

Record Keeping on AF for Production Cost & Income Analysis

Training on Agroforestry

August 28, 2020

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Ministry of
Forestry & Research

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Programme

- 11:00-11:15 Introduction
- 11:15-11:30 Objectives
- 11:30-12:00 Production Cost & Income Analysis
- 12:00-12:30 Record Keeping & Compiling
- 12:30-13:30 Lunch Break
- 13:30-14:30 Practice of Record compiling & Analysis
- 14:30-15:00 Wrap up



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Introduction

- Self-introduction
- Background & Aim of Training
 - AF field activities have launched.
 - Training of Trainers (TOT)



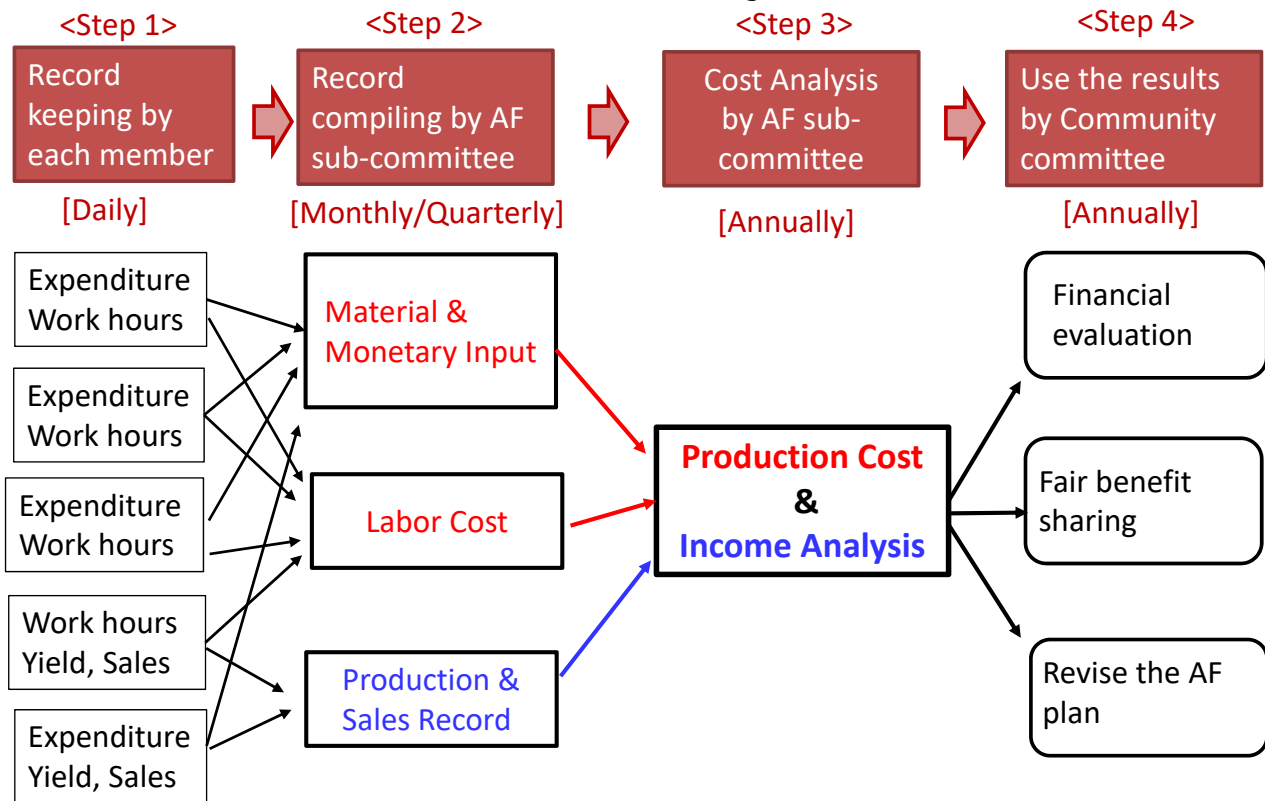
You will become a lecture and deliver the training to the communities.

- How to keep and compile records on AF practices
- How to make the production cost and income analysis

Objectives

1. To grasp objective quantity of input in and output from the AF practice
2. To evaluate financial benefits of AF practices through production cost and income analysis
3. To execute fair benefit sharing based on objective record
4. To revise the AF implementation plan based on the results of production cost and income analysis

Production Cost & Income Analysis



Production Cost & Income Analysis Sheet

<Image of Final Output>

1	2	3	4	5	6	7	8
Crop	Amount of crops planted	Total Production (Yield) (Kg)	Unmarketable produce (including domestic use) (Kg)	Net Produce (Production to be sold) (Kg)	Total Income (SBD)	Total Production Cost (SBD)	Net Income (SBD)
Tomato		25	2	23	1000	780	220
Beans		43	8	35	1650	1270	380
Corn		25	0	25	600	490	110
Total	-	-	-	-	3250	2540	710

Production Cost & Income Analysis Sheet

Crop wise

3) Production & Sales Record

1) Material & Monetary Input
2) Labor Cost

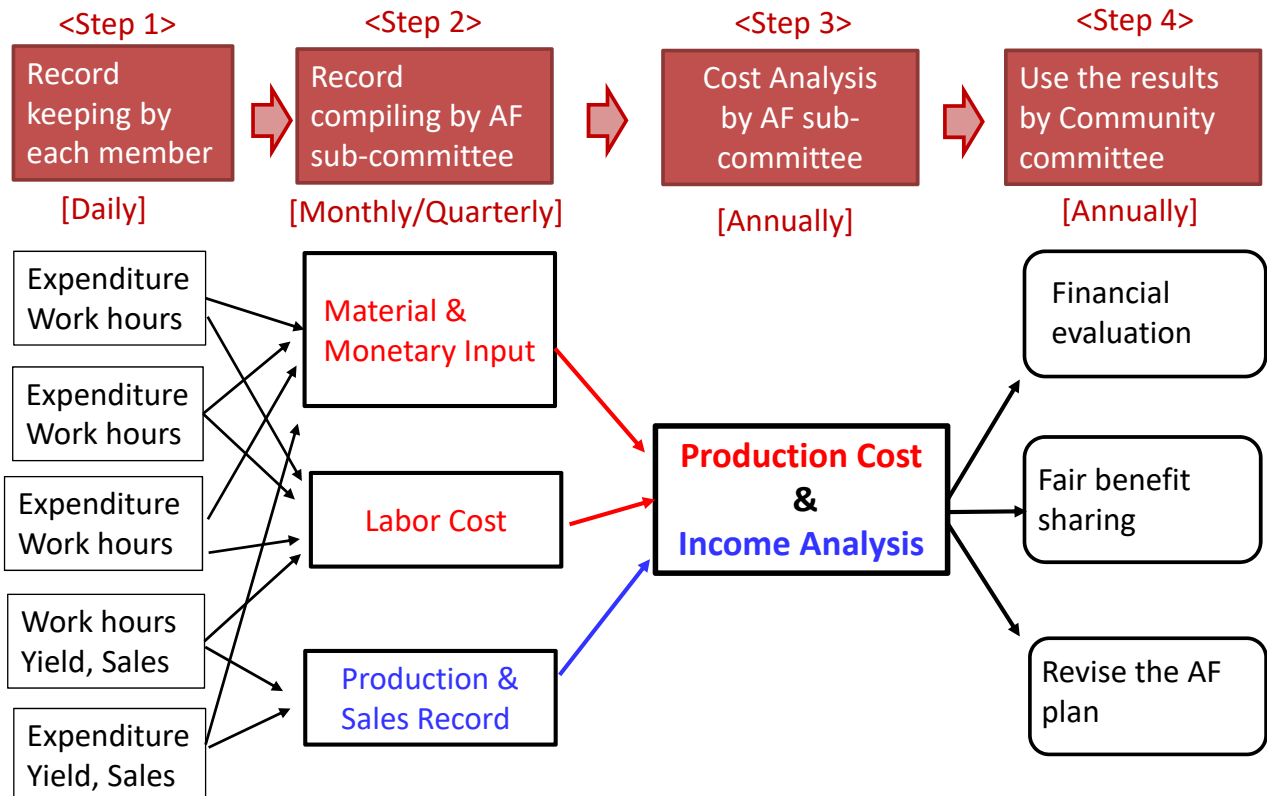
1	2	3	4	5	6	7	8
Crop	Amount of crops planted	Total Production (Yield) (Kg)	Unmarketable produce (including domestic use) (Kg)	Net Produce (Production to be sold) (Kg)	Total Income (SBD)	Total Production Cost (SBD)	Net Income (SBD)
Tomato			2	23	1000		
Beans				35	1650		
Corn		25	0	25	600		
Total	-	-	-	-	1600	1100	400

No sheet but need to keep record

Very difficult to grasp production cost crop wise

Total Income – Total Production Cost

Production Cost & Income Analysis



Record Keeping & Compiling

Record Keeping by Each member

(Ex. 1) Name: Elizabeth

Date	Item/Action	Quantity	Cost (SBD)	Remarks
4 August	Site preparation	3 hours		
7 August	Prepare planting materials of tomato	2 hours		
8 August	Plant tomato	2 hours		
5 Sep	Buy pesticide for crops	1 bottle		
15 Sep	Weeding for crops	2 hours		
15 Nov	Harvest tomato	2 hours		
15 Nov	Transport tomato to market	2 trips	40	Bus
15 Nov	Income by selling tomato	15 kg	600	

Instruction to communities

- ✓ Expenditure (material, service)
- ✓ Work hours (for what)
- ✓ Total Production (Yield)
- ✓ Quantity for domestic use
- ✓ Quantity for sales
- ✓ Income generated

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Record Keeping & Compiling

Record Keeping by Each Member

(Ex.2) Name: Joseph

Date	Item/Action	Quantity	Cost (SBD)	Remarks (unit price, shops etc.)
2 August	Land clearing	2 hours	-	
15 August	Prepare seedlings of Mahogany	2 hours	-	
20 August	Buy planting materials of Hongkong Taro	30 vines	250	From Malaita
30 August	Plant Mahogany	2 hour	-	
7 Sep	Weeding for tree seedlings	1 hour	-	
20 Nov	Income by selling tomato	8 kg	400	All tomato was sold

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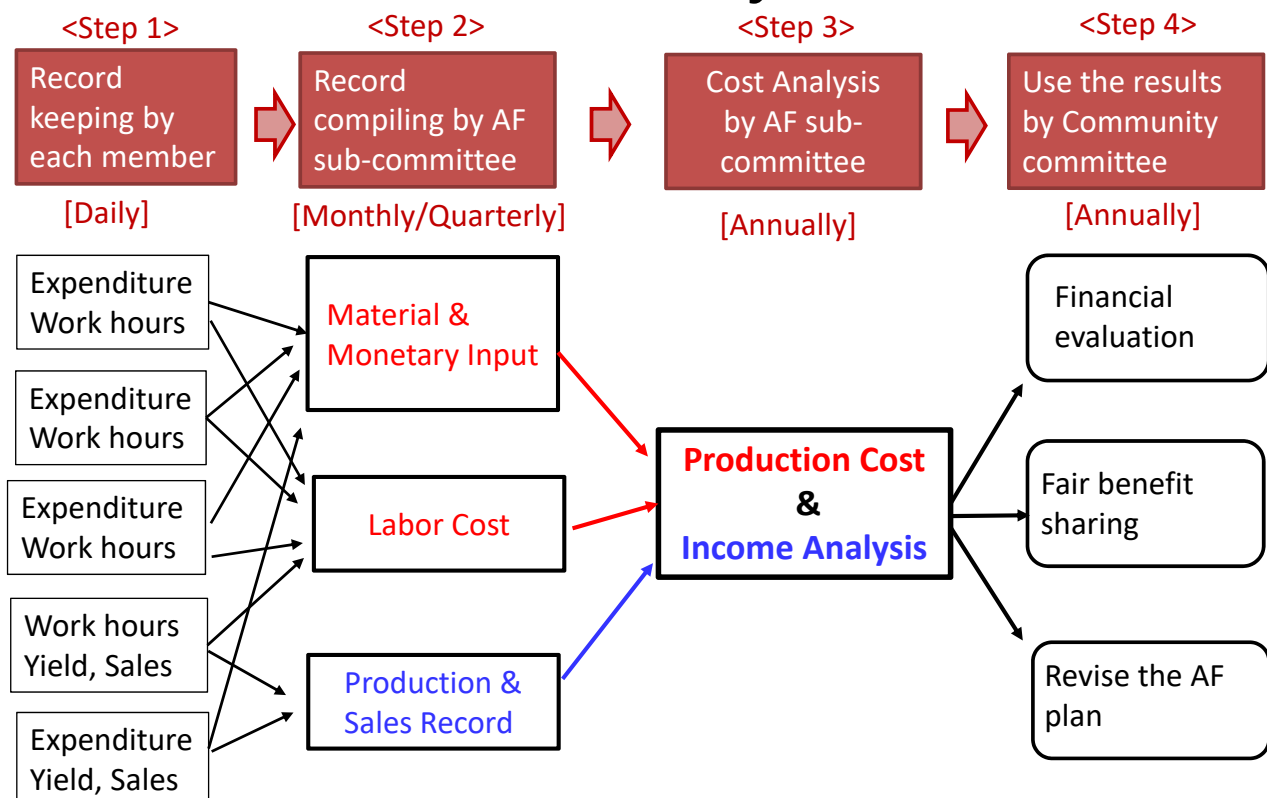
Record Keeping by Each Member

Record Keeping by Each Member

(Ex.3) Name: Mary

Date	Item/Action	Quantity	Cost (SBD)	Remarks (unit price, shops etc.)
30 July	Prepare nursery for mandarin	2 hours		
6 August	Buy beans (planting materials)	1 pkt	200	
22 Sep	Weeding for crops	2 hours		
15 Nov	Harvesting beans	2 hours		
15 Nov	Transport crops to market	2 trips	40.00	Bus
15 Nov	Income by selling beans	15 kg	700	Another 3 kg used for domestic
30 Nov	Income by selling beans	20 kg	950	Another 5 kg used for domestic
30 Nov	Income by selling corn	25 kg	600	All corn harvested was sold

Production Cost & Income Analysis



Record Compiling by AF Sub-Committee

(1) Material & Monetary Input Sheet

Name: * Name of the person who prepare this sheet.

Month & Year: * Incase of quarter, "July- November", for example.

Date	Item	Quantity	Cost (SBD)	Who	Remarks (unit price, shops etc.)
Grand Total					

E.g. Pesticide, Planting materials (seeds, seedlings, etc.) , Transportation,
Market fee, etc.

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Record Compiling by AF Sub-Committee

(2) Labor Cost Sheet

Name:

Month & Year:

Date	Item	Quantity (hour)	Cost (SBD)	Who	Remarks (unit price, shops etc.)
Grand Total					

- Work hour should be converted to labor charge.
- How much is labor cost per hour?

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Record Compiling by AF Sub-Committee

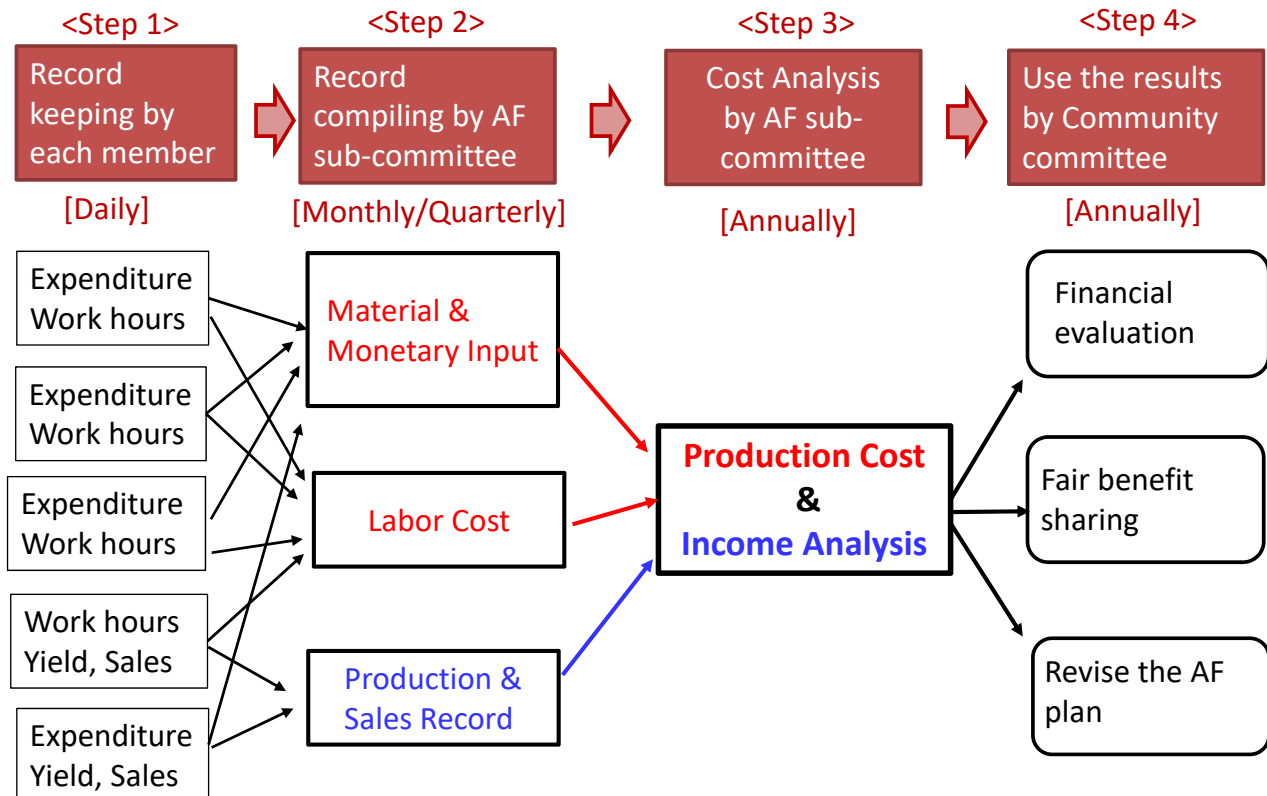
(3) Production & Sales Record Sheet

Name:

Month & Year:

Date	Crop	Total Production (Yield) (kg)	Unmarketable Produce (domestic use)	Net Produce (sold) (kg)	Total Income (SBD)	Remarks
Grand Total						

Production Cost & Income Analysis



Production Cost & Income Analysis

(4) Production Cost & Income Analysis Sheet <Crop>

Name of community:

Year of production:

AF plot (Name & area):

1	2	3	4	5	6	7	8
Crop	Amount of crops planted	Total Production (Yield) (Kg)	Unmarketable produce (including domestic use) (Kg)	Net Produce (Production to be sold) (Kg)	Total Income (SBD)	Total Cost of Production (SBD)	Net Income (SBD)
Grand Total							

Production Cost & Income Analysis Sheet

1	2	3	4	5	6	7	8
Crop	Amount of crops planted	Total Production (Yield) (Kg)	Unmarketable produce (including domestic use) (Kg)	Net Produce (Production to be sold) (Kg)	Total Income (SBD)	Total Production Cost (SBD)	Net Income (SBD)
Tomato			2	23	1000		
Beans				35	1650		
Corn		25	0	25	600		
Total	-	-	-	-	1600	1100	400

3) Production & Sales Record

1) Material & Monetary Input
2) Labor Cost

Crop wise

No sheet but need to keep record

Very difficult to grasp production cost crop wise

Total Income – Total Production Cost

Production Cost & Income Analysis

(5) Production Cost & Income Analysis Sheet <Tree>

Name of community:

Year of production:

AF plot (Name & area):

1	2	3	4	5	6	7	8
Tree species	No. of trees planted or remained	No. of trees harvested	Total volume (m3)	Net Produce volume (after sawing) (m3)	Total Income (SBD)	Total Cost of Production (SBD)	Net Income (SBD)

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Production Cost & Income Analysis

(6) Production Cost & Income Analysis Sheet <Total>

Year	Crop			Tree			Total		
	Production Cost	Income	Net income	Production Cost	Income	Net income	Production Cost	Income	Net income
1 st (2020/ 2021)									
2 nd (21/22)									
3 rd (22/23)									
4 th									
:									
:									
10th									

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Lunch Break

12:30 – 13:30

Practice

Please prepare the following 4 sheets by using sample records.
All sheets shall cover from August to November (2020).

- (1) Material & Monetary Input Sheet
- (2) Labor Cost Sheet (1 hour = SBD 10)
- (3) Production and Sales Record Sheet
- (4) Production Cost & Income Analysis Sheet <Crop>

Record Compiling by AF Sub-Committee

(1) Material & Monetary Input Sheet

Name: Hiromi

Month & Year: August – November, 2020

Date	Item	Quantity	Cost (SBD)	Who	Remarks (unit price, shops etc.)
5 Sep	Pesticide for crops	1 bottle	60	Elizabeth	ABC store
20 Aug	Hongkong Taro (Planting materials)	30 vines	250	Joseph	From Malaita
6 Aug	Beans (Planting materials)	1 pkt	200	Mary	Sunny store
15 Nov	Bus fee	2 trips	40	Elizabeth	
15 Nov	Bus fee	2 tips	40	Mary	
Grand Total			590		

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Record Compiling by AF Sub-Committee

(2) Labor Cost Sheet

Name: Hiromi

Month & Year: August – November, 2020

Date	Item	Quantity (hour)	Cost (SBD)	Who	Remarks (unit price, shops etc.)
4 Aug	Site preparation	3 hours	30	Elizabeth	
7 Aug	Prepare planting materials of tomato	2 hours	20	Elizabeth	
8 Aug	Plant tomato	2 hours	20	Elizabeth	
2 Aug	Land clearing	2 hours	20	Joseph	
15 Aug	Prepare Mahogany seedlings	1 hour	10	Joseph	
30 Aug	Plant Mahogany	1 hour	10	Joseph	
7 Sep	Weeding for tree seedling	1 hour	10	Joseph	
30 July	Prepare nursery for guava	2 hour	20	Mary	
22 Sep	Weeding for crops	2 hours	20	Mary	
15 Nov	Harvest tomato	2 hours	20	Elizabeth	
15 Nov	Harvest beans	2 hours	20	Mary	
Grand Total			200		E: 90, J: 50, M: 60

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Record Compiling by AF Sub-Committee

(3) Production & Sales Record Sheet

Name: **Hiromi**Month & Year: **August-November, 2020**

Date	Crop	Total Production (Yield) (kg)	Unmarketable Produce (domestic use)	Net Produce (sold) (kg)	Total Income (SBD)	Remarks
15 Nov	Tomato	17	2	15	600	
20 Nov	Tomato	8	0	8	400	
15 Nov	Beans	18	3	15	700	
30 Nov	Beans	25	5	20	950	
30 Nov	Corn	25	0	25	600	
Grand Total					3250	

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Production Cost & Income Analysis

(4) Production Cost & Income Analysis Sheet <Crops>

Name of community: **Komuniboli**Year of production: **August – November 2020**AF plot (Name & area): **AF training plot (first year)**

1	2	3	4	5	6	7	8
Crop	Amount of crops planted	Total Production (Yield) (Kg)	Unmarketable produce (including domestic use) (Kg)	Net Produce (Production to be sold) (Kg)	Total Income (SBD)	Total Production Cost (SBD)	Net Income (SBD)
Tomato		25	2	23	1000		
Beans		43	8	3			
Corn		25	0	2			
Grand Total					3250	790	2460

M&M Input: 590
Labor Cost: 200

3250-790

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Wrap up

- ✓ Objectives of record keeping and the production cost & income analysis.
- ✓ Overall procedure of making the Production Cost & Income Analysis.
- ✓ How to prepare the following sheets
 - (1) Material & Monetary Input Sheet
 - (2) Labor Cost Sheet
 - (3) Production & Sales Record Sheet
 - (4) Production Cost & Income Analysis Sheet <Crop>
 - (5) Production Cost & Income Analysis Sheet <Tree>
 - (6) Production Cost & Income Analysis Sheet <Total>

Effects of Burning in AF Site Preparation

November 2020
Hiromi Yamauchi



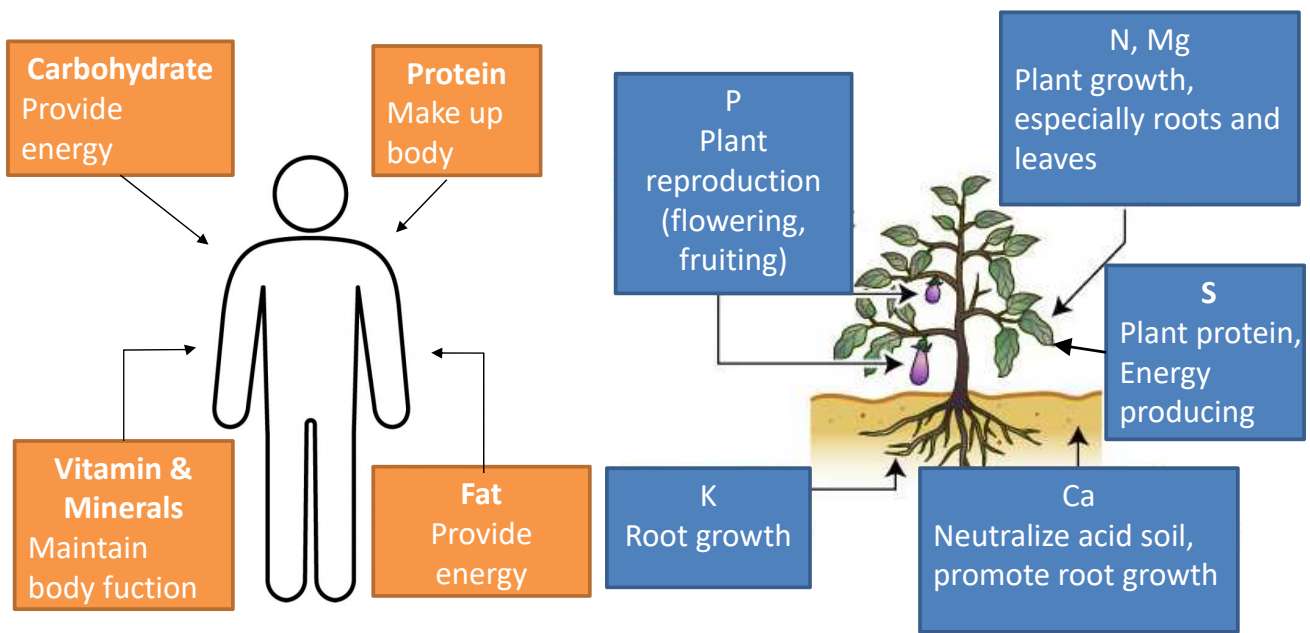
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Introduction (1): Why do you burn?

Why do you burn trees, shrubs, weeds, etc. when you prepare land for crop cultivation?

Introduction (2): Crop requirement nutrients



Source:
<https://www.otsuka.co.jp/en/nutraceutical/about/nutrition/functions/> (modified by the presenter)

Source:
<https://www.jeinou.com/benri/garden/basic/2009/07/151100.html> (modified by the presenter)

Introduction (2): Crop requirement nutrients

■ Three main nutrients

- **N**: plant (leaves) growth
- **P**: flowering, fruiting
- **K**: roots growth

■ Secondary important nutrients

- **Ca**: root health, growth of new roots & leaves
- **Mg**: chlorophyll, photosynthesis
- **S**: plant proteins, energy-producing processes

Source:
https://ucanr.edu/sites/Nutrient_Management_Solutions/stateofscience/Meet_Crop_Nutrient_Requirements/#:~:text=Crop%20nutrients,residues%2C%20and%20biological%20nitrogen%20fixation.
<https://www.dpi.nsw.gov.au/agriculture/soils/improvement/plant-nutrients>
<https://www.jeinou.com/benri/garden/basic/2009/07/151100.html>

Introduction (3): Soil and Nutrient Analysis Report

	Total Organic Carbon (%)	Total Soluble Nitrogen (NO ₃ -N/+NH ₄ ⁺ - N) (kg/ha)	Total Reactive Phosphate (PO ₄ - P) (kg/ha)	Potassium (exchangeable K) (kg/ha)
Optimum Levels	>5	>78	>202	>254
Falake (Low land)	8.6	3.3	3.4	443
Kommuniboli (Secondary Forest)	3.1	10.7	0.73	415

Effects of Burning: Summary

1. Minerals (Ca, Mg, K, P, etc.) stored in the above biomass (trees, shrubs, weeds, etc.) are released into the soil through the ash.
2. A significant portion of the mineral nutrients may be lost through erosion, runoff, and/or leaching.
3. Burning also changes characteristics of soil in terms of soil pH and cation exchange capacity.
4. Burning also contributes to weeds and pest/disease suppression.
5. Burning reduce living microbial biomass and its decomposing activities. But, some reports show that burning increased microbial biomass and its decomposing activities.

Source:

Anthony S.R. Juo, Andrew Manu (1996) Chemical dynamics in slash-and-burn agriculture. Agriculture, Ecosystems and Environment 58: 49-60.

Stefan Hauser, Lindsey Norgrove (2017) Slash-and-burn agriculture, Effects of

<https://www.sciencedirect.com/science/article/pii/B9780123847195001258?via%3Dihub>

file:///C:/Users/yamauchi/Downloads/EncycBiod2013Vol6551-562HauserNorgrove.pdf

Effects of Burning

1. Minerals (Ca, Mg., K, P, etc.) stored in the above biomass (trees, shrubs, weeds, etc.) are released into the soil through the ash.



Crops can use them.

- The amount of minerals released from burning depends on the amount of the above-ground biomass.
=> The AF plot has not much biomass, so that the amount of minerals released into the soil is not much.
- Intensive combustion of biomass causes substantial losses of C, N, and S to the atmosphere.
e.g. In an experiment conducted in Costa Rica, (Ewel et al. (1981))
22 % of N, 30 % of C, 49 % of S were lost.
- The amount of mineral nutrients gained by the soil after burning also depends on the capacity of the soil to retain and store the mineral nutrients in forms that are available to plants.

Source: the same as those in slide 6.

Effects of Burning

2. A significant portion of the mineral nutrients may be lost through erosion, runoff, and/or leaching.

- Mg, K, Ca, nitrate, and sulfate are prone to leaching.

Source: the same as those in slide No.6.

Effects of Burning

3. Burning also changes characteristics of soil in terms of soil pH and cation exchange capacity.

- Burning leads to increases in soil pH.
- Burning decreases CEC (Cation Exchange Capacity), which means the capacity of soil to keep nutrients becomes low.
- Burning increases P (Phosphorus) in surface soils.

Source: the same as those in slide 6.

Effects of Burning

4. Burning also contributes to weeds and pest/disease suppression.

- Heat evolved by burning kills weed seeds.
- Temperature at the soil surface may reach 200 – 800 °C, which depends on the amount of biomass and its water content as well as climatic conditions.
- When the temperature at the soil surface is relatively low, heat penetration into the soil is limited to a depth of 1 -2 cm.
- Soil-borne diseases might be affected by soil chemical changes.

Source: <https://www.sciencedirect.com/science/article/pii/B9780123847195001258?via%3Dihub>
<file:///C:/Users/yamauchi/Downloads/EncycBiod2013Vol6551-562HauserNorgrove.pdf>
https://www.istage.jst.go.jp/article/jsfwr1966/23/2/23_2_111/_pdf

Effects of Burning

5. Burning reduce living microbial biomass and its decomposing activities.

- Burning can reduce living microbial biomass in the topsoil and potentially their decomposing activities.
- However, some literatures reported that burning increased microbial biomass and its decomposing activities in tropical savanna and in a tropical tree plantation.
- Many crops have mycorrhizae that helps crop growth. Burning reduces the mycorrhizae which may affect on plant growth.

Source: the same as those in slide 6.

Conclusion

- Effects of burning are very complicated and depend on soil conditions and those of the above-ground biomass as well as burning situations.

Let's observe effects of burning in the AF plot!

Slash-and-burn vs. Agroforestry

	Slash-and-burn	Agroforestry
Land	<ul style="list-style-type: none"> S-a-Burn is conducted by moving one plot to other. This means S-a-B needs huge areas. 	<ul style="list-style-type: none"> The same plot can be used continuously for crop cultivation as well as tree planting.
Soil nutrient	<ul style="list-style-type: none"> Mineral nutrients (Ca, K, Mg, P, etc.) are released by burning the above-ground biomass into soil through ash However, substantial portion of the mineral are lost through erosion, runoff and leaching, as well as to the atmosphere. 	<ul style="list-style-type: none"> Nitrogen may be fixed by planting legumes Other nutrients, especially K and P might need to be supplied from external sources.
Weed/Pest control	<ul style="list-style-type: none"> Burning kills weed seeds. However, burning sometimes allows invasion of grasses. 	<ul style="list-style-type: none"> Crop cover suppresses weed growing surrounding trees. Tree shade contributes to suppression of some diseases/fungus.
Crop/Tree	<ul style="list-style-type: none"> Only crops 	<ul style="list-style-type: none"> Both crop and trees including fruit trees
Labour	<ul style="list-style-type: none"> Less labour 	<ul style="list-style-type: none"> Labour intensive
Benefit	<ul style="list-style-type: none"> Short-term benefit only 	<ul style="list-style-type: none"> Short, medium, and long-term benefit

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Thank you very much!

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Forest products

HIGH VALUE ADDED

The Project on Capacity Development for Sustainable Forest Resource Management
 Training: High Value Added Forest Products
 Date: 27-28/January/2021
 Local: SI National Herbarium
 Participants: TSC members

Training: step by step

► Day 1: 27/01/2021

(9:00 - 12:30)

- General information and concept
- High value forest products in the Solomon Islands
- Project SFRM: 5 species with high value forest products

✓ Tasks: activity 1, 2, 3

(13:30- 16:30)

- Survey to research high value forest products

✓ Tasks: activity 4,5

► Day 2: 28/01/2021

(9:00 - 12:30)

- Survey discussion: review and adaptation
- Notes about methodologies for Management Assessment

(13:30 – 15:00)

- MOFR report framework for high value forest products in the Solomon Islands
- Discussion: field survey and report updating (responsibilities MOFR)

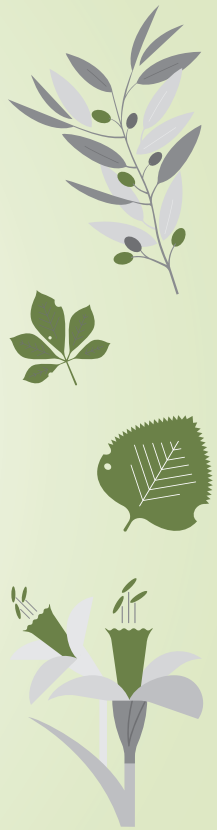
✓ Tasks: Activity 6 and 7



Forest Products

- ▶ Examples of forest products
 - Wood : timber, fire wood, handcraft...
 - Non-wood : nuts, fruits, vines, leaves, barks, flowers, mushroom...
 - Animals ?

▪Terminology: Non-Timber OR Non-Wood ?



Non-wood forest products (NWFP)

- ▶ A key component of definitions of NWFPs is that they **exclude timber**;
- ▶ The product, benefit or service should come from a forest, or from trees on other land.
- ▶ Any part of **any plant or animal** harvested for use can be described as an NWFP.
- ▶ *“Non-wood forest products consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests.”*
(FAO, 1999)

Non-timber forest products (NTFP)

NTFP includes wood for uses other than for timber.



Activity 1 (10 min + 5 min presentation per group)

- List the Solomon Islands Non-Wood Forest Product that you know and briefly describe the use(s) of those products.

Classification of NTFP

why and how?

- Classification systems are useful to:

Reporting; provide a basis for developing an understanding of the uses and demand for products or help match methodologies to resources.

Ex: biosecurity : <https://www.biosecurity.gov.sb/Importers>

Good news: there is no single, commonly used classification for NTFP or NWFT.

- Classifications based on **products** or **end uses** tend to ignore the product source, but can facilitate tracking through the market.
- ✓ **Food** (wild fruits, edible leaves, edible nuts, mushrooms...)
- ✓ **Medicinal** (essential oil and concentrates...)
- ✓ **Construction** (wood, fibres, vines, leaves...)
- ✓ **Fuels** (wood...)
- ✓ **Handcrafts** (wood, fibers, vines..)
- ✓ **Dying and colouring extracts**
- ✓

**Add value to
the forest
products**

+ High value





What are the forests products in the Solomon Islands with potential to add high value ?



What are the high value forests products in the South Pacific?

The Project on Capacity Development for Sustainable Forest Resource Management in Solomon Islands

➤ Selected 5 species:

➤ **Native** ➤ 3 potential HVFP
(2 NWFP, 1 WFP)

- *Calophyllum inophyllum*
- *Cananga odorata*
- *Diospyros spp*

➤ **Exotic** ➤ 2 potential HVFP
(1 NWFP, 1 WFP)

- *Santalum spp*
- *Vanilla planifolia*

- What do we know about these species globally and in the SI?
- What are the available information about those products?
- Where we can find these species in the SI?
- Does it occur in the *pilot areas*?
- Does it possible to grow it in the *pilot areas*?
- What is important to know about them?



High value

The same questions we could make for any other area.

Activity 2 (40 min + 5 min presentation per group)

- Select one of the species listed below:

1. *Calophyllum inophyllum* (Koilo)
2. *Cananga odorata* (Ago, Sa'o, Sa'osa'o, Perfum flower)
3. *Diospyros spp* (King or Queen Ebony; use for carvey)
4. *Santalum spp* (Sandalwood; exotic)
5. *Vanilla planifolia* (Vanilla; exotic)

- Supposing that you need to do a report for the MOFR about the selected specie providing general information about it in the global and national scale and the potential high value products:

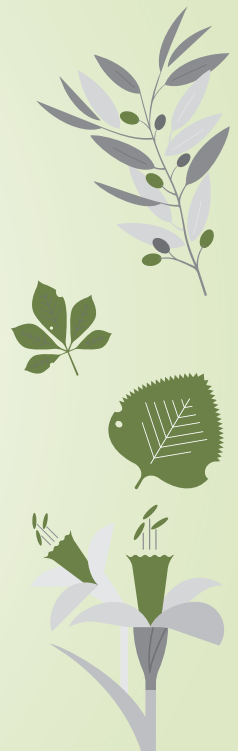
- What are the information that would you include in you report?
- Where would you research and look for information?
- ✓ **List the items(subjects) that you would include in your research.**

1. What and where to research?

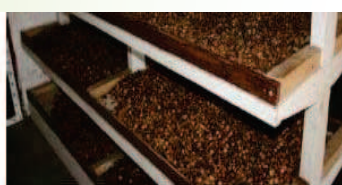
- ✓ Science (botanic, biology, habitat, products, production, etc)
- ✓ Traditional knowledge (habitat, uses, etc)
- ✓ Market (products, where, what, value, etc)
- ✓ Experiences (programs, projects, pilots, gardens, etc)

Report content- draft

1. Overview
2. *Xxxxx sp* in the Solomon Islands
3. Specie Profile
4. Botanic Information
5. Environmental Preferences
6. Growth and development
7. Technical recommendations for *Cananga* cultivation
8. Value added Products and species usage
9. Manufacturing
10. Global Market
11. Supply
12. International Market
13. Market Prices and Trading



Calophyllum inophyllum (Koilo, Dalo, Tamanu)
(Printed material)



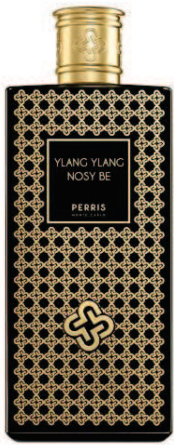
Calophyllum inophyllum (Koilo, Dalo, Tamanu) (Printed material)

Market Prices and Trading

- In Vanuatu: 30 VT/kg (USD 0.25) at the village level for peeled tamanu nuts, while the collectors (middlemen) receive 50 VT/kg (USD 0.42) from the factory.
- In 2019, exported with a cost of USD30 – 35 per litre.
- On the domestic market, a 330ml bottle is sold at USD 7.42 or USD 22.48/liter)
- The online retail store Vulcanic Earth Vanuatu sells 1 liter of pure Tamanu oil for USD 167.99.
- In Fiji : local farmer and oil producer sell it for approximately USD 153.03/liter.
- In USA a gallon (3.78 liter) is sold for USD 269.99 (equals to USD 71.05/liter).
- In Vietnam: certified Tamanu oil for USD 18/L, and 200kg gallon of oil for USD 2200.
- In India: USD 20.45/L while 1 kg in a bulk is sold from USD 7.50 to USD 34,08.
- In Hawai'i, the price for one small bowl with 14 cm x 19 cm is USD 325 ;
- medium bowls with 16.5 cm x 22 cm costs USD 375,
- plate with 6.35 cm x 24.13 cm is sold at USD 225.
- tray are sold for USD 19.99, spoon for USD 31 and plate for USD 79.

Cananga odorata (Ago, Sa'o, Sa'osa'o, Perfume flower) (Printed material)





Cananga odorata (Ago, Sa'o, Sa'osa'o, Perfume flower) (Printed material)

Market Prices and Trading

- In Indonesia: USD 175.00/kg.
- In Nosy Bé Island (Madagascar) prices range from USD 29,6/kg to USD 236/kg for the best quality.
- A 5ml small bottle of Ylang-Ylang extra grade : USD 14,69 in the USA and in New Zealand a 10 ml of pure oil is sold for NZD 10,00 (USD 6,69).
- Blended Ylang-Ylang oil (mixed with bergamot, grapefruit, lavender and neroli) is sold for a much cheaper price of USD 2,49 for 5 ml. 120ml blended oil costs USD 24,99 while one US liquid gallon (3,78 l) costs USD 565,99.
- In Australia, a kilogram of pure Ylang-Ylang oil is sold for AUD 550 (USD 392) while in the USA 2.26kg is sold for USD 1356.
- In Auki and Honiara markets, one bottle with 200ml of coconut oil mixed with *Cananga odorata* flowers is sold for SBD 10,00.

Diospyros spp

(Ebony, Queen ebony, King ebony)

(Printed material)



Ebenaceae : comprises about 744 accepted taxa of species and infraspecific names.

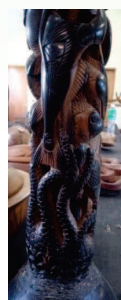
Diospyros is mostly native to the tropics with an occurrence of 10 species in the Solomon Islands (Whitmore, 1966), 5 of them are cited in the IUCN Red list of threatened species.

- In the South Pacific: *D. hebecarpa*, *D. samoensis*, *D. insularis* and *D. vera* produce ebony
- On Vagunu Island: ebony-producing species were identified as *D. samoensis* (locally referred as 'Rihe kokojiolo' or queen ebony, and 'Rihe chinoko' or king ebony) and *D. vera* (synonym for *Diospyros ferrea*, which is the accepted botanical name).
- *D. samoensis* - preferred species for wood carving, while the *D. vera* is often disregarded due its poor quality for carving and sometimes referred to as 'ninije' (meaning 'dirty in colour').
- Makira Island: *D. hebecarpa*

Diospyros spp is listed as a protected tree species under the Solomon Islands Forest Resources and Timber Utilization Act [Section 44 (1) (r)]

Diospyros spp

(Printed material)



EARLY SOLOMON ISLANDS CANOE PROW HEAD AMULET NGUZU
NGUZU INLAID PEARL SHELL

EUR 239.05

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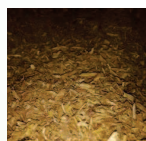
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Santalum spp (Sandalwood)
(Printed material)



Santalum spp (Sandalwood)

(Printed material)

Market Prices and Trading

- More recent information on sandalwood **heartwood** and **oil** prices for *S. album* and *S. austrocaledonicum* and *S. yasi*:
 - S. album* **oil**: USD 1,750 to USD 2,100; up to USD 2,500/kg for legally sourced product
 - S. album* **heartwood**: USD 100/kg.
 - S. austrocaledonicum* **oil**: USD 1500-1750/kg.
 - S. yasi* **heartwood** (village-gate price for Fiji's):USD 50/kg.

Vanilla planifolia

(Printed material)



- *Vanilla planifolia*
- *Vanilla tahitensis*
- *Vanilla pompona*



Natural vanilla is said to be the 2nd most expensive spice on the globe, second only to saffron. This is due to its intensively-involved methods of cultivation, which also makes the vanilla industry one of the world's most volatile markets

Vanilla planifolia

Market Prices and Trading

- PNG cured Tahitian vanilla bean/pod, Grade A, 16cm - 17.5cm: USD 16,00; 2,28 kg:USD 2,500.00;
- PNG Grade B (13cm - 17 cm): 10 kg bulk option of vanilla beans, USD 2,016.00;
- PNG 453 g of Tahitian Vanilla Paste: USD 110.00
- PNG 10kg Tahitian Vanilla Caviar Paste: USD 1,088.00;

- Mexican Vanilla Extract bottle: 456.53 g : USD 72.00, Bourbon Vanilla Extract bottle: 456.53 g :USD 62.00;
- In a bulk, 10 litres of Natural Vanilla Extract (type and quality not specified): USD 567.00;

- Madagascar Vanilla powder: 113 g: USD 111.00; In a bulk, 10kg of ground Vanilla Powder: USD 783.00
- 200g of Vanilla Caviar Seeds: USD 62.00; In a bulk, 10kg of Vanilla Caviar Seeds: USD 1,602.00.

Activity 3 (20 min for analysis+5 min presentation per group)

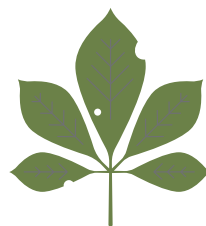
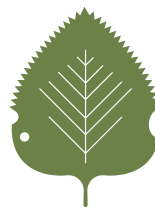
► Verify the draft report and analyse :

1. Does the draft included the items listed in the activity 2?
2. What information is missing or is additional to the list?
3. Does the report bring information about:
 - The species at globally level and in the SI?
 - Production and Products made with it?
 - Market?
 - Where we can find these species in the SI?
 - Does it occur in the *pilot area*?
 - Does it possible to grow it in the *pilot areas*?
 - What is important to know about them?
4. What information is missing?

Break (lunch)



12:30h - 13:30h





Wake up!

2. What we still don't know about it?

3. What we need to know?
Why?

Who wants the information?

- ✓ Preparation of management plan for specific area?
- ✓ National policy and strategic plan?
- ✓ International report? (CITES species; certification; risk analysis...)
- ✓ Other?

Survey

Baseline form
adapted to the objectives of the specific study



Activity 4 (1 h preparation + 10 min presentation per group)

- ▶ Supposing the Reforestation Division are interested to verify the **occurrence** of the High Value Forest specie (selected in the Activity 1) in the pilot area and do a initial assessment to check the potential for producing it in that region, describe:
 - What information should be assessed in the field?
 - What data would you collected during a field survey?
 - How would you collect the data?
 - Would you need support from other Division and Ministries? What? (ex: agriculture)
- ▶ **Using the flipchart and/or notebook prepare:**
 - ✓ **List of information that you would add in the survey form**

Notes about the methodology (ex: interview, community meeting, collection of samples, picture record, etc).
Note of material (equipment)
 - ✓ **Working in the draft**

Survey form HVFP: initial assessment to think about...

- ▶ What are the main subjects (thematic areas) to investigate? (environment, social, production, economic...?)
- ▶ For each thematic area, what is important to know?
- ▶ Who much time, team and budget we have?
- ▶ What to ask? What to collect? What technology?
- ▶ Who can help?
- ▶ How to start? Where to go?
- ▶ We should speak with who? How?



MOFR
HVFP Survey form
initial assessment

Activity 5 (1 h)

✓ **Development of the final survey**
(using notes from activity 4)

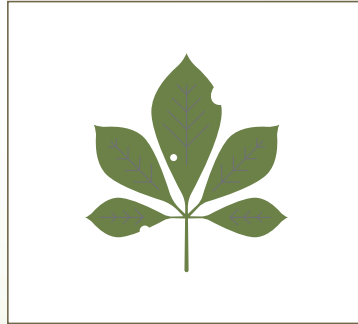
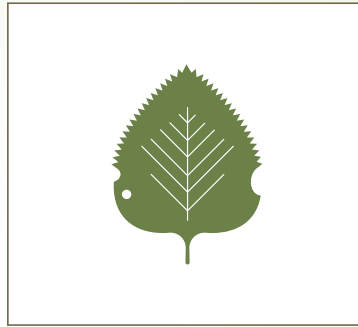


Working together
from the draft to the final version

Final Survey Form:

- ▀ (to add the survey form based on the results of day 1)

Thank you for you participation today!!



Good job!

See you tomorrow !

Forest products

HIGH VALUE ADDED





Training: step by step

► Day 1: 27/01/2021

(9:00 - 12:30)

- General information and concept
- High value forest products in the Solomon Islands
- Project SFRM: 5 species with high value forest products

✓ Tasks: activity 1, 2, 3

(13:30- 16:30)

- Survey to research high value forest products

✓ Tasks: activity 4,5

► Day 2: 28/01/2021

(9:00 - 12:30)

- Survey discussion: review and adaptation
- Notes about methodologies for Management Assessment

(13:30 – 15:00)

- MOFR report framework for high value forest products in the Solomon Islands
- Discussion: field survey and report updating (responsibilities MOFR)

✓ Tasks: Activity 6 and 7



Review of
day 1
(5 min)



Final Survey Form:

- (to add the survey form based on the results of day 1)



Attachment note -methodology

- (based on the results of day 1)



Attachment note- list of material

- based on the results of day 1)



NOTES: HFVP Management Assessment What to consider?

- Why the assessment?
 - For who?
 - Budget?
 - Level of detail?
- 
- ✓ Methodologies of forest inventory/biometric study
 - ✓ Environment information
 - ✓ Social aspects
 - ✓ Economic and value chain issues

When is biometric relevant? (table 18, section 5 FAO, 2001)

Biometric rigour is important because it provides reliable, good quality information ensuring appropriate planning and management.

- ▶ *Exploitation* – avoiding overharvesting
- ▶ *Valuation* of tropical forest resources – allowing comparisons
- ▶ *Strategic* overviews – planning and prioritization
- ▶ *Credibility* – avoiding political bias
 - Where governments have to defend their reasons for setting quotas to those who lobby for higher (industry/trade) or lower (conservationists) levels, reliable data are important).
- ▶ **Livelihoods – giving the right advice :**
 - Decisions based on resource assessments can influence the long-term survival of species and thus livelihoods.
 - Oversimplification of complex situations, risking giving poor recommendations, should be avoided. It is critical that community based assessments provide useful and reliable information – advisers should see this as an ethical obligation.

Good inventory design

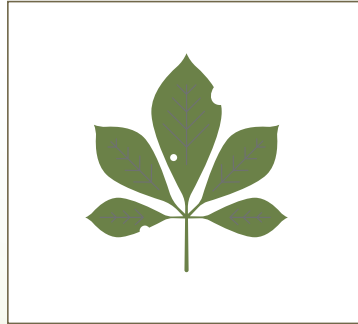
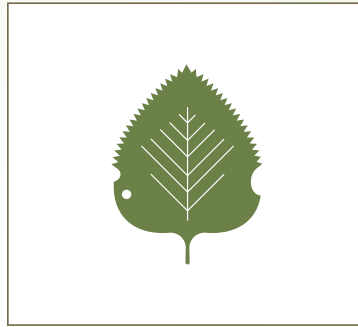
- ▶ There are a series of elements underlying good inventory design. These include knowing:
 - purpose of the inventory (for whom, for what);
 - information needed to meet this purpose (distribution, density, size class distribution, etc.);
 - current status of NWFP (distribution, level of threat);
 - level of recorded local knowledge about NWFP;
 - level of unrecorded local knowledge about NWFP;
 - time and funds available for the assessment; and
 - level of skills available for the assessment.

Section 5, Table 23, FAO, 2001

Break (lunch)



12:30h - 13:30h



Wake up!



MOFR report framework HVFP

- Proposed framework: general information and specific data
- HVFP classification
- Updating system: incorporating field survey data to the report
- Publicity
- Responsible

MOFR
HVFP report
framework

Activity 6 (30 min)

✓ **Development of the final report framework**
(using notes from all previous activities)



Working together
from the draft to the final version



Final HVFP report framework:

- ▀ (based on the results previous discussion)



Activity 7 (HOMEWORK- "DUTIE WORK")

1. Carry out the survey in the pilot areas

- ▀ Define: species and responsibilities (organization, field, analysis, report)

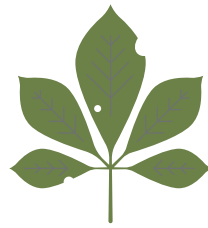
2. Update of the HVFP reports to incorporate the data collected in the field.

- ▀ Discuss the responsibilities (analysis and report)

3. Present the final version to the committee, approval and publicity

- ✓ **WHEN: Field (February?); Report (1 week after field)**

Thank you for you participation!!



Well done!

Have a good field activity!

Project on Capacity Development for Sustainable Forest
Resources Management in Solomon Islands
Ministry of Forest and Research (MOFR) &
Japan International Cooperation Agency (JICA)

JICA SFRM PROJECT STAFF AND TSC(MOFR) STAFF
BRIEF MEETING.
8TH FEBRUARY 2021

NON-WOOD FOREST PRODUCTS & HIGH VALUE FOREST PRODUCTS

MOFR/JICA

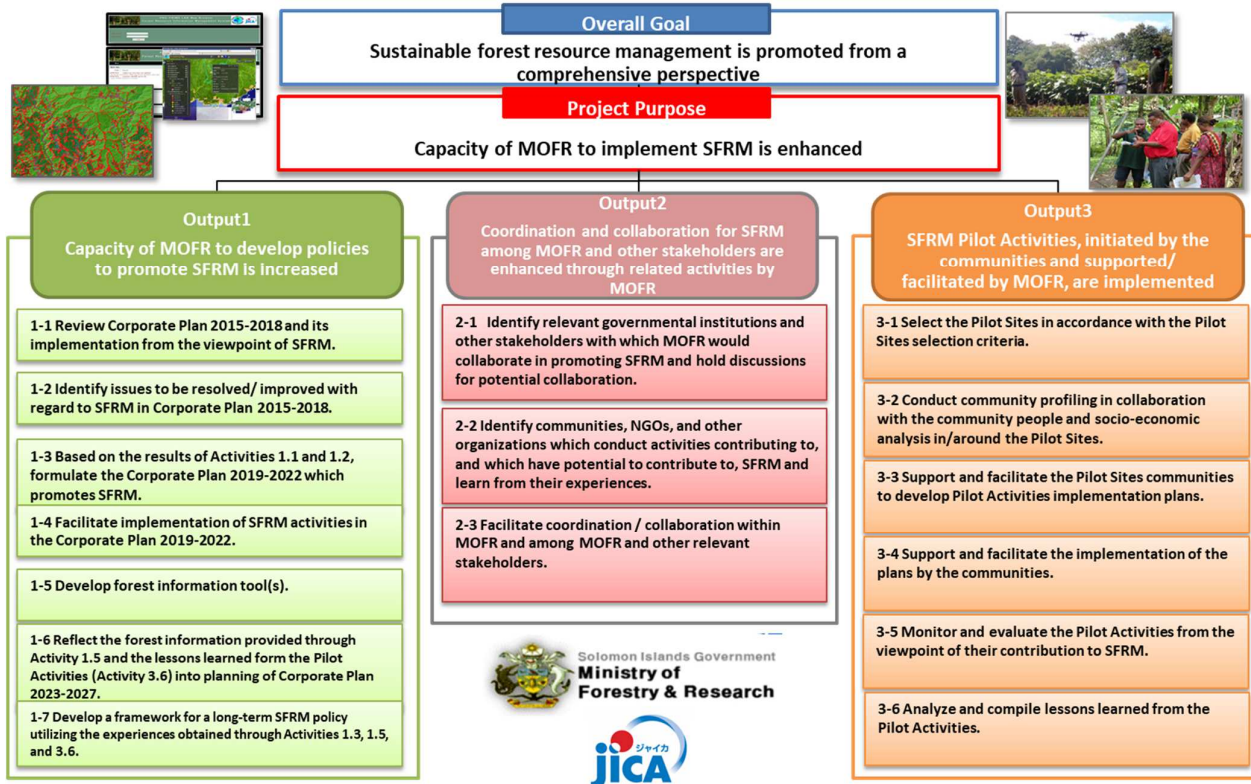


Table of Contents

AGENDA

1. Introduction
2. Program Outline
3. Budget update.
4. Facilities required for trip.
>Species collection requirement.
5. Any comments
6. AOB.

1. JICA's SFRM Project Outline



MOFR/JICA



2. Activities

Output 3: SFRM Pilot Activities, initiated by the communities and supported/ facilitated by MOFR, are implemented.

Activity 3.1 - 3.6 are implemented to realize the output 3.



MOFR/JICA



Activities to realize the Output 3.

- Output 3: SFRM Pilot Activities, initiated by the communities and supported/ facilitated by MOFR, are implemented.
- Activity 3.1 - 3.6 are implemented to realize the output 3.
- **Forest Management Plan**
- **>Scheduled Project Activities 2020.**

Scheduled Activities 2021

Months/2021	Scheduled activities	Comments.
January To December	<p>In 2021, the Project activities of both pilot site will be following;</p> <p>3.3.6 Facilitate formation and enhancement of community organization.</p> <p>3.4.1 Provide technical guidance and training for strengthening the management of the community organization.</p> <p>3.4.2 Provide technical guidance and training for forest management.</p> <p>3.4.3 Provide technical guidance and training for agro-forestry.</p> <p>3.4.4 Provide technical guidance and training for wood product and NTFP.</p> <p>3.4.5 Provide technical guidance and training for other livelihood activities.</p> <p>3.5.1 Develop a M&E Implementation Plan for monitoring and evaluation of pilot activities.</p> <p>3.5.2 Support periodic monitoring and evaluation of MOFR.</p> <p>3.5.3 Analyze the results of monitoring and evaluation.</p> <p>3.5.4 Report the results of monitoring / evaluation to MOFR and community.</p>	<p>These are still upcoming in 2021, so will wait for instruction from Project Experts from Japan.</p>

Background:

- **It is essential to improve the livelihood of local residents by using timber and non-wood forest products in order to realize sustaining forest conservation, and their production and processing is also the responsibility of MOFR. But MOFR does not have enough information on these high value-added forest products. Therefore trainee collect those information in this survey. MOFR officers go to inspect and survey the habitat of forest product and verify the feasibility of commercialization.**

Involvement of TSC MOFR Staff

- Forest Management Research on Potential NTFP plants in SI-Lorenza Cadeiro.
- **Contents and Outcomes**
The expected outcome is firstly the TSC members to acquire the knowledge about NWFP in Solomon Islands, especially in pilot site and acquire the skills how to collect the necessary information below. And MOFR officers utilize those knowledge for the future HVFP industry development.
- Identification, location and Species
- Initial investigation (basic information)
- Environmental assessment
- Social information
- Resource status, management system, yield
- Processing and commercialization

Objectives

- Capacity building for the TSC Members about NTFP and high value-added forest products.
- Field survey preparation to investigate NTFP and forest high value-added products.
- Development of the MOFR framework report about NTFP forest high value-added products

8/4/2022



MOFR/JICA



9

Schedule Activities

Date	Activity	Responsible	Location
01-12/Feb	Field activity organization: material, budget, methodology/approach	Frida, Erik, Ruvie, Arnold Support: Lloyd&Hilary	Honiara- MOFR Office
15-16/Feb	Field activity: HVPF survey Cananga o. (Sa'o'sa) -> Callophylum (Koilo) -> Vanilla -> Santalum (sandalwood) ->	Support: Hillary/Lloyd Frida&Arnold Frida&Arnold Ruvie Erik	Komuniboli
18-20/Feb	Field activity: HVPF survey Cananga o. (Sa'o'sa) -> Callophylum (Koilo) -> Vanilla-> Santalum (sandalwood) ->	Support: Hillary/Lloyd Frida&Arnold Frida&Arnold Ruvie Erik	Falake
23-26/Feb	Survey data analyses (data compilation, download GPS data, maps preparation, download pictures, etc)	Frida, Erik, Ruvie, Arnold Support: Jica and KKC team	Honiara, MOFR Office
01-05/Mar	Report update	Frida, Erik, Ruvie, Arnold Support: JICA and KKC team	Honiara, MOFR Office
08-12/mar	<ul style="list-style-type: none"> • Presentation for TSC; • Discussion and decision about: <ul style="list-style-type: none"> – MOFR Division/ focal point to keep and update the survey framework and report framework; – Publication (MOFR website?) 	Frida, Erik, Ruvie, Arnold Support: JICA and KKC team	Honiara, JICA Office
8/4/2022	– Survey in other provinces? (eg. Diou)	MOFR/JICA	

10

Budget Preparation

- **EXPENDABLE AREAS:**
- >Transportation
- >Food and Accommodation
- >Travelling Allowance
- >Etc.

Other Preparatory Areas:

- Specimen collection (Requirement for this)
- Equipment required:
 - >Sol.Star for wrapping specimes @\$5/bundle.
 - >Zip-lock bags A4 size (20 pcs per pkt) @\$10.00 per pkt. 2 pkts for pilot sites.
 - >Photo taking: Own Mobile, Camera (project)
 - >Secateur – for cutting off specimens approx@SBD40.00.
 - >Pole and hook for higher branch/flowers cutting and collection – Hook at Island Enterprise but pole yet identify source of outlet and Cost is unknown.

-Improvisation-Local pole from bush, climbing.

- Preservation and Drying of Specimens:
 - >Ethanol purchase for preservation of plant specimens.
 - >Give order request through Pharmacy at Hyandai Mall. Need checking on Order request 2020. Need atleast 2 liters of **Ethanol**.
 - >Alternative for preservation _Drying of specimen done at Herbarium, when preserved with Ethanol in the field. Drying will need Gas Cylinder, and stove (Single Burner). Drier belonging to Herbarium.

Cost

> Ethanol = , Gas cylinder 4 kg = 130.00, Single Burner at Origin Gas = 300.00

Stationaries:

>Note book (provided by Project)

>Pencil ""

>Biro ""

Rope for press and tying of specimens at Island Enterprise.

Cost- SBD20 per pc x 4 = SBD80.00

Specimen Storage container – SBD100.00 at Talon

Rain Coat- Own/make available.

Gum Boot – Existing ones in Project custody.

Training Materials:

- Concept Note for field activities.
- Survey Forms
- HVFP Report Framework 1st Draft.
- Training Materials.

> You should got these in your possession.

Thank you

PIGGERY PROJECT TRAINING:

VENUE: KOMUNIBOLI COMMUNITY

DATE: 23/11/20-27/11/20

PROVINCE: GUADALCANAL PROVINCE

ANIMALS AND THE COMMUNITY

Why People Keep Animals?

People Keep Animals Because they are Useful. Animals are source of;

- ❑ **food** such as meat, milk, and eggs
 - ❑ **clothing** from wool, hair, skin, and hides
 - ❑ **shelter** for example, ropes and tents can be made from wool and hair
 - ❑ **money** animals or their products can be sold
 - ❑ **fertiliser** from manure
 - ❑ **handicrafts** for example, bone carvings or feathers for mats
 - ❑ **protection** for example, guard dogs
 - ❑ **transportation** for example, horses can be ridden or used to pull carts
 - ❑ or sleds, bullocks can be used to pull carts or sleds
 - ❑ **companionship** for example, pets
 - ❑ **labour** for example, bullocks can be used for ploughing, sheep dogs can be used to herd sheep, guide dogs can be used to help people who are blind.
-

ANIMAL WELFARE

Animal welfare is concerned with improving the well-being of animals: that is;

- ❑ making sure animals are taken care of in the proper way.
 - ❑ Animals should not be caused unnecessary pain, stress, or suffering.
 - ❑ They should not be starved or forced to go without water.
 - ❑ In fact, it is important to always try to improve an animal's well-being because good welfare increases animal productivity and the quality of animal products
-

VERY IMPORTANT TO NOTE;

- Many Solomon Islanders keep animals and treat them very unfairly because of the consensus that animal is an animal **[not the same as humans] without realizing that animals have useful and important impact in their livelihood.**
-

RELATIONSHIP BETWEEN ANIMAL WELFARE AND ANIMAL PRODUCTIVITY

- Animals treated in a humane way (that is, meeting an animal's needs for food, water and shelter and providing proper medical treatment) are likely to be healthier, grow faster, be more productive and suffer less stress than animals that are treated cruelly.
-

Inhumane treatment would ...

- ❑ On the other hand, animals that are not treated well are more likely to be less tame and suffer from health problems.
 - ❑ Less tame animals are likely to fight more, which can cause wounds, damage to carcasses (animal bodies) and hides (animal skins) and even deaths. Also, less tame animals are more dangerous to handle.
-

ANIMAL SUFFERING

Animal suffering is generally caused by one of three factors:

- ❑ **neglect** when an animal is not given enough food or water or is not provided proper shelter
 - ❑ **abuse** when an animal is hit unnecessarily or someone deliberately causes harm to an animal
 - ❑ **deprivation** when an animal's freedom is restricted, or it is prevented from associating with other animals of its kind
-

REASONS FOR ANIMAL WELFARE PROBLEMS

There are many reasons for animal welfare problems:

- lack of knowledge
 - lack of money
 - greed
 - lack of time
 - laziness
 - cruelty
-

COMMON AREAS OF POOR ANIMAL WELFARE

The welfare of an animal might be ignored in a number of ways. Animal welfare problems are commonly found in:

- handling
 - nutrition
 - health
 - protection from exposure to the elements (wind, rain, heat, sun)
 - tethering
 - housing
 - slaughtering
 - transportation
-

PIG and the Community

NOW WE LOOK AT THE PIG

Introduction to pig Keeping in the Solomon Islands.

- ❑ Pig raising is not a new technology within the country
- ❑ Our ancestors have been keeping pigs in the past decades
- ❑ Today the value of pig is so important for the following reasons:-
 - Income
 - Improve Diet
 - Celebrations, feasts, ceremonies
 - Export possibilities (reduce import)

As this is important and due to introduced breeds into the country, we have to improve the level of management for high production and profit for pig producers.

Reasons for starting or Extending the pig industry in a certain Area

- Shortage of protein in diets
 - Improve economical strength of small holdings.
 - Pigs are popular and there is a good local demand.
 - There are good export possibilities.
 - There are many unused by-products.
 - Land for cropping is unfertile, and fertilizers are expensive, so pig husbandry is advisable.
-

Importance of pig raising in rural areas;

- Income
 - Feasting/celebration
 - Protein source (supplement)
 - Personal status
 - Security/cultural occasions
-

You might have more than one reason for starting a pig enterprise

However in any case there must be a market for pork, and feeds must be available.

Important points to check and think about before starting or introducing pigs into your area.

- Market situations
 - Availability of feed and water
 - Availability of land to grow feeds for the pigs.
 - Animal health and Extension services
 - Site selection-land tenure/topography
 - Availability of labor
 - Financial strength of farmers/possibilities to borrow money
 - Social or religious objections against pigs or pork
-

Project Planning

- ❑ In any project establishment, planning is always to be considered during initial stage.
 - ❑ Planning means a successful project
 - ❑ No planning a project is a failure.
 - ❑ In pig farming the following point should be considered;
-

Choice of the most suitable type of project

Farmers to consider the type of project to be established; -

1. Fattening project-raise fatteners up to 4-6 months and sale
 2. Breeding project-raise and sell weaners for breeding and fattening
 3. Both (1) and (2)- raise breeders and fatteners in the same farm.
-

Small or large scale farming;

The farmer will have to decide on the scale of pig farming before venturing into it.

The size of the project will entirely dependent on the following:-

CONT....

- Land availability
 - Capital to implement the project
 - Market availability for the project
 - Labour/manpower available to implement the project.
 - Managerial ability of the farmer to successfully run the project
-

Planning cont..

System of pig keeping

There were 4 basic systems, and may differ and similar to each other.

1. Extensive system

- Pigs roam around to feed themselves
 - Pigs sometimes are fenced
 - Pigs are not properly managed
 - Pig growth is slow
 - Pigs are easily infected with parasites
 - Production is very low
-



2. Semi-Extensive system

- ❑ Pigs are left in an enclosed area, probably fence/paddock
- ❑ Pigs are provided with food and water at times
- ❑ Shelter may be provided for pigs to sleep and farrow
- ❑ Kitchen wastes are often supplied to animals
- ❑ To improve this system, rotational paddocks are required with food crops grown for the animals.
- ❑ Pigs are often underfed, therefore low production and high worm (parasites) infestations remain a constant problem.

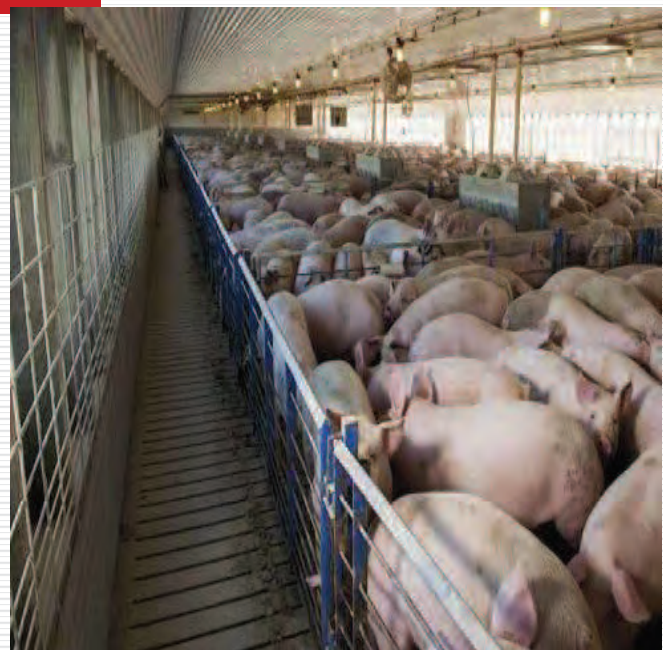


3. Semi-Intensive

- Pigs may have a permanent place to live in
 - Most feeds are supplied from the gardens with supplement from purchased feed
 - May need a high level of management
 - Daily management includes feed/water and proper housing practices
 - Provides good production and profit
 - Good chances to prevent or control diseases and parasite infestations.
-

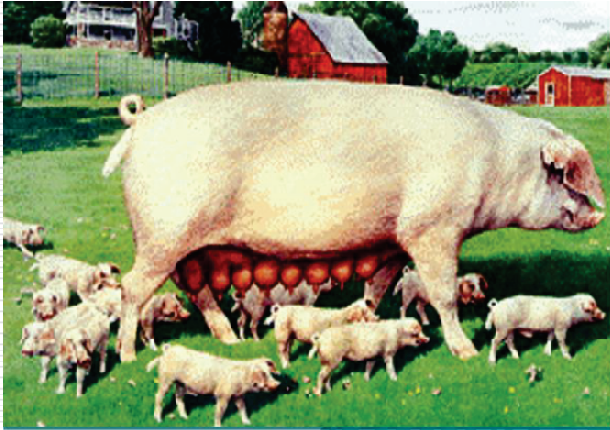
4. Intensive System

- Pigs are housed in special designed houses where they are born and reared
- Pigs have no access to outside environment
- High level of management is required
- Pigs are fed on balanced diet
- Pigs are slaughtered and sold on regular basis
- The system is of high input/output in terms of labour cost and returns
- Diseases and pest infestation are prevented/controlled or treated



Breeds

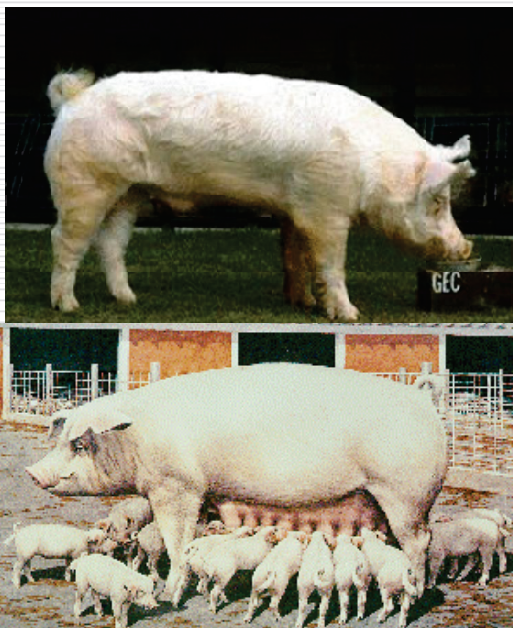
Landrace- originated from Denmark



Characteristics

- Body is long and is white in colour
 - Ears bend towards the eye (sloppy ears)
 - Requires high level of management
 - Good for breeding
 - Produces 12-14 piglets/litter
-

Large white – UK- Yorkshire



- White colour
 - Erect ears
 - Disc face
 - Large body
 - Can produce up to 12-14 piglets
 - Can not tolerate harsh conditions
-

Duroc-USA



- Red/brown in colour
 - Erect and slightly slopy ears bend forward
 - Good well built body similar to large white
 - Quite aggressive animal
 - Good sows can produce 8- 12 piglets
-

Tamworth -England



Provided by Michael von Luttwitz

- Well known pig
- Red or brown in colour
 - Pig with narrow and long snout
 - Erect ears
 - Produces 8-10 piglets/litter
 - Tolerate harsh conditions
 - Good for breeding with native pigs.
-



- Short ears
 - Long and narrow head
 - Broad shoulder but narrow hind legs
 - Slow growth
 - Tolerate harsh conditions
 - Produce 5-6 piglets/litter
 - Good to cross with overseas breeds
-

Cross breeds [Hybrid] pigs



- Pigs which have parents of different breeds; i.e Tamworth crossed with large black.
 - Crossed bred pigs;-
 - a) grows fast
 - b) can produce more piglets/sow
 - c) with local pigs is even better.[give reasons]
-

GENERAL WELFARE AND CARE



HANDLING AND RESTRAINING PIGS

Pigs can be dangerous, but if proper techniques are used they can be easily and safely handled.

Handling of young piglets

- One hand by the hock
 - One hand under the chest
 - And hold against your body
-

Handling cont....

Handling of older pigs.

- Using of boards to lead the pig where you want it to go.
 - Restraining by using a pig snare
 - Or by using rope to hold it against a wall or fence
-

How to keep pigs in a field.

- Pigs can be kept in the field where they can be fed on grasses and plants. The field can be surrounded by a strong fence or a wall. Pigs can go outside if the fence is not strong.
 - Shelters should be provided for pigs to sleep in. these are called pig ark or kennels
 - Beddings such as grasses or wood shavings should be provided in the ark
 - Pig arks should be moved to fresh ground if the area is muddy.
 - Shade trees should also be available to avoid sunburn on the pigs.
-



AIMS of HOUSING

Just like human beings, pigs do also need proper shelter from:-

- Extreme weather conditions.
 - In order to have healthy pigs for a healthy consuming public, proper housing must be provided.
-

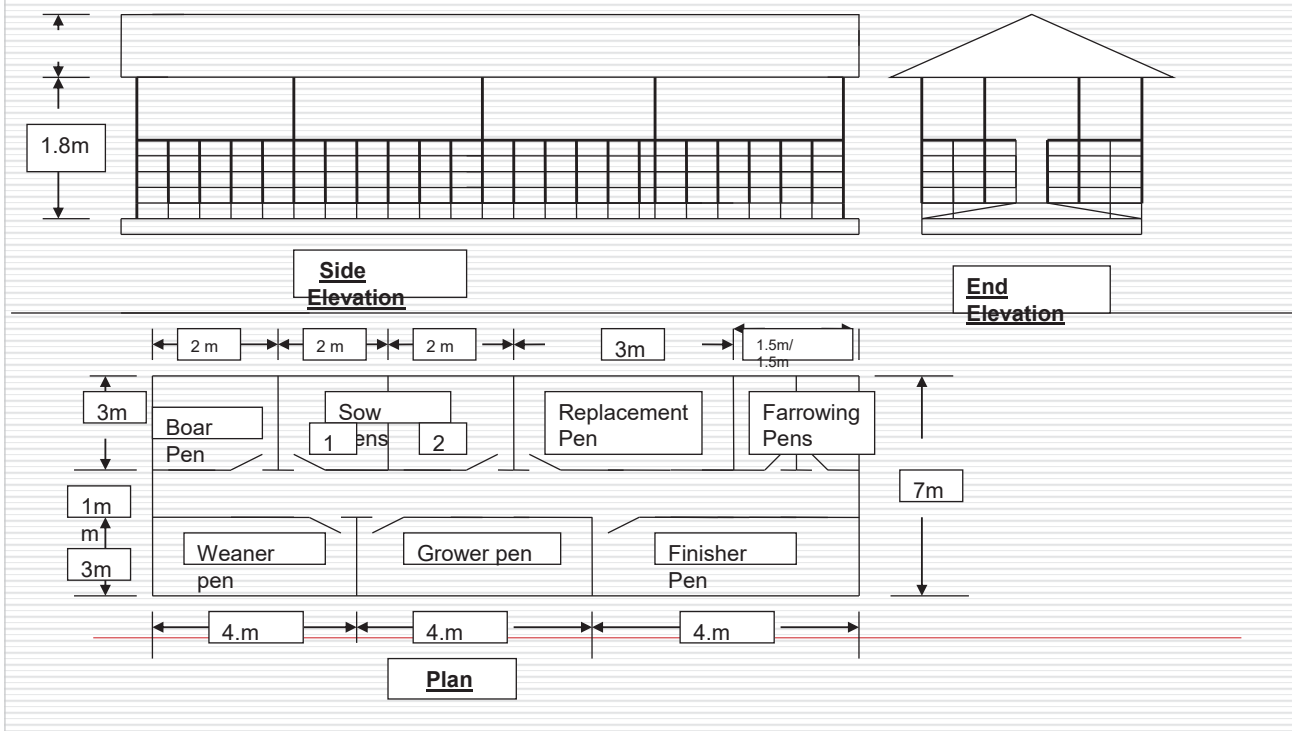
CONTINUE....

- Choose an area that is never floods in rainy seasons
 - Do not build the pigsty very close to sleeping houses as smell and flies can become nuisances
 - Concrete or solid floor is better
-

Below are certain considerations to make when constructing a pigpen.

- House should be built in a position to ensure enough light penetration. Each opposite sides (width wise) should face the easterly and western direction. This is to allow morning sunlight and late afternoon to penetrate but not the midday sunlight.
 - No more than 12 pigs should be kept in a single pen.
 - Ensure pens are kept clean daily.
 - Ensure floor must be a bit sloppy for easy drainage.
 - Ensure good ventilation so that there is no build up of smells or heat in the pigs shed.
 - Ensure plenty of water is available for cleaning and drinking.
 - Make sure to wash the concrete floor before feeding
-

3 -4 sow unit floor Plan



Housing and caring of piglets

Proper housing for piglets reduces the possibilities of health problems

- Proper and good farrowing pens for sow and piglets to stay together.
- Provision of beddings to provide warm for the piglets while in the farrowing pens.
- During farrowing some form of management and husbandry practices have to be applied.
- Creep area should be provided for the piglets within the farrowing pen
- Piglets can be given creep feed while in the creep area
- If it is too cold some form of heat i.e lamp, or electric light should be provided in the creep area to keep the piglets warm

Farrowing management

Things that normally done during farrowing

- Clipping of needle or eye teeth.
 - Tail docking
 - Iron supplement
 - General cleaning
-

Needle teeth of young pigs

Born with eight teeth, 4 at lower jaw and 4 upper jaw.

Why needle teeth of piglets need to be clipped?

To prevent;-

- Piglets from biting and wounding their mothers teats.
 - Sow might not feed the piglets as the teats are painful
 - The sows udder can become infected causing mastitis.
 - The piglets from biting and hurting each other.
-

Best time to clip the needle teeth

As soon as after birth-about 15 minutes old.
To clip the needle teeth, you will need.

- A pair of tooth clippers or side cutter pliers
- Someone to help separate the sow and the piglets.
- A box that contains bedding
- Clean and empty pen

Remember that sow with piglets can be dangerous

.....Illustration required.....

Castration of pigs

Castration is the removal of the testicles

Reasons for castrations

- Male pigs not required for breeding
 - Boars often fight each other causing injuries, castrated pigs are quieter and easier to handle
 - Castrated pig will put on more fat
 - The meat does not have a strong unpleasant smell (boar taint)
-

Castrating the pig

Can be castrated as early as possible- 1-2 days after birth. **But the best time is when they are 2-3 weeks of age.**

There are number of ways to castrate pigs. The most common method is the open method.

Steps of castrations

Materials required for castrations.

A very sharp, knife, razor blade or scapel. (scapel blade is the best)- someone maybe needed to hold the pig.

Steps..

Remove either the sow or piglets from the pen that they would not see or hear each other

Remove your watch, rings etc, as germs from these materials could get into the castration wounds and cause them to become infected.

Wash your hands well with soap and water, and fingernails need to be cut short and cleaned properly

Helper to hold the pig by hind legs and keep the head down while it is being castrated. Its body should be firmly held between the handler's knees

Clean the scrotum with warm water and soap

Wipe the scrotum with antiseptic such as iodine/dettol

Castration steps cont

- Move the testicles into the scrotum with your finger, then using your thumb and index finger, firmly grip the scrotum below the testicle.
 - Make a 2-3 cm (1 in) cut in the bottom of the scrotum. The testicle should pop out of the scrotum. Do not put your fingers inside the scrotum.
 - Pull out the testicle from the scrotum and cut through the white cord. **Leave the red blood vessel uncut.**
 - **Pull the testicle out slightly and twist it around several times.**
 - ❑ **In young pigs pull the entire testicle out to break the blood vessels.**
 - ❑ **In older pigs do not pull the blood vessel. Cut the twisted blood vessel by scraping up and down with the knife, this helps to reduce bleeding.**
 - **Remove the second testicle in the same way**
 - **Apply antibiotic powder or sulpha powder to the castration wounds**
-

Caring for piglets after castration

It is very important to take proper care of castrated piglets.

- **Put piglets and mother together on clean beddings**
 - **Watch piglets for signs of infections in the wound for the next few days. If a piglet does not walk or is lame, this may be due to infections or swollen castration wounds.**
 - **If there are any infections develops in the castration wound just treat as you would treat other wounds.**
-

Reproduction and growth- Heat (oestrus)

Gilt- female pig that has not yet given birth.

- Reaches puberty at 4-5 months old.
- Not ready for mating until 6-7 months old
- Slow growing animals (underfed) may take longer to reach puberty.

Sow or female pigs will come on heat every 3 weeks if it is not pregnant

Points about breeding

- Do not mate the gilt if it is on heat for the 1st Time.
 - Right age at 1st mating is 6/7 months old for breeding
 - Sows with 14 teats are good for breeding
 - A sow that is not pregnant would come into heat every 21 days
 - A sow that is in good health conditions would come into heat at 5-10 days after weaning.
 - A sow may come into heat for 8-36 hours.
-

Signs of pig on Heat

- A female pig on heat may become restless and not eat.
 - The vulva become red or pink and swollen.
 - When pressed on backside and would not move, is an indication that it is in heat and is ready to mate.
-

How to bring the sow into heat;

Healthy well fed sow can be brought to heat at convenient time;

- Put the sow that is in heat with other sows so that other sows may come on heat
 - Put the sows next to the boar pen so that they would smell and see him. Best method to bring the sow into heat
-

MANAGEMENT OF PREGNANT SOW

- Physical examination of a non – return to estrus at 21 days meant the sow is pregnant.
 - Feed intake should be increase for pregnant sow especially protein, energy, vitamins and mineral ingredients.
-

MANAGEMENT OF FARROWING SOW

Signs of about to farrow

- Restlessness scraping at the floor, biting the pen structure, find bed making if material is present, getting up and down, tail twitching, increase in punting etc.
 - Change in udder texture and the presence of milk (colostrums)
 - Breaking the water bag and presence of clear straw colored fluid in the vulva. Some dung maybe contained in the fluid.
-

Sow at farrowing stage

- ❑ At farrowing the sow will usually lie on her side and deliver her piglets in 1 – 3 hours with interval between piglets of 16 mins.
 - ❑ Farrowing is complete only after the expulsion of the placenta. Usually takes place after all piglets have been born.
 - ❑ During farrowing sow should not be given any feed.
 - ❑ Piglets will walk within few minutes of birth and move around to the side of the sow to suckle, usually within the maximum of 20 minutes
-

Lactation/Suckling

- ❑ Lactation usually lasts for 6 – 8 weeks (depending on weaning age)
 - ❑ Sows do not come on heat during lactation
 - ❑ Sow is mated 7 days after weaning
 - ❑ Piglets are kept with the sow for 6 – 8 weeks
 - ❑ Start creep feeding at 2 weeks of age until wean
-

Management of piglets (Piglet Husbandry)

- Availability of sows teats
 - Fostering
 - Creep
 - Clipping the needle teeth/Milk teeth
 - Tail docking
 - Ear notching
 - Iron injection
 - Castration (removal of the testicles)
 - Caring of piglets after
-

Management at weaning and care of the weaned pig

- Piglets are usually weaned at 6 – 8 weeks of age.
 - Sow usually come on heat 7 days after weaning and should be mated
 - Only cull sows producing less number of piglets.
 - Number of piglets produced by a sow usually reduces after 6th litter (3+ years, depends)
-

NUTRITION

- ❑ Nutrition is concerned with the animals feed to be given and when to give.
 - ❑ A diet that is balanced will provide maximum growth just like in the humans.
 - ❑ In order to have a healthy pig, it must have a balanced diet.
 - ❑ A balanced diet must consist of 6 different classes of nutrients which are water, protein, energy, fats, vitamins and minerals
 - ❑ Animals at different stages of growth requires different amount of feed.
 - ❑ Water should be given ad libitum
-

WATER

Fresh clean water must be provided every day a water trough or drinking nipple is best.

Pigs at different stages of growth require varying level of water.

Lactating sow = 20 – 30 liters

(5.5 – 8 gallons)

Young grower = 3 – 5 liters (.8 – 1.3 gallons)

Grower = 5 – 12 liters (1.3 – 3 gallons)

Dry stock = 12 – 15 liters (3 – 4 gallons)

Pregnant sow = 12 – 20 liters (3 – 5.5 gallons)

FEED TYPES

- ❑ Energy source: breadfruit, cassava, sweet potato, taro, spent brewer's grain, millrun
 - ❑ Protein source: meat meal, fish meal, coconut meal, palm kernel cake
 - ❑ Fatty feeds: coconut meal, palm kernel cake
 - ❑ Vitamins and Mineral source: fresh leaves (grasses), fresh leaves, colored fruits and vegetables
 - ❑ Recommended feed types to feed pigs with are millrun, copra meal and fish meal
-

Amount of feed required by each animal per day

- | | | |
|------------------|-----------|-----------------|
| ❑ Piglets | Creep | 0.1kg/pig/day |
| ❑ Weaners | Weaner | 0.5kg/pig/day |
| ❑ Growers | Grower | 1.1kg/pig/day |
| ❑ Finishers | Finisher | 2.0 kg/pig/day |
| ❑ Dry sow & boar | Breeder | 2.0 kg/pig/day |
| ❑ Lactating sow | Lactating | 4 – 6kg/pig/day |
- Note: or 0.5kg/piglet + 1.5kg/sow
-

Feed Calculations

- ❑ Pigs at different growth stages require different amount of nutrient.
 - ❑ Calculated feed is always on the animals energy and protein requirement
 - ❑ Piglets require 21% protein content in its feed
 - ❑ Growers require a feed that contains 19% protein i.e. after 6 – 8 weeks of age
 - ❑ 3 months after weaning i.e. 5 months of age, pigs require 17% protein in the feed
 - ❑ Adult pigs require 14% protein
 - ❑ Most times feed is calculated according to protein need of the animal.
 - ❑ When calculating feed for pigs, you need to consider the nutrient requirement of the animal, availability of feed and its nutrient content, and the stage of growth.
 - ❑ Once feed is calculated, it is weighed, mixed and given to pigs
 - ❑ Inclusion level of fish meal should not be more than 10%. This is to avoid watery pork and fish taste in the pork
-

Feed Formulation one

- ❑ Copra meal 25% [25KG]
- ❑ Millrun 55% [55KG]
- ❑ Fish meal 10% [10KG]
- ❑ Cassava (grated) 5% [5KG]
- ❑ Pawpaw fruit (ripe) 5% [5KG]

this is an ideal mixture for creep feeding. If diarrhea is observe reduce the amount of millrun or stop giving millrun

Feed formulation two (grower ration/lactation)

- Copra meal – 50% [50KG]
 - Millrun – 40% [40KG]
 - Fish meal – 10% [10KG]
-

Feed formulation three (finisher ration)

- Copra meal – 50%
 - Millrun – 35%
 - Fish meal – 10%
 - Cassava – 5%
-

Feed formulation four (breeder and dry sow/boar)

- Copra meal – 25%
 - Millrun – 55%
 - Fish meal – 10%
 - Cassava – 10%
- Calculate actual amount of each feed ingredient in each formula
- OR
- Copra meal – 30%
 - Millrun – 60%
 - Fish meal – 10%
 - Any level of greens/fruits
-

FEEDING

- Pigs should be fed twice daily, one feed in the morning and one feed in the evening
 - Add sugar or salt to creep feed to encourage young pig to eat
 - Avoid wastage of feed as it is expensive
-

FARM RECORDS

- Farmers have to keep records of all operations of the project, both physical and financial records. Farmers are however advised to keep records which are easy for them to understand or are familiar within their projects.
-

Importance of farm records

- To help assess the project progress/ viability
 - Aid his management decision
 - To help understand his failure and correct them
 - Encourage banks if he wants to draw loans
-

Physical records

- Stock Inventory- number of different classes of pigs.
 - Feed consumption
 - Feed stock inventory
-

Financial Records

- Income /sales records
 - Expenditure records
 - Profit /loss records
-

DISEASES and PARASITES

PRODUCTION PARAMETERS

- Sow to Boar ratio = 1:10
 - Number of sows e.g. 6 sows + 1 boar
 - Litter/Sow/Year = 2
 - Litter size/Sow/year = 10
 - No. of piglets/Sow/year = 20
 - Average weaning age = 6 – 8 weeks
 - Gestation period = 112days – 115days
 - Mortality pre – wean = 10% post wean = 5%
 - Lactation period = 42 days
-

Pig Age Groups

- Piglets (0 – 6 weeks or 8 weeks) lactating period 42 days
 - Weaners (7 or 8 – 12 weeks) 42 days period
 - Growers (13 – 18 weeks) 42 days period
 - Finishers (19 – 28 weeks) 64 days to 70 days period
 - Breeders (sow and boar) 365 days period
-

Stockmanship

- Person looking after the farm must be a well competent person with sound managerial skills.
 - The stockman should ensure that the animals have fresh water at all times and feed.
 - Detect presence of diseases and parasites
 - Observe stress animals and remedy their stresses
-









EVRI Ting OL Raet Bata, HAO?



Tagio Tumas

Pig Raising and Management

YOUR GUIDE FOR YOUR FUTURE IN PIG PRODUCTION



Outline

- Piggery Management
fattening
- Breeding
breeder

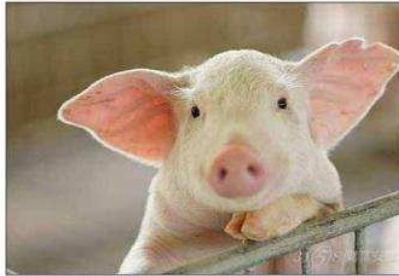


Life of Pigs

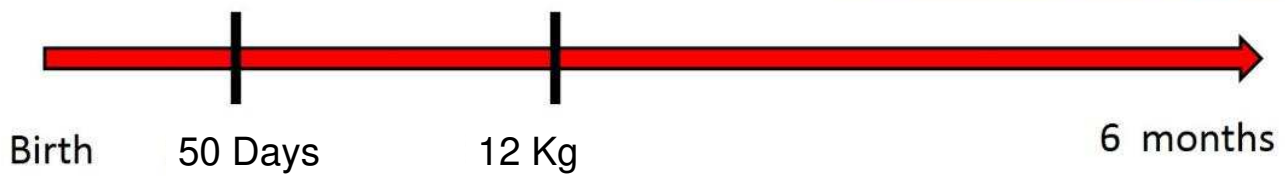
Suckling period



Nursery period



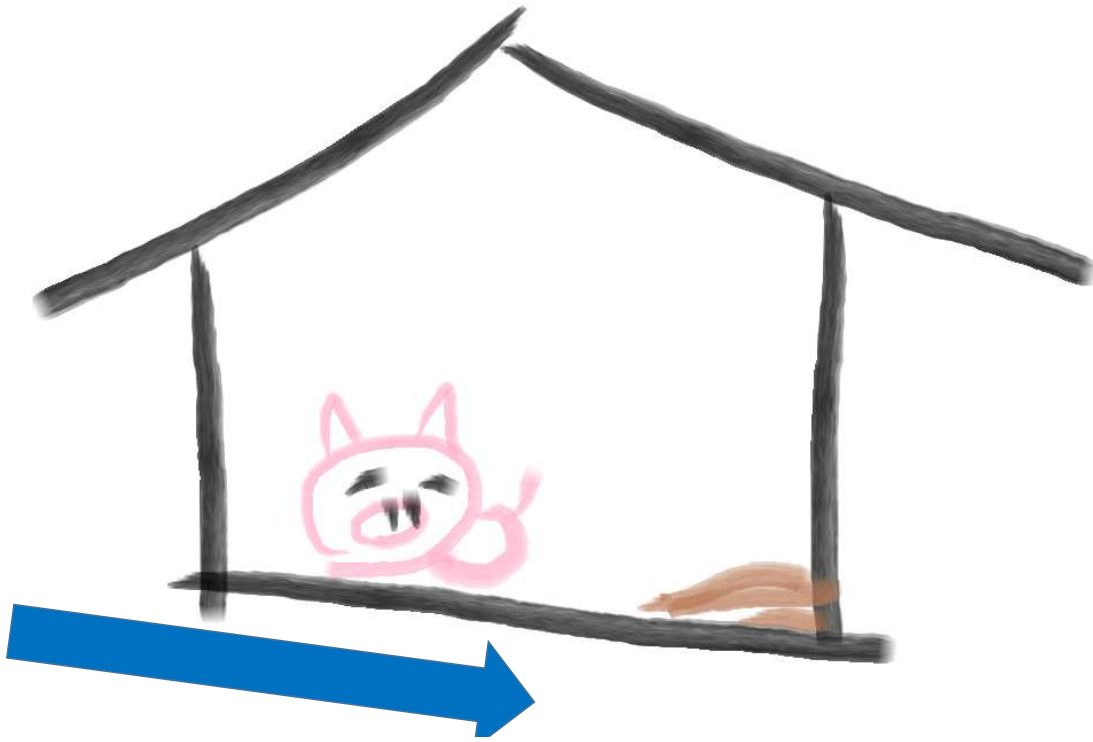
Growing period



Pig house



Floor



Slope

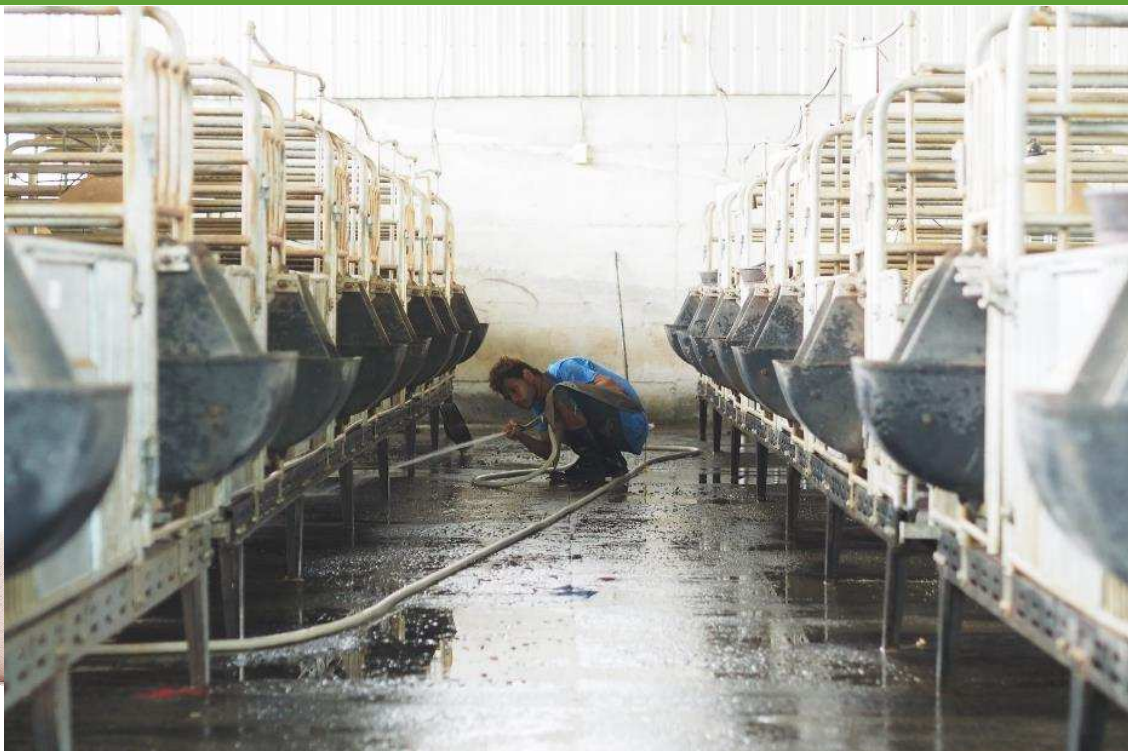


Daily working

- 1.Clean
- 2.Feed



Wash



Collect dry pu



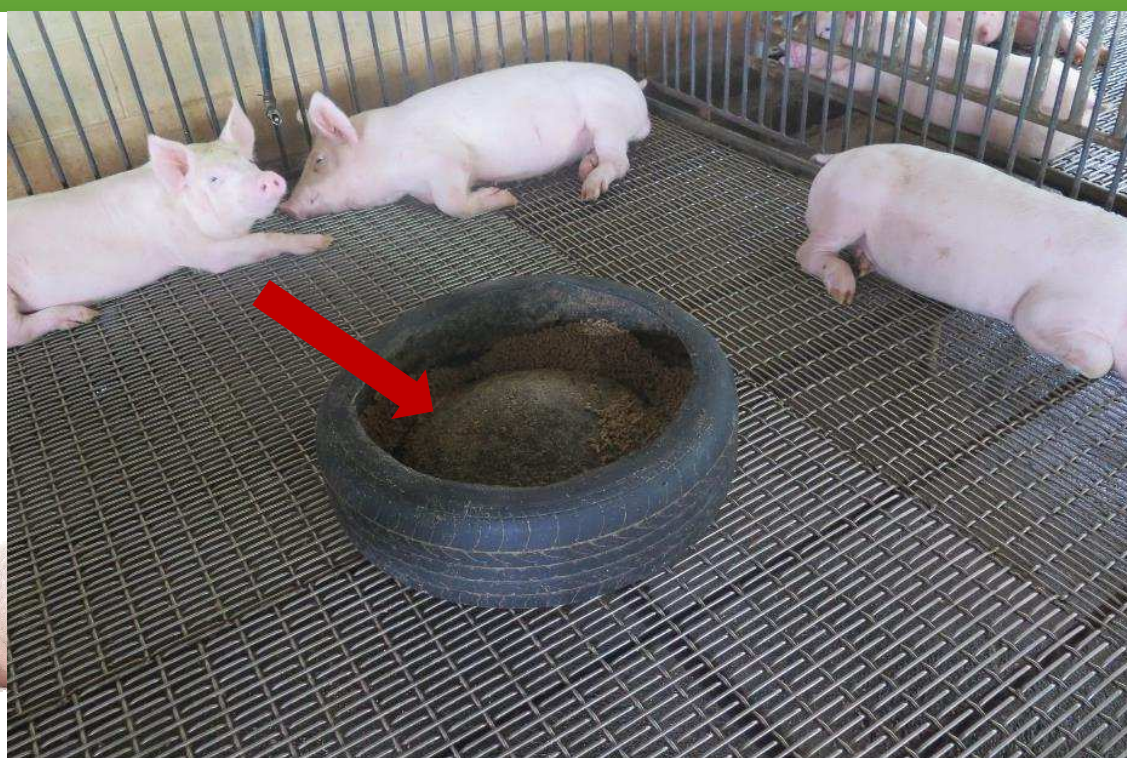
Sawdust



Feeding twice



Tire



Barrels of gasoline



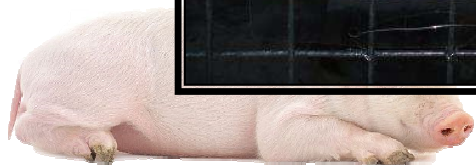
Group by Size



Group by size can decrease fighting and keep growing uniformly



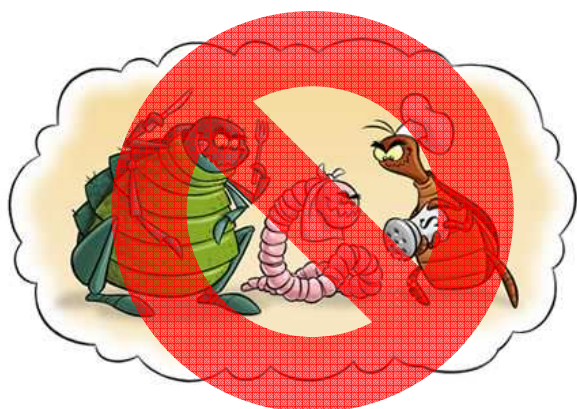
Biosecurity



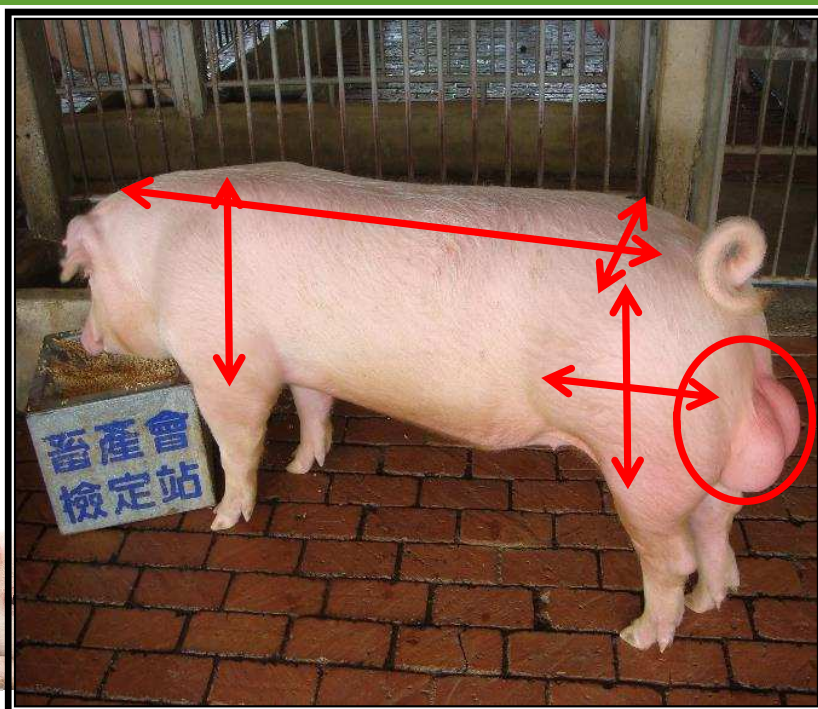
Soap water or bleaching water



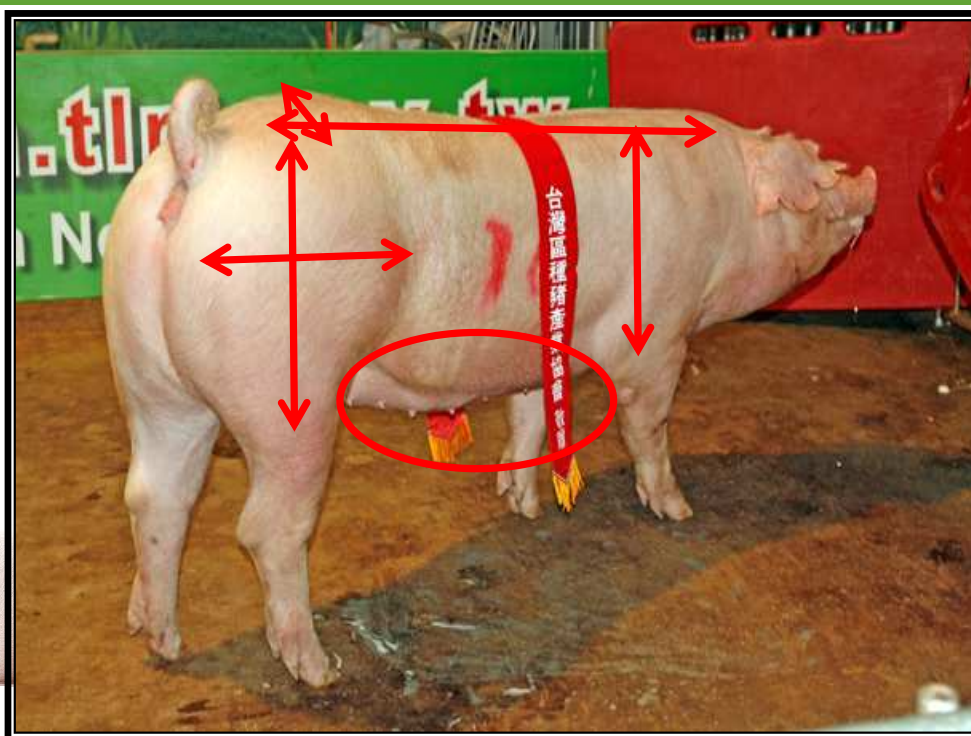
Deworming

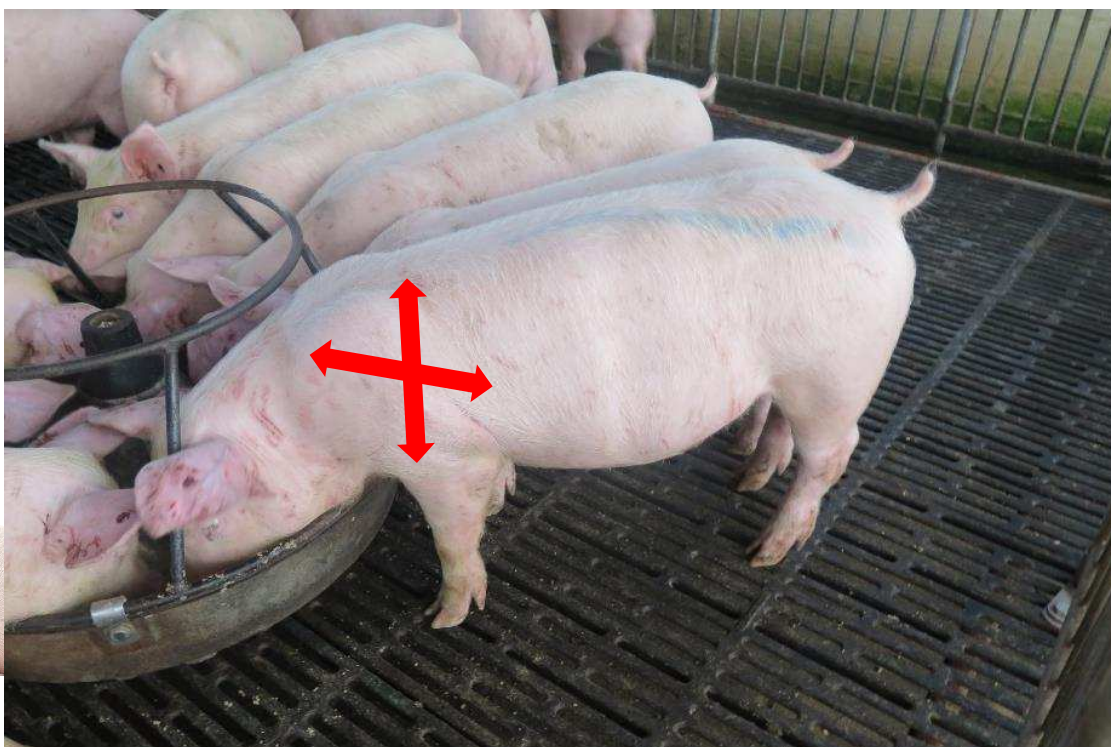
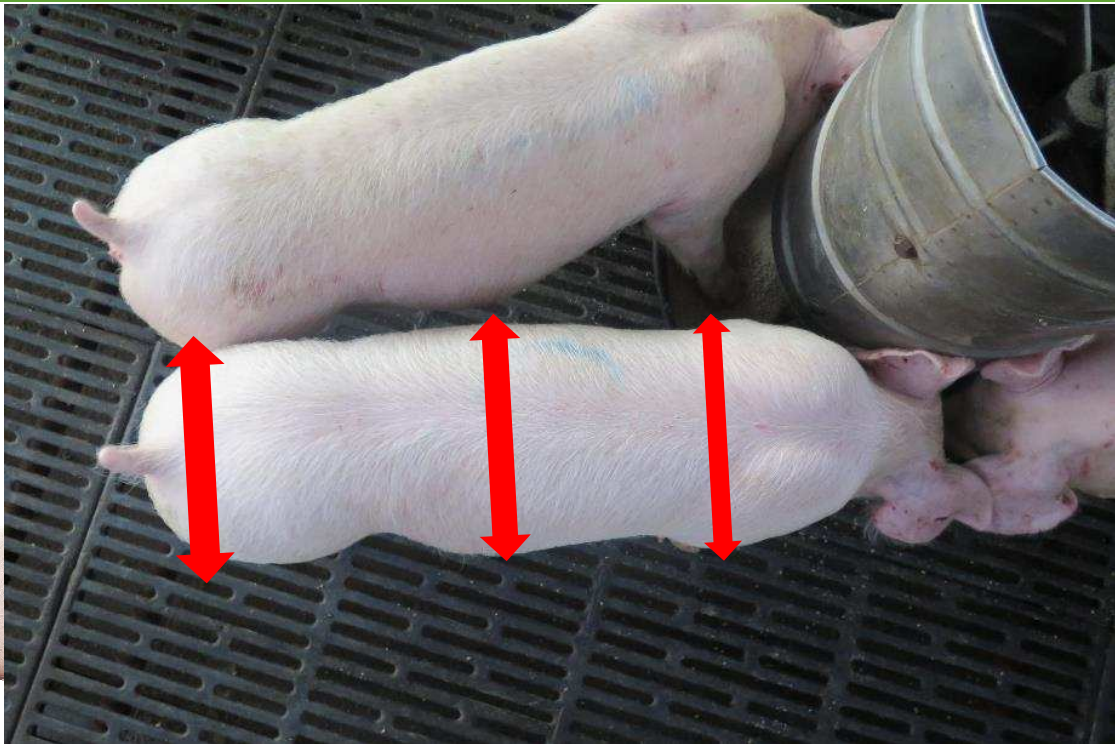


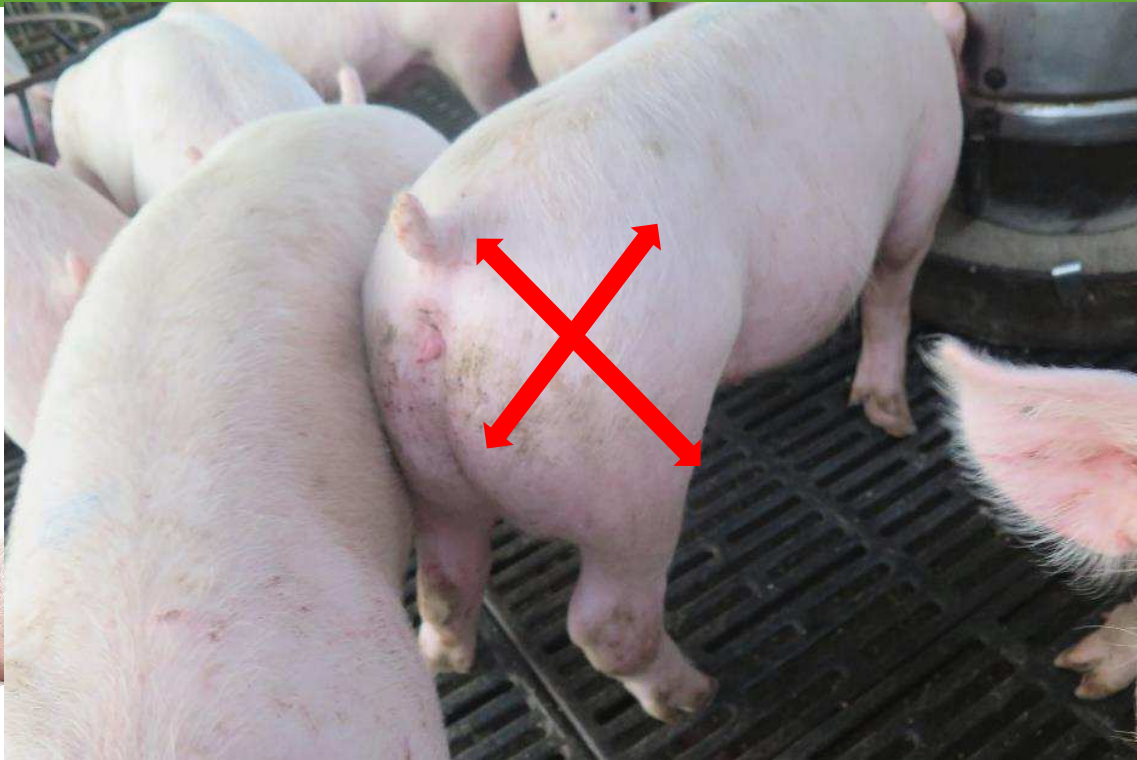
Breeding –BOAR SELECTION



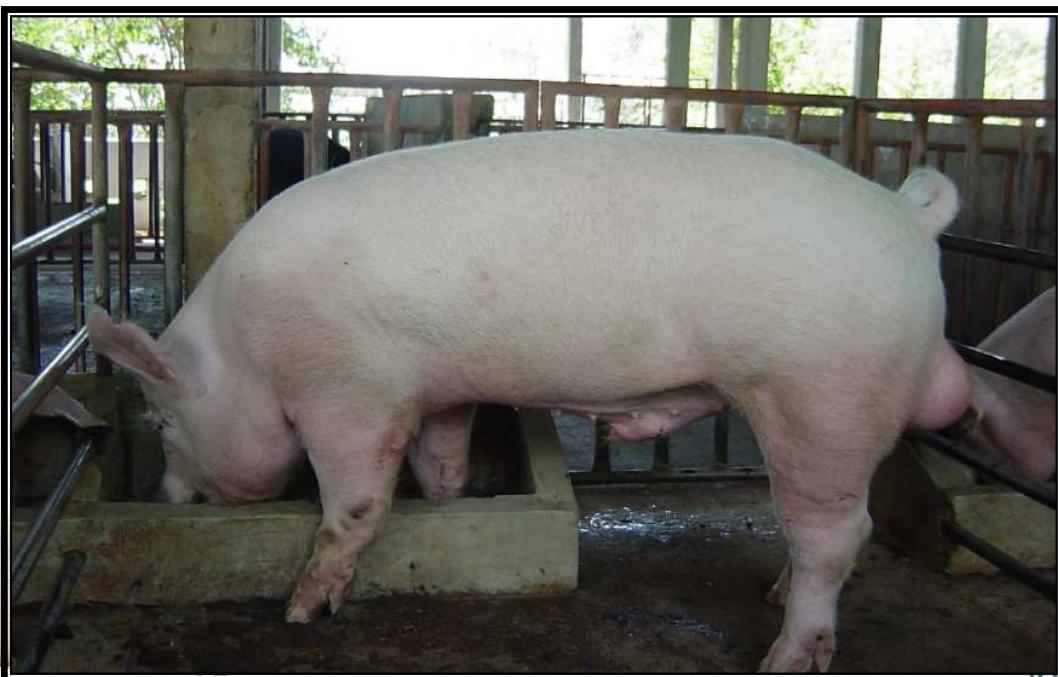
Gilt Selection







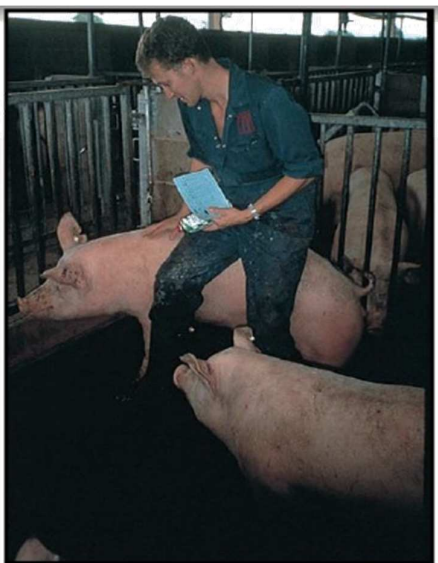
Boar Becomes Mature (100~120 kg)



Gilt Becomes Mature (90~110 kg)



Estrus



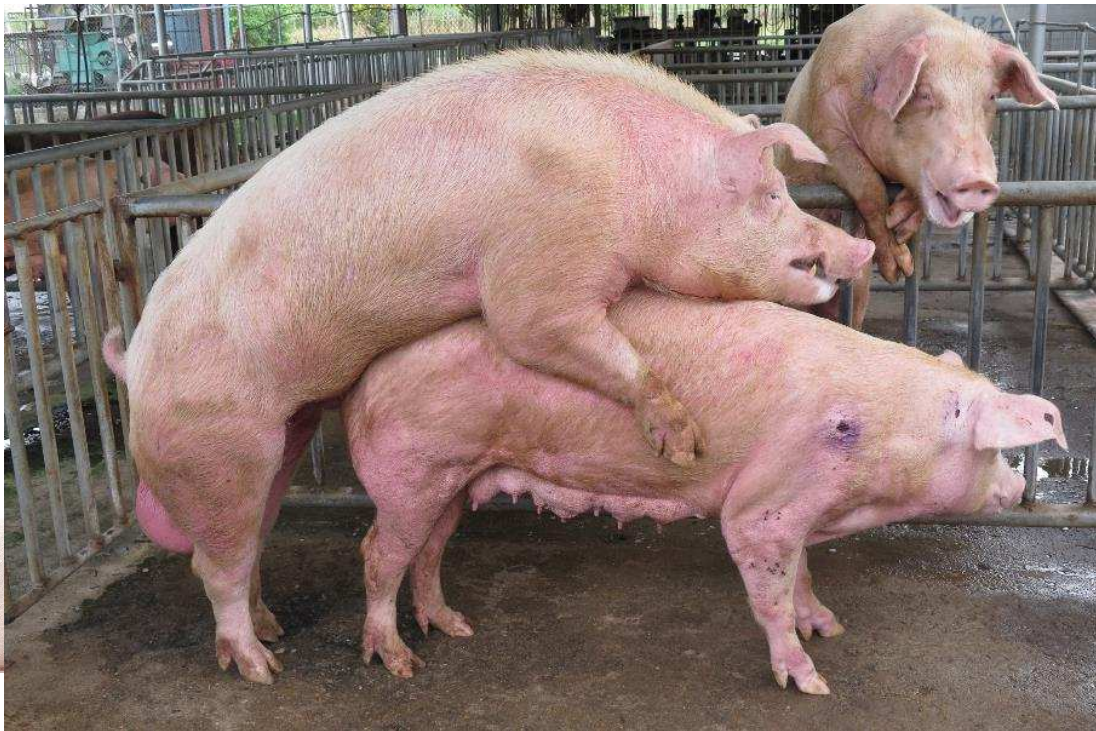
Pressure test



Sow's vulva become red and big

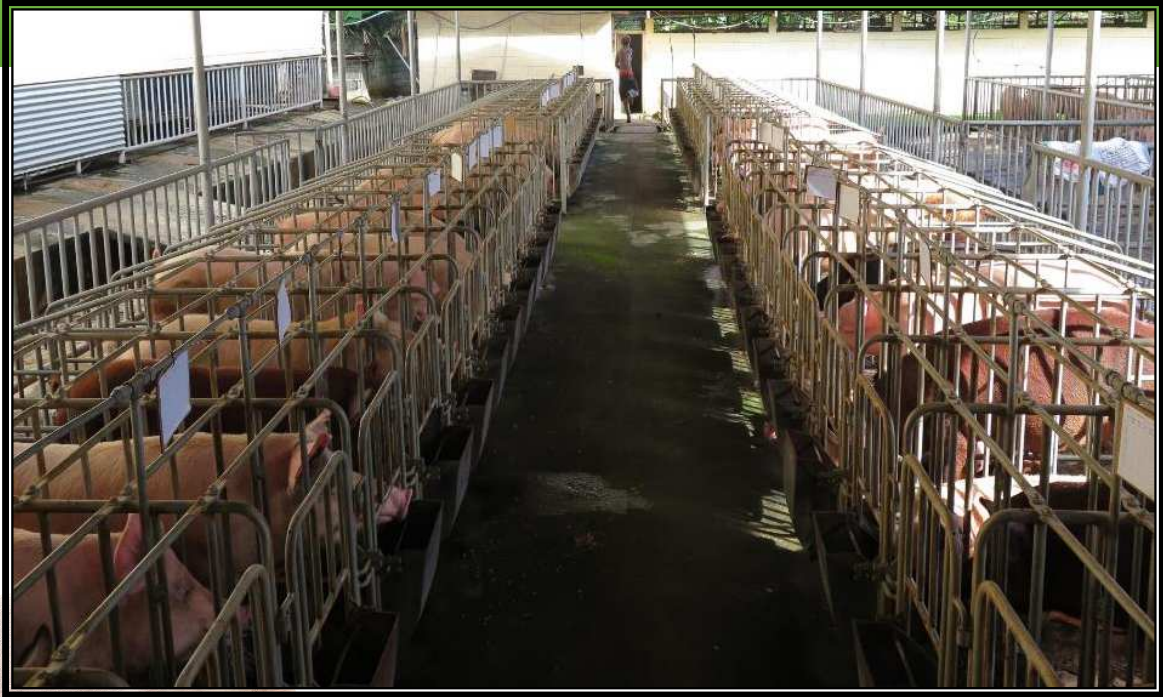


Mating Twice



Help New Boar Put Penis into Sow's Vagina





Pregnant period is 112 days-115 days



Farrowing Pen





Deliver- farrowing



Placenta Coming Out

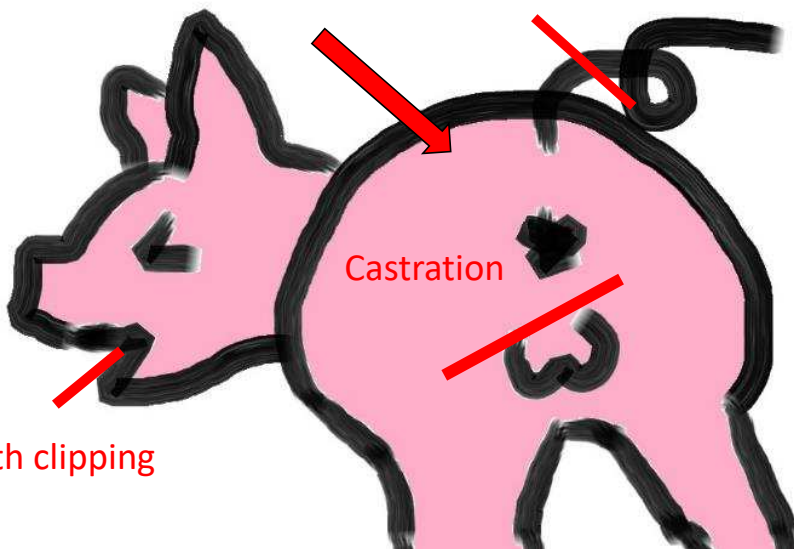


Clean piglet's face and nose



Iron ion(Fe^{2+}) injection

Tail docking



Teeth clipping

Castration



Teeth Clipping



Try to eat solid feed after 10 days



Diarrhea



Thank you tumas



PIG DISEASES

IN SOLOMON ISLANDS



WHAT ARE SOME DISEASES YOU SEE IN SOLOMON ISLANDS

- **PARASITIC**

- Roundworms
- Lungworms
- Mange (sarcoptic)
- Lice

- **INFECTIOUS**

- Porcine Parvovirus (PPV)
- Trichinosis
- Salmonellosis
- Swine Dysentery

- **Young Pig Diseases**

- White Scours
- Pneumonia
- Piglet Anemia
- Navel



CONTINUE

Nutritional

- Calcium Deficiency
- Phosphorous Deficiency
- Iron Deficiency
- Vitamin A Deficiency

Exotic Diseases [Overseas]

- Not yet but must be very careful that they are not introduced...

DISEASES REVIEW

- Porcine Parvovirus (PPV)
- Mange
- Trichinosis
- E.coli (White Scours in Piglets)
- Pneumonia
- Piglet Anemia
- Navel Ill



PORCINE PARVOVIRUS (PPV)

- What type of pigs does it affect?
 - Sows
- What are the symptoms?
 - Pregnant sow appears healthy
 - If infected before 35 days of pregnancy → small litters
 - Pregnant Mummified piglets
 - Increased stillbirths
 - Increase in low birth weights
- How can the disease be prevented?
 - Prevent exposure to infected adults



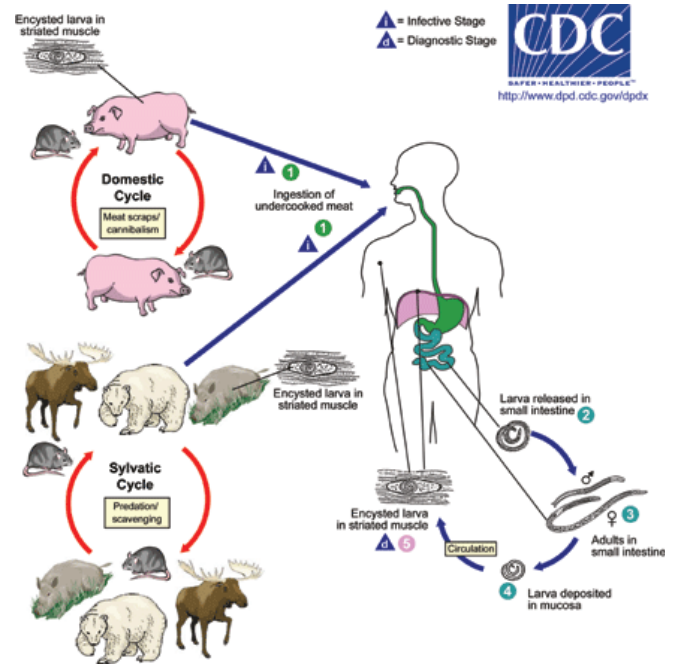
SARCOPTIC MANGE....*KARUKARU*

- What type of pigs does it affect?
 - Any pigs
- What are the symptoms?
 - Scratchy/itchy
 - Usually starts around the eyes and ears and spreads to the rest of the body
 - Hair loss and skin sores
- How can the disease be prevented/treated?
 - Improve nutrition
 - Prevent exposure to infected animals
 - All pigs must be treated regularly and piggery must be sprayed
 - Malwash/ Gammawash, Asuntol, Ivermectin



TRICHINOSIS (ROUNDWORM)

- What type of pigs does it affect?
 - Any pigs
- What are the symptoms?
 - Usually no signs in infected pigs
 - Worms burrow into intestines and travel through blood and lymphatics to the muscles
 - If people eat undercooked pork, they may have fever, muscle pains, weakness, respiratory symptoms and even death.
- How can the disease be prevented/treated?
 - Cook all meat fed to pigs.
 - Do not allow pigs to eat uncooked meat of other animals, including rats, which may be infected with *Trichinella* parasites.
 - Keep pigs penned up (no free roaming).
 - Persons handling potentially infected muscle tissue should wear rubber gloves and wash their hands and face thoroughly before eating or handling food.



REVIEW QUESTIONS....

- What disease can cause mummified piglets and increased stillbirths in sows?
 - Porcine Parvovirus
- If a sow is infected with Porcine Parvovirus, does she appear sick?
 - No
- What could cause this skin condition in a pig?
 - Sarcoptic Mange
- How can you keep pigs from becoming infected with *Trichinella* (Roundworm)?
 - Don't feed them uncooked meat and keep them penned up
- How can you prevent yourself from becoming infected with *Trichinella*?
 - Thoroughly cook all pork before eating
 - Wear gloves when handling infected meat
 - Always wash hands thoroughly before eating



E. COLI (COLIBACILLOSIS) WHITE SCOURS IN PIGLETS

- What type of pigs does it affect?
 - Piglets less than 3 weeks of age
 - Piglets that are stressed
 - Not enough milk production by the sow (not enough colostrum); poor quality of milk; bad housing; unhygienic conditions; vitamin A deficiency and iron deficiency
- What are the symptoms?
 - Inactive piglets
 - Piglets do not suckle on sow
 - Elevated temperature (40 C)
 - Yellow/white diarrhea
 - Usually death after 3-5 days
- How can the disease be prevented/treated?
 - Feed the pregnant sow enough green feed
 - Keep farrowing pens clean (clean feces regularly)
 - Use Aureomycin pig doser orally or
 - Use Terramycin by intramuscular injection or
 - 5 mg per 500 g body-weight
 - Treat all piglets for 4 days
 - Neobiotic
 - Give 4 mg per kg body-weight



PNEUMONIA COMPLEX

- What type of pigs does it affect?
 - Can occur in any pigs but most often in pigs less than 1 year
- What are the symptoms?
 - Caused by a COMBINATION of bacteria, parasites and *poor feeding*
 - Rapid, difficult breathing
 - Coughing
 - Nose discharge
 - High temperature (40-42 C)
 - Poor appetite
 - Poor growth
- How can the disease be prevented/treated?
 - Make sure pigs are fed enough good food
 - Give antibiotics such as 'Trespen ' by intramuscular injection
 - Give an anthelmintic, e.g. 'Nilverm', to reduce intestinal worms and so build the pigs up.
 - Use 1 small scoopful per 9 kg live-weight or 1 large scoopful per 45 kg liveweight.
 - Owner to provide adequate nutrition and dry & draught – free housing.



REVIEW QUESTIONS

- What age of pigs do you usually see White Scours in?
 - Piglets less than 3 weeks old
- How can you help prevent White Scours?
 - Make sure the pregnant sow is fed the proper diet
 - Keep farrowing pens clean (keep feces out of food and water)
- What are the three causes of Pneumonia Complex?
 - Bacteria, parasites, poor diet
- What are the signs of Pneumonia Complex?
 - Rapid, difficult breathing
 - Coughing
 - Nose discharge
 - Fever
 - Poor appetite
 - Poor growth

PIGLET ANEMIA (IRON DEFICIENCY)

- What type of pigs does it affect?
 - Young pigs
- What are the symptoms?
 - Caused by not enough iron
 - Pigs who only have sow's milk (not enough iron) without access to other sources of iron (soil)
 - Pale mucous membranes of eyes and mouth
 - Difficult breathing
 - White or grey feces
 - Pigs not active and not suckling
 - If severe, most of the litter will die
- How can the disease be prevented/treated?
 - Make sure pigs have access to CLEAN soil or
 - Give 2ml 'Imposil' (iron) intramuscularly) at 4 days and 14 days old



NAVEL ILL (YOUNG PIG ARTHRITIS)

- What type of pigs does it affect?
 - Pigs 1-3 weeks old
- What are the symptoms?
 - Caused by bacteria that get into the body by a navel infection or by infection from castration
 - Acute lameness of many joints
 - Joints swell
 - High temperature
 - Piglets lose condition very quickly
 - Nervous signs due to brain damage
- How can the disease be prevented/treated?
 - Make sure the farrowing and feeding pens are clean
 - Put iodine or Pink-eye Spray on the umbilical cord (navel) at birth and on the scrotum after castration
 - Give injections of antibiotic EARLY in the disease
 - 'Trespen', 'Terramycin' or 'Chloromycetin'



REVIEW QUESTIONS

- What causes Piglet Anemia?
 - Not enough iron in piglets
- How can farmers help prevent Piglet Anemia?
 - Make sure piglets have access to clean soil or
 - Give iron injections
 - What age should the piglets be injected?
 - Day 4 and Day 14
- What could this be caused by?
 - Naval ill (infection in joints from bacteria that entered the navel or castration wounds)
- What are some signs of Navel Ill?
 - Swollen joints
 - Lameness in multiple joints
 - Fever
 - Weight loss
- How can you prevent Navel Ill?
 - Keep pens clean
 - Put iodine or pink-eye spray on the navel and castration area

•QUESTIONS??



Parasitology in Pigs

**Hearley Atupule
Animal Health and production**



PACIFIC PARTNERSHIP



Parasitology in Pigs

- **What kind of parasites can pigs get?**
 - **Internal Parasites**
 - Roundworms
 - Trichinella
 - **External Parasites**
 - Mange
 - Lice
 - Ticks
 - (Erysipelas (diamond skin disease))



PACIFIC PARTNERSHIP



Roundworms

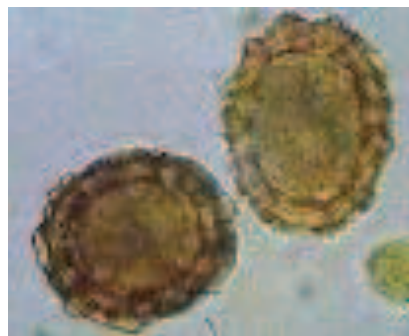
- There are many different kinds of roundworms that can infect pigs.
- What are four different body systems that roundworms like to target?
 - Digestive System
 - Respiratory System (lungs)
 - Urinary system (kidneys)
 - Liver
- Different names for different roundworms
 - Large roundworms = Ascarid
 - Stomach worms = Hydrostrongylus
 - Intestinal treadworms = Strongyloides
 - Kidney worms = Stephanurus
 - Lungworms = Metastrongylus
 - Nodular worms = Oesophagostomum

PACIFIC PARTNERSHIP



Roundworms

- How do pigs get infected with roundworms?
 - Orally (through the mouth)
 - Pigs eat a worm egg
 - One female worm may produce **a million eggs a day**, which pass out in the dung!!!
 - The eggs can stay alive in the ground or the pigsty for up to **5 years!!**
 - Transplacentally (piglets get infected from sow in the uterus)



PACIFIC PARTNERSHIP



Roundworms

- What are the signs of a pig infected with roundworms?
 - Diarrhea
 - Weight loss
 - Coughing
 - Lung infections
 - Death
 - White spots on liver (milk spots)
 - DO NOT EAT!!!

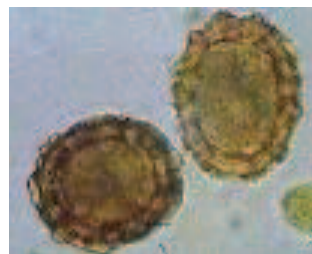
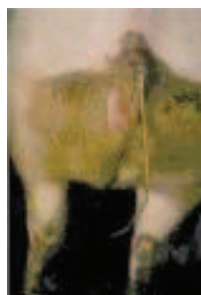


PACIFIC PARTNERSHIP



Roundworms

- How can you identify a roundworm infection?
 - See worms in feces
 - Microscopically



PACIFIC PARTNERSHIP



Roundworms

- **How do you treat roundworm infections?**
 - Treat infected pigs with an anthelmintic medicine such as piperazine/ levamisole/ ivermectin
 - Treat the pregnant sow with an anthelmintic a week before farrowing
 - Prevents passing infection to her litter
 - Keep the pig pen **CLEAN!!**
 - Clean out the pens and shelters.
 - Treat the walls and floor with a disinfectant. Leave the disinfectant on the walls and floors for 2–3 days before washing it off.
 - Caustic soda solution is an effective disinfectant to use. Caustic soda is dangerous to handle so must be used with care.
 - If infected pigs have been kept out in a field, the land should either be ploughed and used for crops, or used as pasture for other animals.
 - Other farm animals are not infected by the types of roundworms that infect pigs.

PACIFIC PARTNERSHIP



Roundworms

- **Can people get roundworm infections?**
 - YES!
- **How?**
 - Eating infected tissue (e.g. liver)
 - Consuming the roundworm eggs
 - For example, you are cleaning out a pig pen and get a microscopic amount of infected pig feces on your hands. You then eat lunch without washing your hands. You consume worm eggs without even knowing it!
- **How can you prevent this from happening?**
 - Inspect meat at slaughter to make sure not infected
 - Don't eat infected meats
 - Always cook pork thoroughly (don't eat undercooked)
 - **WASH YOUR HANDS!!**
 - Every time you finish handling pigs
 - Every time before you eat



PACIFIC PARTNERSHIP



Zoonotic Parasites –[can infect humans]

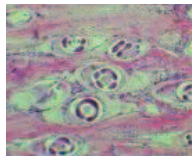
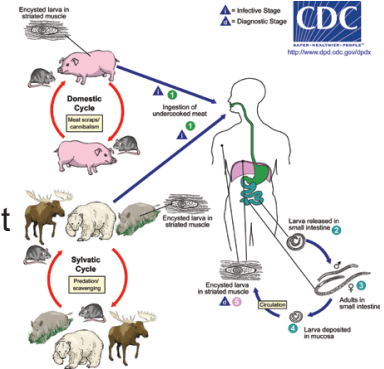
- What is a zoonotic disease?
 - A disease that humans can get from animals



- What is one type of parasite that people can get from eating undercooked pork?

– Trichinella Roundworm

- The adult trichinella worms live in the pig's intestine
- Young worms are found in the pig's muscles (meat)
- Any animal or human that eats infected pig meat can be infected with the worm



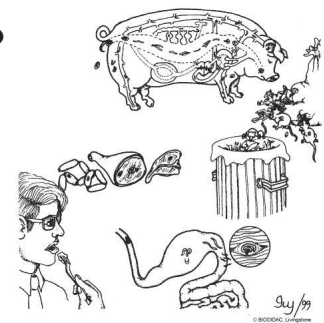
PACIFIC PARTNERSHIP



Trichinella

- How do pigs get infected with Trichinella?

- Pigs can be infected with trichinella by eating rats that are infected with the worms or by eating other meat contaminated with worms.



- Since pigs can get trichinella from eating infected rats or infected meat, how can you prevent pigs from becoming infected with Trichinella?

- Do not allow pigs to wander around free.
- Keep pigsties, pigpens and shelters clean and dry.
- Always thoroughly cook meat and swill that is fed to pigs.
- Treat infected animals to prevent parasite eggs from being passed in their dung and infecting other animals.



Zoonotic Parasites

- **Another Zoonotic Parasite is TAPEWORMS**
 - If pigs are allowed to roam free, they may eat plants contaminated with human feces that are infected with tapeworms.
 - In this way, the pig meat can become infected with a tapeworm from humans.
 - If the meat of an infected pig is not properly cooked, people who eat it can become infected with the pork tapeworm.
 - Infected humans may suffer from stomach problems such as diarrhea, constipation or stomach pains.

PACIFIC PARTNERSHIP



Tapeworms

- **How can you prevent tapeworm infections in pigs?**
 - Do not allow pigs to wander around free.
 - Keep pigsties, pigpens and shelters clean and dry.
 - Treat infected animals to prevent parasite eggs from being passed in their dung and infecting other animals.

PACIFIC PARTNERSHIP



Skin Parasites in Pigs

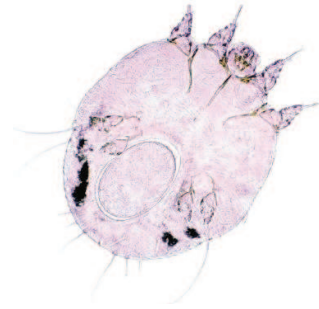
- **Mange**

- **What is mange caused by?**

- Mites that burrow under the pigs' skin

- **What are the signs of mange?**

- Crusty, thickened skin
- Pigs scratch/rub a lot
- Infected wounds
- Usually starts around the head, ears, legs and tail, but it will spread over the body if not treated



PACIFIC PARTNERSHIP



Mange

- **How do you treat mange?**

- Spray or dip the animal or paint the infected areas with a suitable insecticide

- Amitraz (pour on or spray)
- Malathion (powder)
- Ivermectin (liquid for drenching, pour on, injection)

- Clean out and wash down the pen and shelter.

- Spray the pen and shelter with a suitable insecticide such as malathion.

- Repeat the treatment of the animal and the pen and shelter after 2 weeks.

- After working with mangy pigs, wash your hands and clothing **thoroughly** because humans can catch the mange infection.

- You **DON'T** want to become infected with mange!



PACIFIC PARTNERSHIP



Scenario

- What other parasites will the Ivermectin treat?

INDICATIONS

For the treatment and control of gastrointestinal roundworms, lungworms, lice, and mange mites. See package insert for complete indications, precautions, warnings, residue warning, and use directions.

PACIFIC PARTNERSHIP



Lice

- Lice are dark coloured and can be seen on the animal's body.
- The lice feed on the skin and irritate the pig.
- This skin irritation causes the pig to scratch, which may cause wounds that can become infected.
- Clean the areas where the animals are kept and spray the pigs and their pens with an insecticide



PACIFIC PARTNERSHIP



Lice

- Using Unit 9 in your Paravet Manual, what insecticides could you use to treat lice?
 - Section 9.32 and 9.58
 - Amitraz
 - Diazinon
 - Malathion
 - Coumaphos

PACIFIC PARTNERSHIP



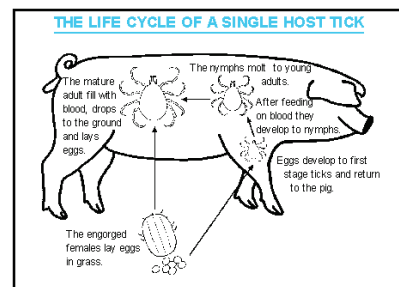
Ticks



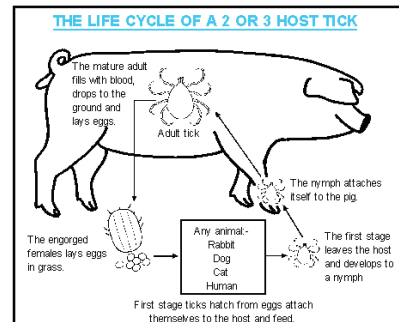
- Ticks suck blood and are dangerous because they can spread other infections to pigs.
- Spray the infected animals with a suitable chemical such as malathion (see Unit 9), or remove the ticks by hand making sure the mouth parts of the tick are removed, or wet them with kerosene to kill them.
- Clean the pens thoroughly cleaned and spray the pens with an insecticide such as malathion.
- Fortunately, tick infections are quite rare with pigs.



PACIFIC PARTNERSHIP



(Fig.11-21)

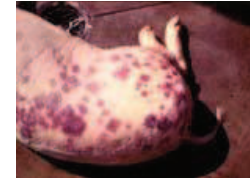


(Fig.11-22)



Erysipelas (diamond skin disease)

- What causes Erysipelas?
 - A Bacteria
- What are the signs of an Erysipelas infection?
 - Reddish, diamond-shaped areas on the pig's body
 - Purplish color to the head and ears
 - High temperature
 - Pigs don't eat
 - Squeal if touched
 - If the infection is serious and develops quickly (acute), the infected animal can die.
 - In cases that develop slowly and last over a long period of time (chronic), the animal survives but suffers from swollen joints and lameness.



PACIFIC PARTNERSHIP



Erysipelas



- How do you treat Erysipelas?
 - Injecting the infected animals with the antibiotic penicillin
 - How much penicillin would you give a 100 pound pig?

Active constituent and concentration	Trade name	Withholding period	Storage requirements
<p>CAUTION S4 SUPPLY WITHOUT PRESCRIPTION ILLEGAL KEEP OUT OF REACH OF CHILDREN FOR ANIMAL TREATMENT ONLY</p> <p>SPC Penicillin - SA Injection</p> <p>ACTIVE CONSTITUENTS: Procaine Penicillin G: 300 mg/ml</p> <p>FOR INTRAMUSCULAR ADMINISTRATION ONLY</p> <p>SPCVET 100ml.</p>		<p>WITH HOLDING PERIOD: MILK TAKEN FROM ANIMALS WITHIN 36 HOURS FOLLOWING SINGLE TREATMENT AND 72 HOURS FOLLOWING MULTIPLE TREATMENTS MUST NOT BE USED FOR HUMAN CONSUMPTION. DO NOT USE LATER THAN 5 DAYS BEFORE SLAUGHTER TO BE USED BY OR UNDER THE DIRECTION OF A VETERINARY SURGEON ONLY</p> <p>Registered under: Stock Medicines Act Veterinary Medicines Act</p>	<p>Manufactured and Distributed by: SPCVET Private Mailbag Swaga</p> <p>Store below 8°C (Refrigerate) Protect from light</p> <p>EXP: MAR 2020</p> <p>Batch No: 970379</p>
<p>Administrative: </p>		<p>Dose rate: </p>	<p>Manufacturer</p>

PACIFIC PARTNERSHIP



Erysipelas

- How much penicillin would you give a 100 pound pig?
 - $100 \text{ pounds} \div 2.2 \text{ pounds/kg} = 45.5 \text{ kg}$
 - $45.5 \text{ kg} \div 50 \text{ kg} = 0.91$
 - $0.91 \times 2 \text{ ml} = \mathbf{1.8 \text{ ml}}$
- How would you administer this?
 - Intramuscularly



PACIFIC PARTNERSHIP

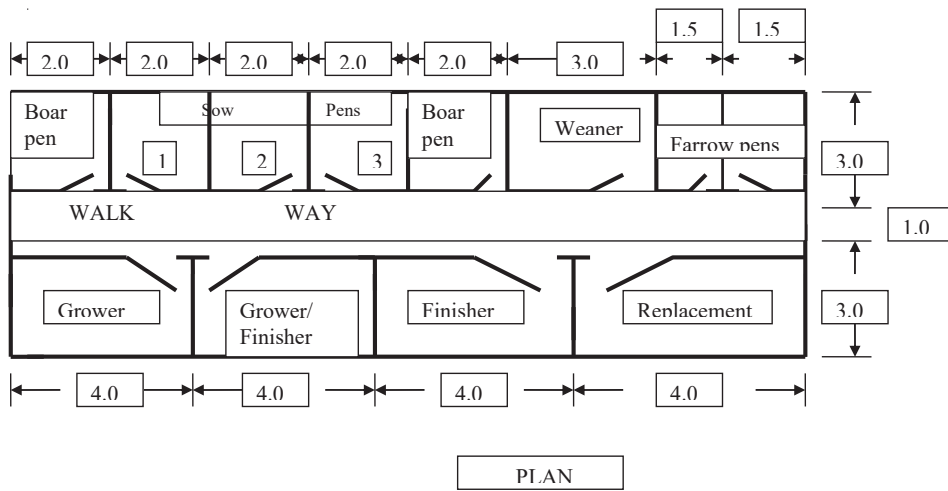
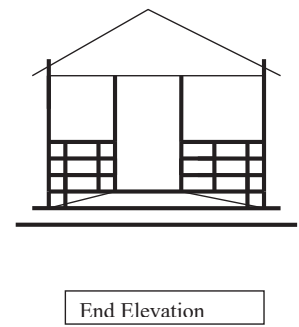
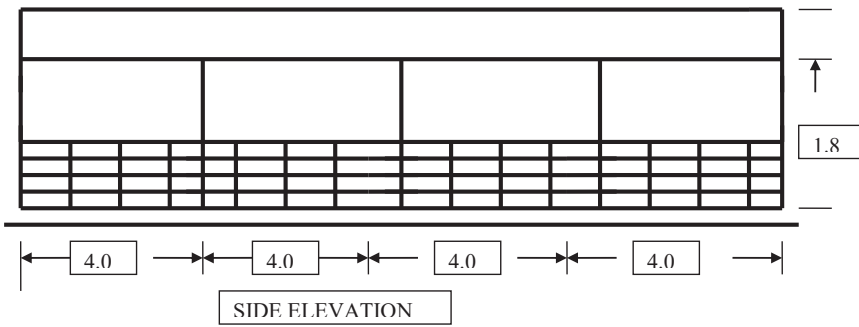


• QUESTIONS??

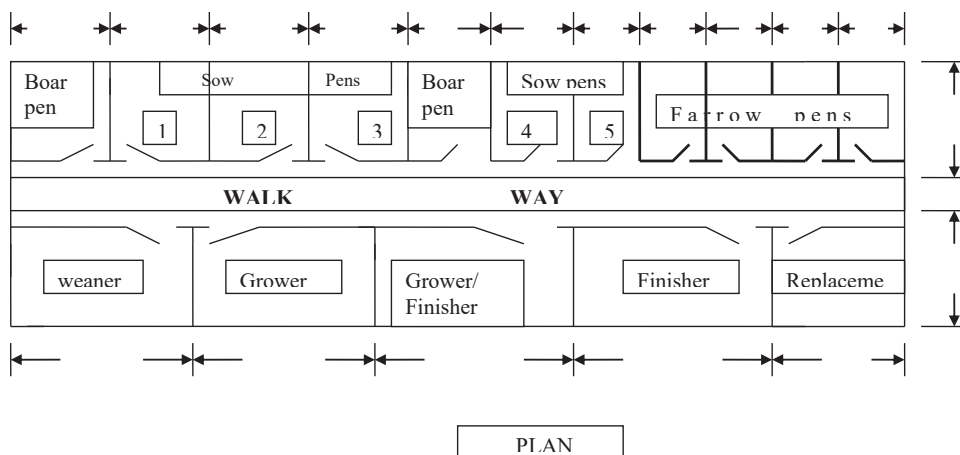
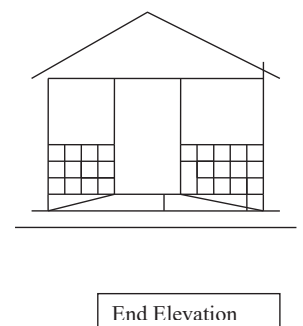
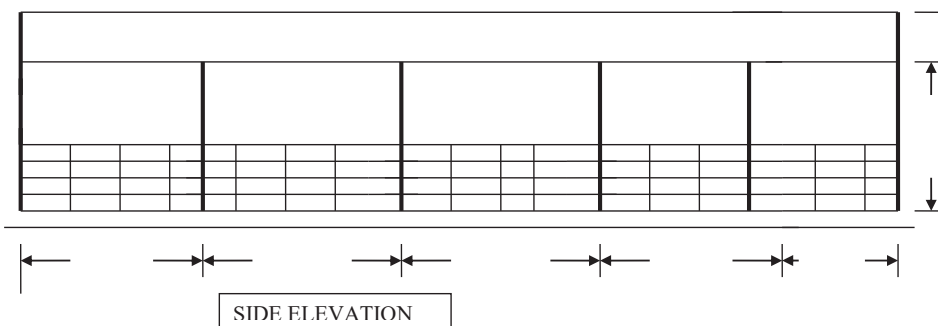


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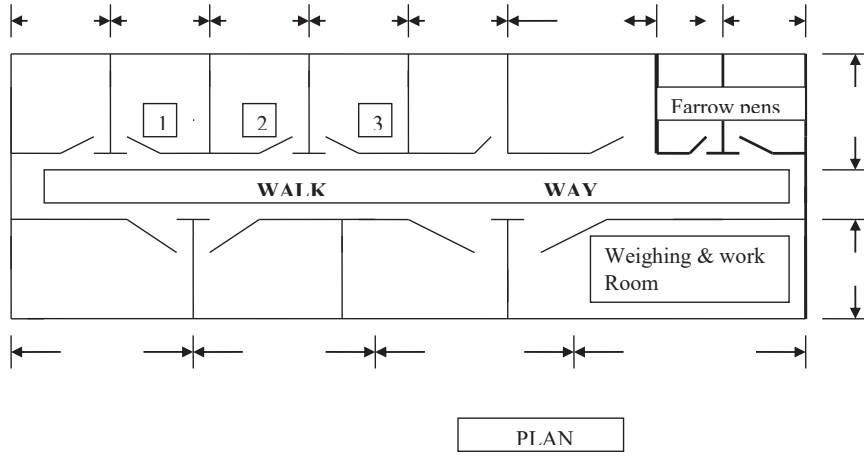
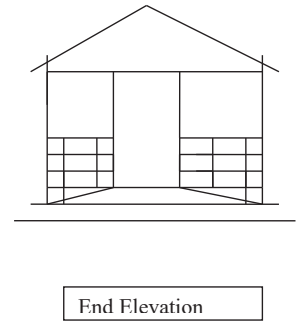
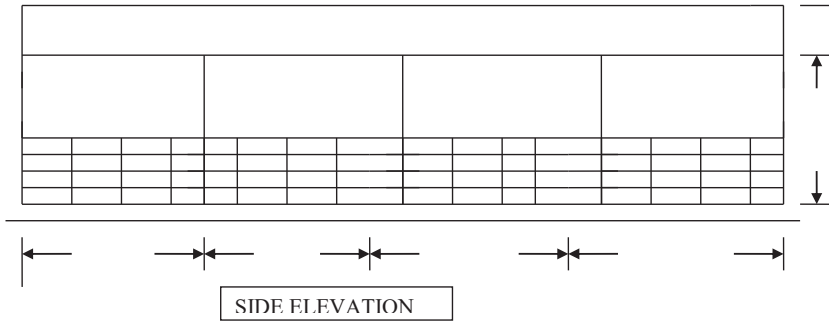
6 - SOW UNIT



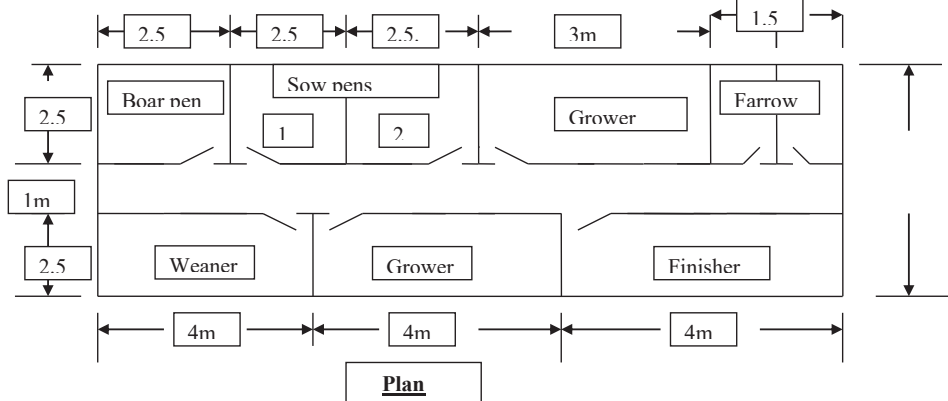
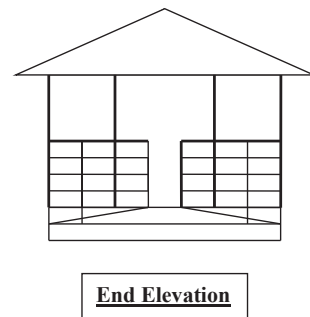
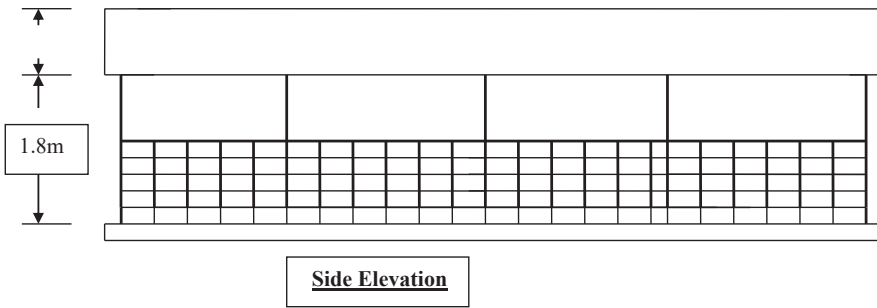
10 - SOW UNIT



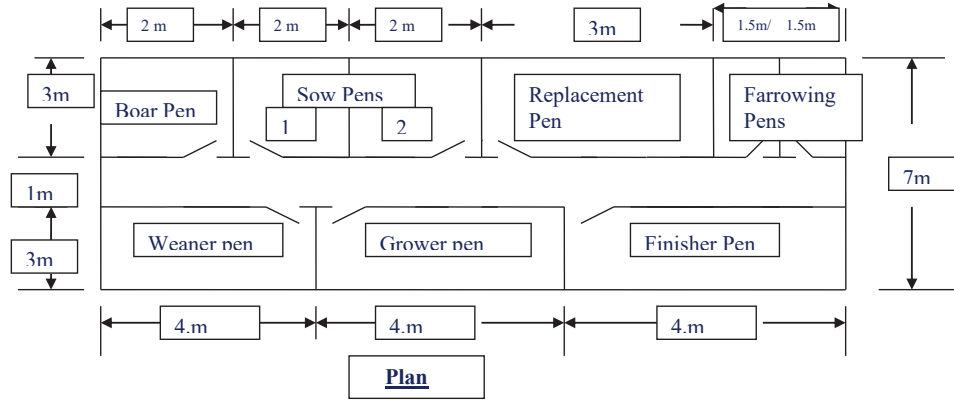
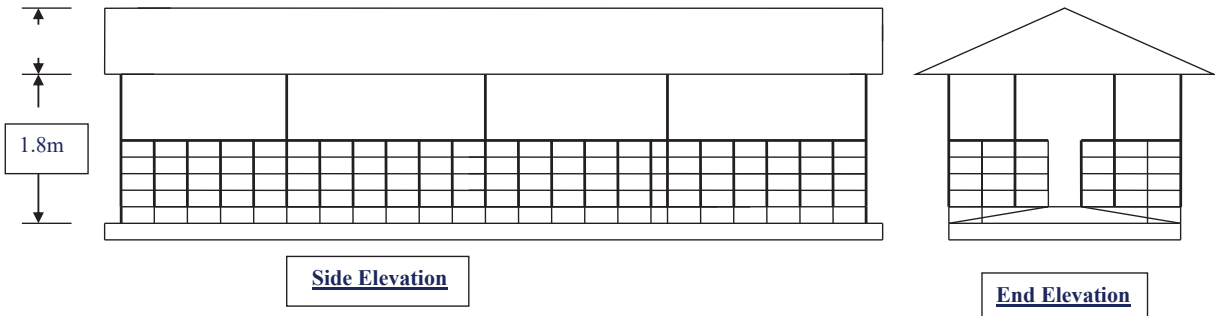
Pig Quarantine Shed



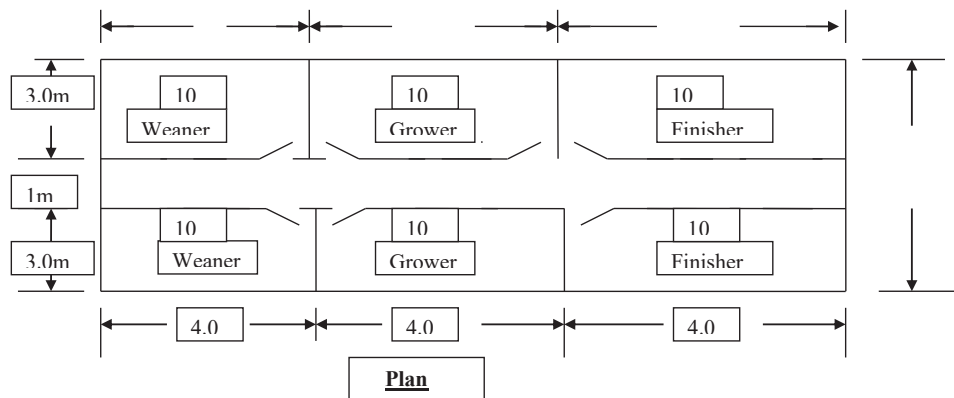
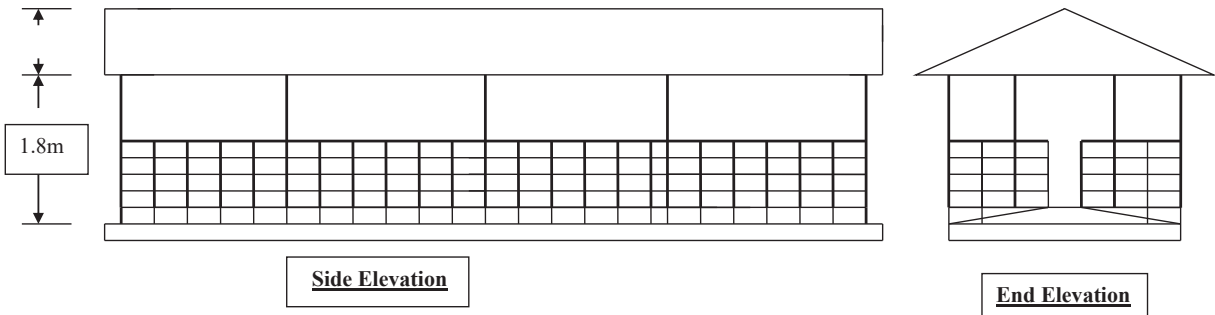
3 – Sow Unit Pig Shed



3 – 4 Sow Unit Shed



60 Fatteners / Convertible Piggery

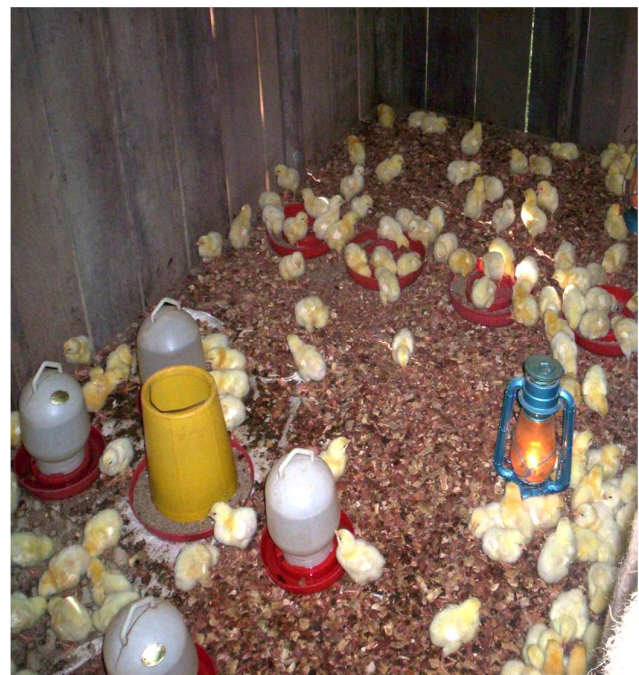


BROILER [Meat bird] Production



What are Broiler Birds?

- Imported Chickens that are raised for 6-7 weeks before sold.
- Fertile eggs are imported and are hatched locally, [Vuvula poultry & Food works Hatchery.] sold as Day Old Chick; DOC



Planning a broiler enterprise

- In a well-managed broiler flock, day-old-chickens take 6-7[8] weeks to grow to a weight suitable for sale (1.5-2.5 kg dressed weight).

Success in raising broilers depends on

- access to markets
- supply of chicks
- good feed and water
- care and management of birds

Siting a broiler shed

- As far from other chickens as possible
- away from ducks, which can spread diseases to chickens
- any soil type is suitable, including land not used for cultivation
- a firm foundation for dirt or cement floors with deep litter systems
- accessible to transport of feed, litter, stock and other materials

Chicken sheds should be comfortable for the birds

- well-lit
- well ventilated
- free of draughts
- not damp
- easy to clean.



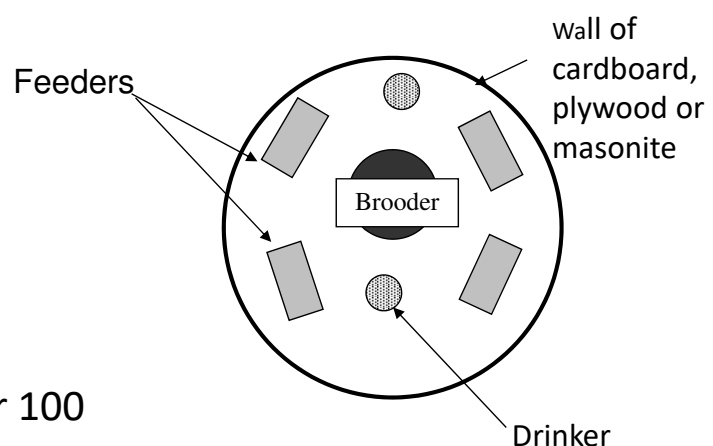
For fast growth pay close attention to;

- chick management in the first 2 weeks
- cleanliness of litter
- feed quality and amount
- water quality and supply

How to Raise 100 broiler birds

- 100 DOC
- Period of raising until sale
7 weeks.(max)
- Starter feed
1 – 2 weeks
- Grower feed
2 – 4 ½ weeks
- Finisher feed
4 ½ - 7 weeks
- Feed & Water
adlib
- Expected weight in kg at sale
(dressed) 1.5kg – 2.5 kg
- Deep litter is better
- Space /floor requirement for 100
birds 9 -12 m sq

- BROODER
- During the first 2 weeks of life the young chick needs to be kept at a temperature similar to the natural brooding hen's (30-35° C).



The broader area should contain:

- deep litter
- feeders
- drinkers
- Light /lamp (heat source)

Notice the behaviour of the chicks to check the temperature of the brooder:

- If the chicks huddle close to the light they are too cold.
- If chicks stay away from the light, they are too hot.
- *Comfortable chicks will be evenly spaced nearby.*



too cold



too hot



just right

Broiler management: 0-2 weeks old

- Although chicks have enough food in their yolk sac after hatching to survive 3 days without feeding, aim to avoid delays in transport and
- supply them with water and food as soon as possible:
- collect chicks as soon as they are available from the supplier
- transport chicks in clean boxes that have not been used to transport chicks before
- keep chicks dry and warm but do not leave them in the sun
- transport chicks to the farm without delay
- if chicks are more than 2 days old before getting to the farm, give them water and chick starter feed during transport
- put chicks in a brooder area as soon as they get to the farm

FEEDING OF BROILER CHICKENS

Average Feed Per Bird in One Day

- Starter: 60grms. per day for the period of two (2) weeks
- Grower: 96grms. per day for the period of three (3) weeks
- Finisher: 200grms. per day for the period of two(2) week

100 broiler birds

- Starter: 100birds x 60g x 14d = 84,000g
84,000g/1000g = 84kg
84kg/40kg = 2bags & 4kg of feed for 2 weeks.
- Grower: 100birds x 96g x 21d = 201,600g
201,600/1000kg = 201.6kg
201.6kg/40kg = 5bags for 3 weeks
- Finisher: 100birds x 200g x 14d = 280,000g
280,000g/1000g = 280kg
280kg/40kg = 7 bags for 2 weeks

FEED & WATER

- ADLIB FEEDING & WATER- ALWAYS AVAILABLE
- DAY AND NIGHT...

Broiler Diseases

Be observant every time you visit the chickens. The earlier you detect a problem the better.

The most common disease found in broiler chickens in Solomon Islands is **scouring** (white or red diarrhoea).

Bacteria cause white diarrhoea and coccidia protozoa cause red diarrhoea.

Other common diseases are caused by:

- poor nutrition
- mismanagement
- the Fowl Pox virus

Important notice;

1. Seek help from Veterinarians or Livestock Officers for advice when you notice such diseases affecting chickens.

Any drugs used to treat chickens must be used strictly according to directions so that the chicken meat is fit for humans to eat.

- [Keep litter clean and replace all litter between batches of chicks.]

Slaughter

- Remove feed from the chickens at least 4 – 6 hours before slaughter. This allows the chickens to fully digest any food. Food eaten immediately before slaughter will be wasted because it is undigested.
- Catch the chickens at night to avoid chasing them and causing stress and bruising of the chickens.

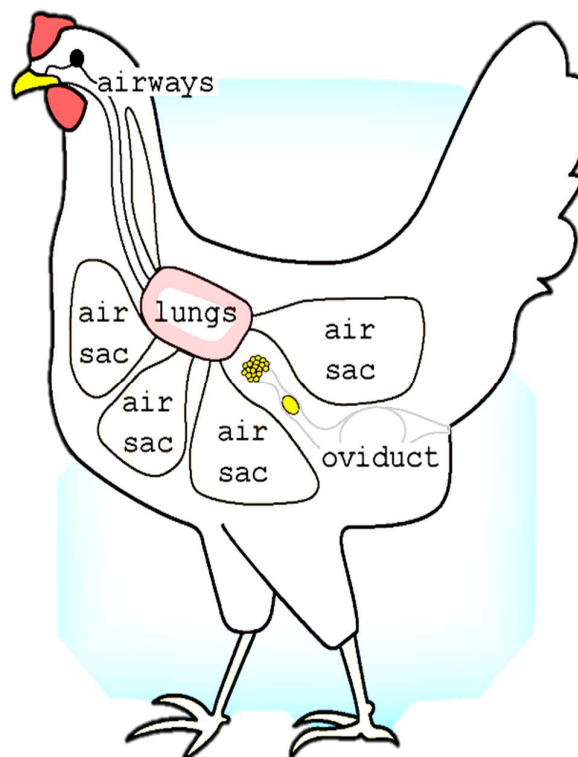
Hygiene for good quality carcasses

- Slaughter chickens in a clean and healthy place, ideally an abattoir or specifically built shed.
- Slaughter at night or in the early hours of the morning to avoid flies and heat.
- De feather birds with a plucking machine or pluck them manually.
- Use warm water for de feathering at about 58 – 65 oC for 60 seconds. Water that is too hot will damage the appearance of the skin of the chicken and reduce carcass quality.
- After de-feathering and removal of offal, wash the dressed chicken carcass in **chilled** (iced) water.

Cont...

- Keep the dressed carcasses chilled **on ice** as they dry. Then carefully pack in plastic bags and immediately **chill** the carcasses in an insulated box with ice blocks **or freeze** them for storage.
- Meat should be pink and look fresh.
- Wash offal for human consumption in chilled water and keep offal cold and separate from carcasses.
- Dispose of unwanted offal and feathers in a safe place to avoid contamination of the carcasses and pollution of the environment.

TAQIO TUMAS



LAYER {EGG} BIRD PRODUCTION



Modern hens descended from the Red Jungle Fowl



PLANNING A LAYER ENTERPRISE;

WHAT ARE LAYER BIRDS?;

- Layers chickens are bred for laying fresh eggs for eating.
- Layer hens do not need roosters to lay eggs continuously.
- If fed a good balanced diet, each hen can produce an egg almost every day (up to 240 eggs each year).

A successful layer farmer must plan:

- markets for eggs
- reliable sources of feed and layer birds
- site and location of the shed
- number of hens to keep
- layer management

3 TYPES OF HOUSING LAYERS

- deep-litter floor
- cage (or battery)
- free-range

Management practices are similar for each system and for large and small operations, but hens in a deep litter floor shed have more space than caged birds.

Sheds should be:

- properly constructed
- well ventilated with open sides to allow good air flow
- enclosed with bird-proof wire mesh to protect the birds from predators and pests such as rats, wild birds, cats, dogs etc.
- cleaned regularly

Layers in Deep Litter Floor

- Layers are kept on a floor covered in deep litter. E.g ;wood shavings, shredded paper, rice hulls, dried grass and other cheap absorbent materials covering the floor of the shed to a depth of about 8cm.
- Deep Litter provides warmth, a comfortable environment and absorbs moisture and gases from the birds' droppings. But litter must not be too dusty as this would cause breathing problems in the birds.

Managing deep Litter.

- Change the litter when it is old, dusty and damp. Damp patches should be turned over to dry the litter out.
- Remove all litter and replace it with fresh litter for each new batch of layers.

[top up the litter with fresh ones if it is too dusty]

NEST BOXES IN A DEEP LITTER SYSTEM;

Birds lay their eggs in nest boxes and eggs are collected from these. Place nest boxes inside the deep litter shed around the floor and along the sides of the walls.

- Nest boxes should measure at least 30cm x 30cm x 30 cm (1ft x 1ft x 1ft).
- Line nest boxes with clean material such as dry grass.
- Provide 1 nest box for every 7 hens.
- Design boxes to discourage hens from perching on them.

Size of deep litter layer sheds

[Some birds will lay their eggs on the litter and these eggs are likely to be dirty.]

- The space requirement for each layer is:
1 bird/square feet (3 birds per square metre).
- This amount of space allows for feeders, drinkers and nesting boxes in a **well-ventilated** shed.
- A shed measuring 6m x 13m (20 ft x 37 ft) will house up to **198 [200] layers**.

Layers kept in Cage system.

Cage Units are available from suppliers locally. The cages are normally made of wire (or can be made from bamboo) and are divided into 5 compartments with 2-3 birds in each compartment (to accommodate up to 15 birds in each cage).



Management of birds in cages.

- If birds seem stressed or uncomfortable, especially in hot weather, the number of birds per cage should be reduced to two or even one.
- The cages are designed so that when hens lay eggs, the eggs roll to the edge of the cages where they are easily collected.
- The eggs are usually clean because of the clean floor of the cage.

Cage system cont.....

- The cages are designed with feed troughs, water troughs and/or nipple waterers attached.
- Cages are arranged in a step-like manner with both sides of the cages providing egg collection areas and a walk-way along the cages.
- Collect droppings (manure) from the floor or under the cages regularly to prevent flies from breeding.



Bamboo cages are much more cheaper



Prices of bird cages;

- Cages are expensive but last well if managed properly. The total cost depends on the number of birds in each cage.
- **Example:** Cost of Cages at Vuvula Poultry Ltd, Honiara
- (Approximate cost, March 2021)
- One cage (10-15 birds in each) = \$922
- One unit (complete for 40-60 birds) = \$3,688

LAYERS IN FREE RANGE SYSTEM

This type of system is similar to village management practice.

- Commercial free range layers are kept in sheds with fences erected around the sheds. The sheds have a floor covered in deep litter and the birds roam in and out of the shed each day and return at night to sleep..
- Ideally the fenced area contains grass and other edible plants. Hens search for their own food such as green leaves, insects and other feed in the fenced area.
- The eggs from these layers are labeled as “free-range” and may be preferred by consumers.

LIGHT REQUIREMENT IN LAYER SHEDS

The number of eggs produced by layers can be increased by extending the 12 hours of daylight to 16 hours.

- In Solomon Islands provide an extra 4 hours of light by switching on lights in the layer shed 6pm - 10pm.
- The light should be strong enough to just enable you to read a newspaper.
- The light source needs to be reliable. Hens may lay fewer eggs if the number of hours of light is reduced. Once started, the light regime must be consistent.
- Introduce increased hours of light to pullets gradually from the age of 16-23 weeks.

STOCK [DOC]

- Layer chickens are sold by suppliers who import fertile eggs and hatch them before selling them as day-old chicks.
- Layer day-old chicks are twice the cost of broilers.
- These commercial layers are the result of years of selecting and breeding birds that produce many eggs.
- Commercial layers in Solomon Islands are either brown or white feathered hens.

MANAGEMENT OF DAY OLD CHICK-STOCK.

Before you receive them, check that the supplier has vaccinated the day-old layer chicks against the diseases

➤ Fowl Pox and Marek's Disease.



Above, chicken with fowl pox; at right, chicken with Marek's disease.



Management cont..

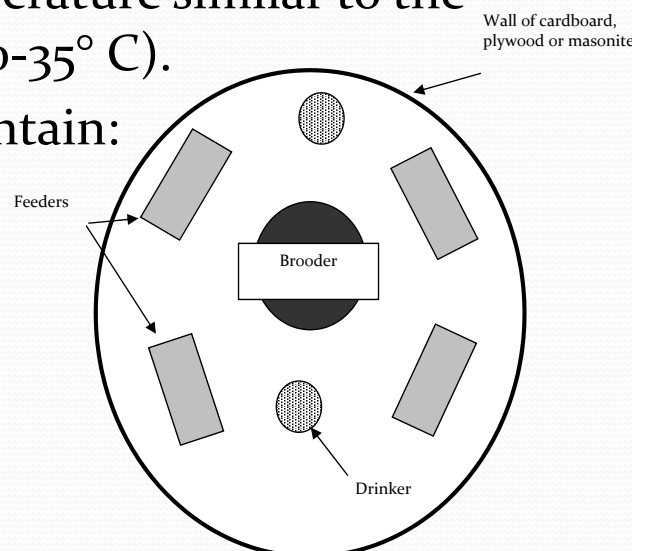
- collect chicks as soon as they are available from the supplier
- transport chicks in clean boxes that have not been used to transport chicks before
- keep chicks dry and warm but do not leave them in the sun
- transport chicks to the farm without delay
- if chicks are more than 2 days old before getting to the farm, give them water and chick starter feed during transport.
- raise chicks in a brooder area in the shed as soon as they get to the farm.

Caring for chicks 0-2 weeks old: In the Brooder

- During the first 2 weeks of life the young chick needs to be kept at a temperature similar to the natural brooding hen's (30-35° C).

The brooder area should contain:

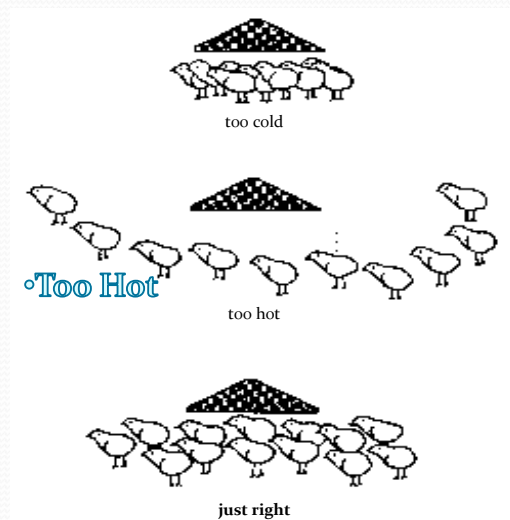
- deep litter
- feeders
- drinkers
- brooder (heat source)



Notice the behaviour of the chicks to check the temperature of the brooder

- If the chicks huddle close to the light they are too cold.
- If chicks stay away from the brooder, they are too hot.
- *Comfortable chicks will be evenly spaced nearby.*

- Too cold



- Just Right

The Growing Bird.

- Young layers (pullets) start to lay eggs at about the age of 16-18 weeks. Their first eggs are small. Large eggs are laid from about 21 weeks of age.
- Once a hen starts to lay eggs she will continue to produce an egg almost every day (every 26-28 hours).
- With good feeding and management each layer may produce up to 240 eggs in one year

Feeding Layers-100 birds

Feed Type	Crude protein content (%)	Age (weeks)	Amount eaten / bird / day (grams)	No;of 40 kg bags of feed needed each week for 100 birds
<i>Pullet Starter</i>	21%	0–8 wks	67 g	9 bags
<i>Pullet Grower</i>	18%	9–18 wks	99 g	16 bags
<i>Layer feed</i>	16%	18 -72 wks	121 g	114bags

FEED STORAGE FOR LAYERS

- The correct storage of feed can make all the difference to the success of a layer farm.
- Store feed away from direct sunlight, wind, rain and heat. Keep feed free of rats.

WATER

- Fresh, clean and cool water should be available to layers **at all times**.
- Do not give layers brackish water which has too much salt. The rule of thumb is that water for layers should be “drinkable by humans”.
- Notice when your birds pant or hold their wings open and feathers ruffled when they feel the heat on a hot day and provide plenty of cool fresh water. In hot, dry weather a layer can drink up to 0.5 litre each day (50 litres each day for 100 hens).
- Provide enough space at water troughs: 2.5 metres for every 100 hens.

EGG PRODUCTION

- 5 – 6 months old : layers should start giving you eggs
- Average: a layer chicken lays only 1 egg in a day or 26 – 28 hours
- Layers do not lay eggs at night unless light is provided
- Layers become broody after a clutch of eggs
- Peak production of egg for a layer is at the age of 8 1/2 months old
- Layer chickens will produce no more eggs after 18 – 20 months of age
- Egg production will increase during the first year of production. You should expect to collect more or less than 240 eggs in a year during first year of production.

EGG PRESERVATION

- Check eggs against light
- Clean eggs with sand paper
- Never wash dirty eggs in warm water and never wipe eggs with a damp cloth
- When placed in water, bad eggs float to the top and good eggs sink to the bottom

Markets

- A layer farm must make profits and provide a sustainable service. Eggs must be of good quality, affordable and attractive so that clients continue to buy them.
- Before establishing a layer farm, carefully research reliable market outlets, the number of eggs to produce, possible market expansion, transport and the economics of producing eggs.
- The demand for eggs is currently higher than the supply, especially in cities and towns, where eggs are sold to supermarkets, restaurants, shops and institutions. In villages reliable markets must be found.

LIVESTOCK AND VETERINARY SERVICES



FOR



Healthy Animals

Wealthy Communities

TAQIO TUMAS