil history and formation	
Making a garden	Drainage rates Soil erosion	
Making a compost heap	Humus The nutrient cycle; bacteria	Legumes
Planning the garden	Crop rotation	
Digging	The earthworm The soil profile	
Raking	Preparing a tithe	
Digging in compost	Soil structure	
Seed sowing		Seed structure Germination Seed dispersal
Garden records		
Thinning out		Competition
Weed control		
		A plant's needs for light, water and nutrients
		Photosynthesis
Watering		Transport in plants; root hairs. Transpiration
Transplanting		
Care of the growing crop e.g. side shooting		Flower structure Pollination
Pest and disease control	Life in the soil	
Vegetative propagation		Modifications for food storage e.g. rhizomes, tubers, corms, tap roots, stems

Year 8

A totally integrated approach to the Year 8 course is harder to devise. However, as the accompanying suggested syllabus shows, the topics of ‘Understanding Farm Animals’ and ‘Improving Village Poultry’ can be linked in a logical manner. The syllabus also shows how a third course, probably taught after the first two are completed, is used to reinforce some ideas, as well as to provide a useful contrast with others. Some schools will prefer to teach goats rather than pigs, in which case topics such as ruminant digestion will be introduced earlier; but the modifications that the teacher must make in order to ensure that all students cover the total course content are comparatively minor.

Year 9

The Year 9 course covers the three major commercial agricultural crops of Vanuatu, namely copra, cocoa and beef. It does so by taking ideas of plant and animal husbandry introduced in earlier work, and developing them further in the context of cash crops. Some schools will have problems in providing students with worthwhile amounts of practical work with some of these crops, but it should be possible to arrange for students to visit plantations in the area.

Year 10

The Year 10 course attempts to summarise all that has gone before, to give students the idea that no crop can be grown in isolation, and that to farm successfully the farmer, either in the plantation or the small holder sector, must also be a businessman. It does so by attempting to put farmers and their crops into a local, a national and an international setting. At the same time, students are given useful revision of work covered in the previous three years, in order to prepare them for their Year 10 examination in Agriculture.

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6. Describe the difference between monoculture and mixed cultivation, mentioning the major advantages and disadvantages of both, and giving examples of both that have been shown to be successful in Vanuatu.
 7. Describe examples of successful ni-Vanuatu
 - a. plantation owners
 - b. smallholders
 - c. officers of relevant departments

Appendix 1: Approach to the course

The successful farmer adopts the method of cultivation that is most suited to his needs and conditions. The successful agriculture teacher does the same. There are many alternative approaches that can, and have, been adopted to the teaching of the course. The following approach has been tried with minor variations in many schools.

The course aims are built upon the premise that the most effective learning occurs when the student develops both theoretical and practical skills simultaneously. With this in mind, the Year 7 syllabus is based on the growing of garden crops, whilst the Year 9 syllabus looks at the care of animals.

The Year 9 course takes ideas introduced in Years 7 and 8 and examines them in greater detail, in the context of cash crops such as coconut, cocoa and beef. The Year 10 course should encourage students to develop further the ideas of enterprise management that will have been developed as the course progresses, so that the student develops a more holistic systems based approach, rather than seeing each of the crops studied in isolation.

The use of the agricultural project area by students is fundamental to the course.

Year 7

The Year 7 work begins with an introduction to the course. One method that has been used successfully is to begin by asking students about traditional farming methods used on their home islands, and then to move on to the growing of both introduced and traditional vegetables in the school garden. As these crops develop, lessons on soil and on basic plant biology complement and reinforce the practical work. One method of integrating these topics is set out on page 18.

Objectives: Development of Agriculture in Vanuatu

Having successfully completed this course, and having revised all of the other curriculum units, the student should be able to:

1. Describe the major roles of the Agriculture sector as outlined in the National Plan, mentioning in particular
 - a. import reduction and substitution
 - b. increased exports and therefore a better balance of payments
 - c. enhanced earning potential for rural populations
 - d. more balanced diet for all ni-Vanuatu
2. Describe the major factors explaining the current pattern of agriculture practised in Vanuatu, mentioning
 - a. custom and history
 - b. land tenure, leasing, and its effect on agricultural development
 - c. climate
 - d. topography
 - e. vegetation
 - f. soil quality and soil erosion
 - g. trading conditions
3. Describe the role of the government in its role of supporting farmers, mentioning in particular
 - a. the extension service
 - b. the information service
 - c. the crop-specific departments, i.e. the Department of Livestock, the department of Forestry, the Department of Fisheries, the Department of Agriculture and Horticulture, Quarantine and Inspection Services.
4. Identify examples of the following crops, and describe briefly the way in which they are grown, and their potential as cash crops in Vanuatu.
 - a. pepper
 - b. coffee
 - c. vanilla
 - d. kava
 - e. pineapple
 - f. citrus fruits
 - g. avocado
 - h. peanut
5. Describe the establishment of a village fisheries project, and a village forestry supply plantation; and say how these can contribute to an increase in rural incomes, and why these projects sometimes fail.

Objectives: Managing the whole farm

Having successfully completed this course, the student should be able to:

1. Analyse a described example of a typical Vanuatu farming enterprise, either from the smallholder or from the plantation sector, to identify the major
 - a. establishment and production costs
 - b. products, as subsistence or cash crops
 - c. cash flow records
2. Describe the major sources of finance available to the farmer in Vanuatu, and briefly outline the advantages and disadvantages of each of them. The following should be covered
 - a. commercial banks
 - b. Development Bank of Vanuatu (DBV)
 - c. Short- and long-term loans
 - d. interest rates
 - e. relatives
 - f. overseas aid schemes (e.g. KDP)
 - g. accumulated capital
 - h. Department of Agriculture and Horticulture grants.
3. Describe the importance of ensuring markets for, and the marketing of cash crops, and be able to describe the major outlets for farmers in Vanuatu, mentioning in particular the role of
 - a. the VCMB
 - b. co-operatives
 - c. private enterprise (e.g. market traders)
4. Describe the role of plans, such as forward planning and enterprise integration, and records, to farmers in both the small holder and the plantation sectors, including the advantages and disadvantages of
 - a. breeding records
 - b. a farm diary
 - c. a budget
 - d. a performance analysis

Objectives : Beef cattle

Having successfully completed this course, the student should be able to:

1. Describe some of the more important considerations that a smallholder must take into account when deciding whether to start a cattle project, including access to markets, stocking rates and breed selection.
2. Demonstrate a knowledge of the methods used to prepare ground for cattle, including pasture improvement, the construction of fences and stockyards and the provision of a water supply.
3. Demonstrate a knowledge of the basic techniques of cattle husbandry, including
 - a. handling and control of stock
 - b. weaning
 - c. castration
 - d. dehorning
 - e. cattle identification techniques
 - f. culling
4. Demonstrate a knowledge of the differences commonly observed between a sick animal and a healthy one, and in particular be able to identify, and describe control measures for, the following problems
 - a. brucellosis
 - b. tuberculosis
 - c. roundworms
5. Describe the work of cattle breeders with particular reference to
 - a. VLD
 - b. control of breeding stock
 - c. herd improvement
6. Describe the importance of planning and recording to good herd management.
7. Describe the major factors influencing the future of beef production in Vanuatu.

Objectives: Cocoa

Having successfully completed this course the student should be able to:

1. Correctly name the major parts of a
 - a. cocoa tree
 - b. cocoa flower
 - c. cocoa bean
2. Demonstrate a knowledge of the growing conditions needed to produce good crops of cocoa.
3. Demonstrate a knowledge of the criteria used when selecting seed for planting, including selection of the best variety, and of the techniques used to produce healthy seedlings.
4. Demonstrate a knowledge of the methods used when preparing ground for cocoa to be grown in, including the establishment of shade trees and fences.
5. Demonstrate a knowledge of the methods used to plant out good seedlings into the cocoa plantation, and of the way in which the plants should be cared for until they are established.
6. Demonstrate a knowledge of the way in which cocoa trees are pruned and of the reasons for doing this.
7. Demonstrate a knowledge of the way in which pods should be picked and opened.
8. Describe the process of fermentation, mentioning
 - a. the reasons for fermenting
 - b. large- and small-scale methods of fermentation
 - c. care of the beans after fermentation
9. Describe the process of cocoa grading and marketing, mentioning the criteria by which the cocoa is graded.
10. Correctly identify a pod suffering from black-pod disease, and suggest five steps that the grower should take to reduce the risk of infection.
11. Correctly identify evidence of rat damage, and suggest steps that the grower should take to reduce this problem.

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- and by knowing which nuts to discard.
4. Describe the work of the plant breeders at CIRAD (formerly IRHO), mentioning the techniques of collection, breeding and selection that are being employed, and the characteristics for which the breeders are aiming.
 5. Demonstrate a knowledge of the recommended procedure followed when planting coconuts in a pre-nursery, and of the maintenance of the pre-nursery.
 6. Demonstrate a knowledge of the recommended procedure followed when planting coconuts up from the pre-nursery, and of their maintenance in the nursery.
 7. Demonstrate a knowledge of the recommended procedure followed when planting coconuts out in the plantation, both when
 - a. coconuts are to be grown alone;
 - b. coconuts are to be inter-cropped with other crops e.g. cocoa.
 8. Demonstrate a knowledge of the procedures followed when maintaining a plantation, with particular reference to
 - a. care of the young plantation
 - b. the relative merits of weed control by hand, by cattle, and by machine.
 9. Describe the major problems facing coconut palms growing in Vanuatu, including
 - a. foliar decay
 - b. helminthosporiose
 - c. brontispae beetles
 - d. senility
 10. Describe the methods used to produce
 - a. smoke-dried copra
 - b. hot-air dried copra
 - c. sun-dried copraand compare the advantages and disadvantages of these three systems.
 11. Describe the method by which the price paid to producers for their copra is decided, mentioning in particular the work of
 - a. the copra graders
 - b. the VCMB.

5. Correctly describe the symptoms of either

- | | | |
|----------------|----|----------------------------------|
| A (Goats) | or | B (Pigs) |
| i. Mastitis | | i. Onset of following |
| ii. Footrot | | ii. Lack of milk in sows |
| iii. Roundworm | | iii. Roundworm and
kidneyworm |
| iv. Oestrus | | iv. Oestrus |

and describe in each case what steps should then be taken to deal with the situation.

6. Identify the characteristics that would be looked for in breeding animals of either sex, and the features of the management system that would prevent unplanned mating.
7. Describe the care that should be given to a pregnant female animal, both during the pregnancy and at the time of birth.
8. Describe the requirements of young animals from the time of birth through to weaning, including castration.
9. Identify the points of the animal's body.
10. Explain the usefulness of these animals as part of a mixed farming enterprise, and the marketing of the main products.
11. Assume total responsibility for the care of an animal over a period of at least one week, and show evidence of having cared for the animal conscientiously during that time.
12. Prepare a record of the animal's development during the time that it is in the students care, noting the animal's development, health status and the conditions of its environment, including costings, where appropriate.

Objectives : Coconuts

Having successfully completed this course, the student should be able to:

1. Name the main parts of a
 - a. coconut palm
 - b. coconut leaf
 - c. coconut flower (male and female)
 - d. coconut seed
2. Describe the process of pollination and nut development in a coconut.
3. Select good seed nuts, both by recognising the characteristics of a good parent tree, by describing seednut collection techniques

Objectives: Understanding farm animals

Having successfully completed this course, the student should be able to:

1. Categorize common animal foods used in Vanuatu according to
 - a. their suitability for feeding to ruminants, pigs or poultry;
 - b. their value as a supplier of carbohydrate, protein or vitamins and minerals.
2. Give the correct names for the young, the male and the female (both entire and castrates) for cattle, goats, pigs and poultry, and give the correct length of pregnancy (or breeding) for each of these animals.
3. Identify the major parts of the digestive system of a ruminant (e.g. a cow or goat), a non-ruminant (e.g. a pig) and a domestic bird (e.g. a hen), and describe, in each case, how the animal's food is digested, and how the digestive system is adapted to deal with the animal's diet and lifestyle.
4. Correctly locate the major muscle groups on the body of a cow, a pig, and a domestic hen, and briefly describe the role of these muscles in the live animal, and their importance as sources of meat.
5. Correctly identify the major parts of the reproductive system of both male and female farm animals, and describe the role of each of these in enabling the animal to reproduce.

Objectives: Animal option

This course will be based on either a pig or a goat project, according to the school's facilities and preferences. Having successfully completed the course, the student should be able to:

1. Demonstrate a knowledge of the animal's dietary requirements, and explain how this diet is suited to the animal's type of digestive system.
2. Demonstrate a knowledge of the different levels of nutrition required by animals at different stages of growth and production.
3. Demonstrate the ability to assess the confirmation of an animal, and correctly decide whether the animal is finished, or, if not, prescribe a diet that will bring it to a finished condition.
4. Correctly describe the signs of good health in the animal.

Objectives: Improving village poultry

Having successfully completed this course, the student should be able to :

1. Keep accurate production records, including a simple balance sheet for eggs sold.
2. Name the external features of a hen, a rooster or other poultry.
3. Identify the major parts of a hen's digestive tract and explain briefly how each of them functions.
4. Identify the major parts of a hen's reproductive tract and explain briefly how each of them functions.
5. Identify the characteristics required in good breeding stock and of improved breeds.
6. Describe the conditions required for successful incubation of eggs, using a broody hen.
7. Describe the conditions required for the successful rearing of chicks in a village situation.
8. Identify at least five important characteristics of a healthy hen.
9. Identify the symptoms of, and treatment for:
 - a. external parasites
 - b. internal parasites
 - c. broodiness
10. Describe the features of a management system that are required to keep a flock healthy.
11. Describe systems of management based upon the use of
 - a. simple nestboxes; and
 - b. poultry houses made of bush materials.and state, for each of these, how poultry kept in this manner would be more productive than poultry kept in a traditional village system.
12. Describe a system of management based upon the use of a battery house, and give reasons why this system is not widely used in Vanuatu.
13. Demonstrate the ability to distinguish between a hen in lay, and a hen that is not laying.
14. Demonstrate the ability to keep a small flock of poultry in semi-intensive or improved conditions, for a period of at least three days, including the preparation of a balanced diet from locally available foodstuffs.

Objectives: Plant biology

Having successfully completed this course, the student should be able to:

1. Name the following parts of a typical flowering plant and say how each contributes to the work of the plant: root, stem, leaf, bud, growing point, flower and fruit.
2. Identify examples of a fibrous root system, a tap root, a root tuber and root hair, and describe the purposes that these serve.
3. Name the following parts of a typical flower and say how each contributed to the work of the flower: the stem, sepal, petal, stamen, anther, filament, stigma, style, ovary, ovules, nectary and fruit.
4. Explain, using diagrams and examples as appropriate, how a seed is formed and distributed.
5. Identify the following parts of a typical seed, and say how each contributed to the work of the seed : test, embryo and cotyledon, in both a typical monocotyledon (e.g. corn) and a typical dicotyledon (e.g. bean).
6. Describe accurately the major factors that influence germination rates.
7. Explain, using diagrams and examples as appropriate, how a plant takes in water, gases and minerals, and how these are transported throughout the plant.
8. Explain, using diagrams and examples as appropriate, how a plant gives off water and waste gases through the processes of respiration and transpiration.
9. Explain, using diagrams and examples as appropriate, how a plant manufactures carbohydrates through the process of photosynthesis.
10. Explain, using diagrams and examples as appropriate, how a plant transports and stores the products of photosynthesis in modifications such as stem and root tubers, rhizomes, bulbs and corms, stems and tap roots.
11. Explain, using diagrams and examples as appropriate, how a leguminous plant works, and how it is used by growers.
12. Explain a sexual reproduction in crops such as manioc.

Objectives: Vegetable growing

Having successfully completed this course, the student should be able to satisfy each of these objectives for the following range of crops:

1. Demonstrate the basic skills used to produce these crops, including (where appropriate) bed preparation, selection and planting of propagation material or seed sowing, thinning out, spacing, care of the growing plant, need for special conditions e.g. support or wind break, crop requirements for nutrients and water, control of major pests and diseases, weed control, cover crops, harvesting and storage.
2. Demonstrate the preparation and maintenance of a compost heap.
3. Demonstrate the correct use of compost, both as a mulch and as a soil additive.
4. Correctly classify each of the crops listed in each of the following categorizations:
 - i. traditional food crop or introduced vegetable.
 - ii. nutritional status, as a supplier of protein, carbohydrate or vitamins and minerals.
 - iii. major use of the crop, as either a subsistence or as a cash crop.
 - iv. root, leaf or fruiting/seed vegetable.
5. Produce a garden plan that takes account of factors such as crop requirements, planting times, staggered production, soil type and crops previously grown.
6. Produce and use a record of work done in the garden, including a simple balance sheet for crops sold.
7. Demonstrate the correct use of, and care for, common garden tools including a fork, a spade, a rake, a hoe and a bushknife.
8. Demonstrate the correct, appropriate, safe use of, and care for, a hand-held sprayer.
9. Correctly identify examples of the important varieties of crops grown in Vanuatu, giving common and botanical names, where appropriate.
10. Correctly name the major parts of each of the crop plants; naming as appropriate the leaf, stem, root, node, axil, flower or fruit, and any specialised adaptation, such as a corm, a stem or root tuber, a tap root or a bulbil.
11. Correctly identify the different growth stages of the crop plant as appropriate.

Objectives: Soils

Having successfully completed the course, the student should be able to:

1. Explain how soil is formed.
2. Identify the following soil constituents: sand, silt, and clay particles, soil water and humus.
3. Perform an analysis of a soil sample so as to determine the relative proportions of each of the constituents listed in objective 2.
4. Describe the properties of a sandy soil, a clay soil and a loam, and explain how the cultivation of a soil is affected by these properties.
5. Draw and label a diagram of a soil profile, and explain the properties of each of the horizons labelled.
6. Name the major plant nutrients listed below, and say briefly how a shortage of them affects crop growth, and how growers can replace them in their soils, using either organic or inorganic fertilizers. The nutrients are nitrates, phosphates, potash and trace elements (to be treated as one group).
7. Describe the advantages of organic fertilizers over inorganic fertilizers in terms of their effects on soil structure, and their costs.
8. Describe the cycle of movement of plant nutrients in the soil, and understand how this relates to the rotation of crops, and the activities of soil micro-organisms.
9. To be able to identify the following common soil organisms: earthworm, soil-living beetle larvae, millipede, slugs and snails and describe how they affect the work of the crop-grower.
10. Understand the importance of correct soil management techniques to crop growth and soil conservation and the relationship between good soil and good crops.

Introduction

This syllabus has been prepared for use in all of the Junior Secondary Schools in Vanuatu in both language mediums. It has its origins in the work of J.A. Sutherland for the Pacific Islands Agricultural Curriculum Development Project. It has been developed by groups of Agriculture teachers since then, in an attempt to make it more appropriate and relevant to the needs and experiences of our students. Two points should be borne in mind:

1. Individual schools should adopt their own teaching order, and the manner in which the course content is presented to students, to fit in with their individual circumstances, or to facilitate a continuity of crop production, and of learning. The teaching plan suggested in Appendix 1 is an integrated approach that has been successfully used in some schools.
2. Teachers should remember that the most important requirement is that by the end of Year 10 all students in all schools will have covered the same course content, and will be sitting the same exam.

Aims of the course

Having successfully completed the course the student should :-

- i. Understand the importance of Agriculture to the economy of Vanuatu, and to the lives of the ni-Vanuatu people.
- ii. Have theoretical and practical knowledge of appropriate techniques of plant and animal husbandry, as exemplified by the important traditional and commercial crops of Vanuatu.
- iii. Appreciate the practical opportunities and limitations of traditional and commercial agricultural systems.
- iv. Have confidence in their ability to match, sensibly and appropriately, possible combinations of agricultural enterprise to the social, financial and environmental parameters.
- v. Understand the importance of a balanced diet as a way of improving the nutritional status of rural and urban populations, through increased use of local foods.
- vi. Have developed reading and other information-seeking skills, so as to be able to use a basic technical vocabulary to acquire knowledge.
- vii. Have acquired a basis for more advanced studies in agriculture and related studies.

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VANUATU AGRICULTURE SYLLABUS



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1997**