TRAINING MATERIALS FOR AGRICULTURAL MANAGEMENT, MARKETING AND FINANCE

3

Farm planning and management for trainers of extension workers

ASIA

Module 3
FARM BUSINESS ANALYSIS

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Module 3
FARM BUSINESS ANALYSIS

Food and Agriculture Organization of the United Nations
Rome, 2006

FARM BUSINESS ANALYSIS

Unit 3.1
Enterprise and farm profitability

Session 3.1.1 Enterprise profitability analysis (150 minutes)
Session 3.1.2 Whole farm income (30 minutes)
Session 3.1.3 Enterprise and farm efficiency measures (30 minutes)

Unit 3.2
Constraints and potentials

Session 3.2.1 Analysis of constraints and potentials (60 minutes)

Unit 3.3
Comparative analysis/field visit

Session 3.3.1 Benchmarking (15 minutes)
Session 3.3.2 Farm performance analysis (30 minutes)
Session 3.3.3 Farm diagnosis using gross margin (75 minutes)
Session 3.3.4 Planning for a field visit (120 minutes)

This volume has been designed
as a complete working package which includes all components
of the training programme needed for Module 3.

The "trainers information box",
at the beginning of each session, lists the handouts,
training slides and exercises needed for that segment of the course.
The trainer's guide, in the section "steps for instruction",
suggests a sequence for the use of these training materials.
Mini-versions of all slides are provided at the end of each session.
Where appropriate, answer keys for training exercises are also provided.

FARM BUSINESS ANALYSIS

Analysis of the farm business is essential for both farmers and extension workers to understand how the farm business is performing. This can help to locate weaknesses in the business and to correct them. It can also highlight areas of satisfactory performance so that they may be promoted more fully.
Some simple diagnostic methods to improve farm management performance would assist in examining the profitability and efficiency of individual farm enterprises and the farm as a whole. Planning for a field visit to be carried out at local farms is also discussed.

Enterprise and farm profitability

This unit introduces the concepts of gross income, gross margin, enterprise profitability and efficiency as applied to farm enterprises and the farm as a whole. It is essential for extension workers and farmers alike to understand the components that make up the farm enterprise budget in order to better analyse performance.

Preparing for session 3.1.1
Enterprise profitability analysis

Teaching methods
Presentation, trainer/participant interaction, group work, training exercise, discussion

Duration: 150 minutes

Learning support materials
Handouts 3.1.1a (Enterprise profitability analysis) and 3.1.1b (More about variable costs), *Handout 3.3.4 (Planning for a field visit)*, Slide 30 (Enterprise profitability analysis), Slide 31 (What is gross income?), Slides 32a and 32b (Gross income forms), Slide 33 (Factors that influence enterprise gross income), Slide 34 (Costs of production), Slide 35, (Variable and fixed costs), Slide 36 (Variable costs/crop enterprise), Slide 37 (Variable costs/livestock enterprise), Slide 38 (Fixed costs), Slide 39 (Calculating depreciation), Slide 40 (Calculating enterprise gross margin), Slide 41 (Procedure for gross margin analysis), Slide 42 (Analysis of a tomato enterprise), Slide 43 (Enterprise profit), Slide 44 (Factors affecting profitability), Training exercise 7 (Enterprise analysis)

Notes

Enterprise profitability analysis

This session covers enterprise profitability analysis with emphasis on gross income and cost of production. Costs of production are divided into variable and fixed costs. Enterprise analysis is used to study the profitability of existing enterprises as well as those newly established. The session concludes with an explanation of gross margin.

It is useful for farmers to know how to determine the profitability of their farm business so that they may make decisions and take actions to improve current performance. Enterprise analysis is one of the tools used to determine the performance of the farm. It provides useful information on the profitability and efficiency of farm enterprises and is a basis for identifying their strengths and weaknesses.

Objectives

At the end of this session the participants should be able to:

- understand the classification of costs into variable and fixed and recognize their importance in the decision-making process;
- acquire knowledge of the components of farm enterprises: gross income and variable and fixed costs;
- understand the meaning of gross margin and enterprise profitability;
- learn how to calculate gross margins and enterprise profit and to interpret the results.

Key points

1. Gross income is the value of production of individual enterprises.

2. The overall gross income for the farm is the sum of the gross income of individual farm enterprises.

3. Factors that influence the gross income of the farm are:

   - the value of farm produce sold both directly or via intermediaries;
   - the value of by-products and farm produce utilized on the farm;
   - the value of farm produce consumed by the farmer and the farm family;
   - the gains or losses in value of tree crops and livestock;
   - the gains or losses in value of stored farm produce.

4. Variable costs are short-term costs incurred usually within one year or within a production cycle. Examples of variable costs are seed, fertilizer and pesticide.

5. Fixed costs are longer-term costs, which last more than a year and are divided into four broad categories:

   - permanent labour;
   - depreciation of machinery and equipment;
   - land and building costs;
   - other fixed costs.

6. Some fixed costs can be allocated between different enterprises but most often fixed costs are handled at the farm level.

7. Gross margin is a simple and practical tool for assessing the comparative profitability of different farm enterprises.

8. Gross margin measures only the relative profitability of the enterprise and not the actual profit.

9. Gross margin and enterprise profitability analysis show the profitability of growing crops or livestock on a unit basis.

Steps for instruction

1. Distribute Handouts 3.1.1a (Enterprise profitability analysis) and 3.1.1b (More about variable costs) to the participants in advance of the session and it is also suggested that Handout 3.3.4 (Planning for a field visit) be distributed at this time. Ask the participants to review them beforehand.

2. Introduce this session with the aid of Slide 30 (Enterprise profitability analysis). Explain why this is important and describe briefly the various issues that will be covered in the session.

3. Explain the concept of gross income. Clarify the difference between gross income and gross output, pointing out that the latter is the physical indicator of production while gross income is the value of what is produced. Illustrate your answer by showing Slide 31 (What is gross income?). Initiate a discussion among participants as to whether the definition given is adequate. Move the trainees towards providing a broader definition of gross income that includes (i) reused products on the farm and (ii) farm produce consumed by the farmer and the farm family. Summarize how gross income is calculated by showing Slides 32a and 32b (Gross income forms) and explain its various components.

4. Show Slide 33 (Factors that influence enterprise gross income) and explain each factor. Encourage discussion among the participants on the different elements and draw on examples from their field experience.

5. Once the concept of gross income is clear to the participants, a discussion could be conducted on costs of production. It should be mentioned at the outset that farmers aim to reduce costs per unit of output in order to increase farm income.

6. The two categories of production costs (fixed and variable costs) must be explained clearly. Reiterate that some costs are fixed in relation to certain decisions but variable in relation to others.

7. To better differentiate between fixed and variable costs provide concrete examples and cite instances when a variable cost can become a fixed cost and vice versa. Refer to Handout 3.1.1.b and explain that the classification of costs depends on the nature and timing of the management decisions considered. Ask participants to provide examples of fixed and variable costs that differ, depending on time and the nature of the management decision.

8. Review depreciation and the depreciation cost concept as already explained. Stress that depreciation is computed specifically for machinery, equipment, buildings and other fixed items whose value fall over time because of wear and tear.

9. Use Slides 34-39 to summarize the discussion above. They are: Slide 34 (Costs of production), 35 (Variable and fixed costs), 36 (Variable costs/crop enterprise — short term), 37 (Variable costs/livestock enterprise — short term), 38 (Fixed costs — long term), 39 (Calculating depreciation).

10. Define the concept of gross margin and enterprise profit. Differentiate between the two notions. Explain that not all fixed costs can be allocated to an individual farm enterprise and that combined enterprise profits will not reflect the overall profit of the farm.

11. Conduct further discussion on enterprise gross margin. Explain that gross margin is a tool that can be used for enterprise analysis and planning purposes and is conducted on a per unit basis. Point out that gross margin is used for analysing relative enterprise profitability and is particularly useful for evaluating the profitability of new technologies in comparison with those currently used by the farmer. Emphasize that in gross margin analysis the variable costs are allocated to their respective enterprises. Highlight these points by showing Slide 40 (Calculating enterprise gross margin).

12. Describe the set of procedures used in calculating the gross margin. Use Slide 41 (Procedure for gross margin analysis) to illustrate. Once the procedure has been understood by the participants show Slide 42 (Analysis of a tomato enterprise) and, using this example, encourage discussion and review some of the issues raised.

13. With the aid of Slide 43 (Enterprise profit) explain the concept and ensure that participants understand it. Discuss with them the various elements that compose enterprise profit. Highlight some of the issues of fixed cost allocation. Give examples of factors affecting enterprise profit by showing Slide 44 (Factors affecting profitability of rice and poultry enterprises).

14. Distribute Training exercise 7 (Enterprise analysis). Organize the trainees into groups of 3—4. Each group should compare the gross margin of two crops, local rice and hybrid rice, which could be planted on the same plot in the same season. Trainees should be encouraged to discuss their results.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 3.1.1a and 3.1.1b, (iii) refer to Training exercise 7.

Notes

Enterprise profitability analysis

A farm enterprise analysis consists of allocating income and costs among individual enterprises. Knowledge of enterprise gross income, production costs, gross margin and profitability of all possible enterprises is essential for extension worker and farmer alike.

Gross income

The gross income represents the total value of the product over a production cycle or year. The value of sales can be measured easily by the amount of money a farmer gets. But typically not all of what is produced is sold. Gross income also includes the value of unsold produce. Thus, gross income consists of the money received from the sales of the product together with the value of the produce consumed on the farm and stored.

Gross income is the value of output of an enterprise ...

The gross income is obtained by multiplying the total volume of the final marketable production by its average farmgate price. Final production normally excludes intermediate products but this also has to be added in. The calculation should include the value of home consumption and stored produce. The farmgate represents the point of first sale. The selling price to be used in the calculation of gross income should be the farmgate price. The costs of transportation and other marketing expenses are deducted from the market price in order to arrive at the gross income at the farmgate.

... and includes what is consumed, stored and sold

By season or year. Since it is possible to produce more than a single short-term crop from the same land area within a year, a distinction should be made between the gross income for a particular season and the gross income for a particular year. The crop gross income for the year is the sum of the gross income for two or more crops grown during the year. Examples are shown on the next pages.

Example

Gross income for a crop enterprise

(calculated by season or year)

Item	First crop	Second crop	Average	Total
Hectares (ha)	2	1.5		3.5
Yield per ha in tonnes	6	7	6.5	
Production in tonnes	12	10.5		22.5
Farmgate price per tonne	80	60	70	
Gross income ($)	**960**	**630**		**1 590**
Gross income per ha ($)	**480**	**420**	**450**	

Gross income can be calculated for enterprises that extend over a single year or production cycle

In this example, the gross income for tomatoes in the year is the sum of the two crops produced during the year. The gross income per hectare for the year is derived by dividing the total gross income for the year by the total area of tomatoes grown during the year.

For longer than a season or year. Some enterprises extend over a longer duration than a single year. This is the situation for livestock production and the cultivation of tree crops. In the case of livestock, gross income is defined more precisely as the difference between the closing valuation of stocks plus sales and the opening valuation of stocks plus purchases.

Example

Gross income for a livestock enterprise

(calculated for longer than a season or year)

Item	No. and kind of cows	Cost ($)	Total ($)	
Closing valuation (end of year)	5 beef cows	25	125	= 175
plus sales (during the year	2 beef cows	25	50	
minus opening valuation (beginning of year)	2 calves	14	28	= 52
plus purchases (during the year)	2 calves	12	24	
			Gross income ($)	**123**

In this example, the farmer fattens cows. Calves are purchased at a cost of $12 per head. The fattened animals are sold at $25 per head. The farmer starts the year with two calves, which are fattened and sold during the year, and purchases another two calves, which remain in the herd at the end of the year. The total gross income is $123.

Some factors that influence enterprise gross farm income

- *Value of farm produce sold,* both directly or via intermediaries;
- *Value of by-products and farm produce reused on the farm,* produce that is used again as input on the same farm (e.g. maize produced and used as feed for the farm livestock enterprise);
- *Value of farm produce consumed by the farm family* (e.g. rice, beans and maize);

- *Gain or loss in value of tree crops and livestock* or the increase or decrease in value of tree crops and livestock. This is the difference in value at the beginning of the year (opening valuation) and the value at the end of the year (closing valuation);
- *Gain or loss in value of stored farm produce* as in the case of products from a previous agricultural season and stored at the farm to be sold (e.g. rice, onions). This is the difference in value from when the produce was stored and when it is sold from the beginning to the end of the year.

Example

A gross income calculation

Gross income of 1 ha of sweet potatoes ...

Sweet potatoes: 3 500 kg x $ 0.35 per kg	=	$1	225.00
Farm consumption: 225 kg x $ 0.35 per kg	=	$	78.75
Gross income	**=**	**$1**	**303.75**

The method of calculating the gross income for perennial crops and livestock enterprises is similar. Changes in the value of tree crops or livestock and the value of produce stored on the farm are part of the gross income.

Costs of production

It is necessary to understand the structure of the costs of production. Production costs are usually classified as either variable or fixed. The classification of a particular cost as variable or fixed depends partly on the nature and timing of the farm management decisions being considered. Some costs are fixed in relation to certain decisions but others remain variable.

Costs of production can be classified as variable and fixed

Variable costs

Variable costs are short-term costs (usually within one year or within a production cycle) and are defined as costs that:

- occur only if something is produced (and do not occur if nothing is produced);
- tend to vary according to the size of the enterprise;
- can easily be allocated to individual enterprises.

For example, much labour is required in vegetable production. If a farmer has to hire labour, then as production increases, so too will the need for more hired labour. Similarly, fuel costs for a tractor rise as the use of the tractor increases. As the area of land planted with rice increases, the cost of inputs also rise. Variable costs in farming are the costs of seeds, fertilizers, pesticides (e.g. insecticides, herbicides, fungicides), livestock feeds, veterinary services, fuel and lubricants, interest.

Example

Variable costs of a crop enterprise

Variable costs change as production increases

Seed. This is usually bought but may be a mixture of purchased and home-grown seeds. Home-grown seeds will have been in store at the end of the previous season and need to be valued. Even though the seed is home grown, it will have a value (the value at which it might have been sold).

Fertilizer. This is normally purchased but could include animal or farmyard manure.

Pesticide. This includes any chemicals or biological agents used to control weeds, pests or diseases affecting the crop.

Hired labour. This covers the labour brought in from outside the farm. Hired labour is used for tasks required to be done quickly at times when sufficient numbers of the farmer's family labour are unavailable (e.g. special weeding operations, assistance with rice harvesting or egg sorting before marketing).

Draught oxen or buffalo. This covers the number of hours of work of draught livestock.

Fuel and lubricants. Where farms are mechanized this includes the costs of fuel and lubricants for farm machinery and equipment used.

Interest. Payment for use on borrowed capital.

Miscellaneous costs. These include any other costs attributable to the crops not included under other headings.

Example

Variable costs of a livestock enterprise

Feed. This is feed purchased or transferred from another enterprise on the farm (e.g. maize produced on the farm and used to prepare a ration for animal feed).

Veterinary expenses and medicines. This covers all expenses for animal health, including veterinary costs and medicines. For example, among more commercial farmers prophylactic doses of minerals or vitamins are used to improve the health of intensively reared livestock (e.g. pigs or poultry).

Livestock transport. If the amount of produce to be transported is considerable, a transportation company may need to be contracted. For small amounts of produce sold, farmers often prefer to take their own animals to market.

Fuel and lubricants. These include the costs of fuel and lubricants for farm equipment.

Interest. Payment for use on borrowed capital.

Miscellaneous costs. These could include items such as ear tags for animal identification and bedding, and small amounts of purchased forage. Larger quantities would be added to the feed cost item.

Fixed costs

Fixed costs are long-term costs (lasting for more than a year) and are defined as costs that remain the same regardless of the volume of output. They do not alter with small changes in the size of an enterprise. The allocation of fixed costs to a specific farm enterprise can be difficult in some cases. Some fixed costs can be allocated directly to a specific enterprise (e.g. a maize harvester or cages for chickens). Other fixed costs (e.g. farm machinery) are more difficult to allocate.

High fixed costs place a strain on the business to increase profit

Tractors, for example, tend to be used in all farm operations and for all activities. If a farmer grows an extra hectare of maize, the costs of the tractor will hardly increase. If the farmer stops growing the crop altogether, some tractor costs will still be incurred. The operating costs of using the tractor, and in particular the cost of fuel, are variable but the capital cost of the tractor is fixed.

Note: Other fixed costs include depreciation of buildings and machinery, maintenance and repairs, regular labour, water, fencing, insurance and rent. These items need to be calculated for the whole farm unless they can be directly allocated to a specific farm enterprise.

Fixed costs are divided into labour, and machinery and equipment depreciation. These are discussed below.

Labour. Labour can be either supplied by the farm family or hired. Hired labour is treated as a variable cost as noted previously. Family labour is sometimes treated as a variable cost and on other occasions as a fixed cost. This depends very much on the family size and composition, which varies between countries and cultures. Where the farm operations are shared between the adult members of the family on a regular basis throughout the year, family labour is treated as a fixed cost.

However, some members of the family, particularly children, might also help out for specific operations at particular times of the year. In this event their labour contribution could be treated as a variable cost. To value this cost, the concept of opportunity cost is applied.

Machinery and equipment depreciation. The annual cost of capital items is called depreciation. Depreciation is included to reflect the fall in value of farm machinery in a year. A rate of depreciation is applied depending on the class of machinery involved. For example, powered machinery (tractors, combine harvesters) will often have a depreciation rate of 20—25 percent per annum, whereas trailed equipment (cultivators, drills) is usually depreciated at 10—20 percent.

The annual cost of depreciation of a capital item is calculated as follows ...

$$\textbf{Annual depreciation cost} = \frac{\textbf{Purchase price - Salvage value}}{\textbf{Useful life in years}}$$

Purchase price is the value of the capital investment at the time of the purchase.

Salvage value is the value of the implement at the time it has come to the end of its useful life.

For example, the purchase price of a tractor is $5 000 and the salvage value is $600. If the expected useful life is 10 years, the depreciation cost will be ...

$$\frac{\$5\,000 - \$600}{10 \text{ years}} = \$440$$

Suppose a farmer buys poultry cages for $500. If the cages last for ten years, it would be wrong to include the entire $500 in the cost of production for the year that cages were bought. The cost of cages for a single year would be the $500 divided by the number of years for which it can be used. That is, the annual cost of cages would be $50. This is the cost of depreciation.

Note: Examples of some of the more advanced type of cost calculation can be found at the end of Handout 3.1.1b.

Land and building costs

Rent. These are all land rental costs that cannot be allocated to a specific enterprise.

Building depreciation. This includes the depreciation costs on buildings and fixtures, land drainage and irrigation facilities.

Building repairs. These are repair and maintenance costs of all fixed property.

Note: While farmers have control over some of the costs of production, they tend to have little or no control over the prices received for most of their products. This is often the case because product prices are determined by both country and global factors. Therefore, in the event that farmers wish to increase their income, they should attempt to reduce the cost per unit of output.

Other fixed costs

Machinery maintenance and repairs. These are payments made for repair and maintenance of farm machinery, including purchase of tyres and spare parts for immediate or future use.

Electricity. This is composed of all farm electricity payments, including electricity charges for operations such as irrigation.

Water. Payments for the use of water (where applicable) are also included here. On intensive cropping farms in Asia these payments are often quite significant.

Fencing, hedging, ditching. This includes the costs of protecting and maintaining the land.

Miscellaneous. This consists of a mix of items that could include communication costs and any other small fixed cost items that cannot be allocated to a specific enterprise.

Enterprise gross margin

This is a practical tool for assessing the comparative profitability of different farm enterprises using simple arithmetic. Gross margin for an enterprise is the gross income minus its variable costs. It is particularly suitable for those farmers who are selling increasing amounts of their farm production in the marketplace and using purchased inputs.

A simple formula
for calculating gross margin is ...

Gross margin = Gross income - Variable costs

Resources to grow crops worth $60 at a variable cost of $10 generate a gross margin of $50 ($60 - $10). The gross margin is a measure of what the enterprise is adding to farm profits. Variable costs rise and fall as an enterprise expands and contracts. The fixed costs of the farm are not affected. It is only the variable costs and value of production that increase. If the extra variable cost is less than the value of extra production, the farmer will increase profits growing that crop.

Gross margin compares profitability of different farm enterprises

Gross margin allows a comparison between various activities and farm enterprises and is particularly useful for evaluating the profitability of new technologies and practices in comparison to the farmer's current practices. Comparisons are made between the "without new technology situation" and the "with new technology situation". Values for non-purchased inputs, such as family labour, draught power and manure, need to be noted and included among the variable costs. If gross margins rise substantially as a result of new technologies, the farmers would have a strong incentive to adopt these technologies.

The gross margins for each enterprise are combined to give the gross margin for the whole farm. Fixed costs are then deducted to arrive at whole farm profit.

Gross margin analysis

Gross margin aids farmers in enterprise choice

- The gross margin measures only relative profitability of the enterprise and not actual profit. It guides farmers on which enterprise to engage in, given the resources available. Classification of costs into variable and fixed, based on the cost and income analysis, is necessary.
- For crops where land is the most limiting resource, gross margin analysis is usually done on a per hectare basis.
- Gross margin analysis is usually done at the end of the cropping season or year after harvest as in the case of rice (two to three crops in the case of annual crops).
- For perennial crops where harvests occur two to three times a year, the entire harvest period should be considered in the analysis because both yields and prices are likely to vary over the year.
- Inputs and outputs considered for analysis must refer to the same year.

Example

Procedure for gross margin analysis

1. Calculate an average yield per hectare for each farm enterprise or activity.

2. Calculate the average input per hectare.

3. Calculate the gross income for the enterprise or activity.

4. Calculate the variable costs on a per hectare basis.

5. Calculate the gross margin by subtracting the variable costs from the gross income.

6. Compare the gross margins among activities to determine which is most profitable.

An appraisal of the cost and income factors in the gross margin can help identify those factors that contribute most to the attractiveness of a new enterprise or technology. For example, increases in yields could be obtained for a cereal crop by applying improved seed and higher fertilizer use. Gross margin analysis may, however, indicate that this is financially attractive only in some parts of the country. In remote areas, the gross margin may be low owing to the high cost of fertilizer resulting from exorbitant transport costs. Gross margin analysis can identify these differences leading to better farm decisions.

Enterprise profit

Enterprise profit shows the farmer's gain after taking into account all the production costs of the enterprise that can be allocated to it. Some enterprises may be highly profitable, while others are either unprofitable or less profitable. In order to identify problems of low profitability, enterprise profitability analyses need to be conducted for different farm enterprises.

The calculation of profitability consists of deducting all the costs incurred for the enterprise (i.e. variable and fixed costs) from enterprise gross income. When the gross margin was calculated, the variable costs were taken into account but fixed costs were not. Now in calculating the enterprise profit the total cost of production, fixed costs as well as the variable costs, is considered.

Enterprise profit is calculated by allocating the costs of production to individual farm enterprises

Enterprise profit calculations assume that nearly all fixed costs can be allocated to the enterprise. In many cases this may be difficult to assess. Fixed costs that can be allocated to a single enterprise might include labour and machinery costs (depreciation, interest on capital, fuel, repairs). Rent could also be divided according to the area of the farm allocated to the enterprise and the duration of the crop. Where the land is owned, a rental value can be assigned by using the concept of opportunity cost. The land would be valued at the market rate for similar land types.

Labour required on the farm can be either supplied by the farm family or hired. Family labour does not constitute a cash cost. But to estimate all possible costs in calculating the profit for each enterprise, labour is treated as though it were all hired. The time required for all operations needs to be accounted for, and the accumulated time devoted to the activity is multiplied by the going wage for hired labour.

Interest on working capital is defined as the payment for the use of borrowed capital. This refers to capital tied up in variable costs and operating expenses. Because it is generally less than a year from the time of expenditure until harvest, when income is received, interest is charged over this period. The period taken is the average length of time from the point when costs are incurred until harvest. It should be pointed out that even if no capital is borrowed, there is an opportunity cost incurred.

However, since the capital requirements of the farm may be supplied partly by the farmer and partly by outside sources, it is usually difficult to determine how much interest should be included in the cost. In all events, interest should be computed on all of the costs of the enterprise as though the money required to produce the crop were borrowed. An example of how to calculate the interest on working capital is given in Handout 3.1.1b (More about variable costs).

Seed, fertilizer and the costs of other chemicals can be calculated by simply multiplying the quantity of each material input by the per unit input cost.

Fuel, oil and other operational expenses for machinery and equipment relate to the type and size of machinery used and the number and type of machinery operations performed for the enterprise. Fuel consumption per hectare is normally determined for each machine operation. The total fuel consumption for all of the operations for a particular crop enterprise is simply aggregated. The result is multiplied by the cost of fuel to arrive at a per unit cost figure (e.g. cost per hectare). An alternative method is to compute fuel consumption per hour of tractor use and then determine how many hours will be needed to perform the machine operations.

Table 3.1 — **Analysis of a tomato enterprise**

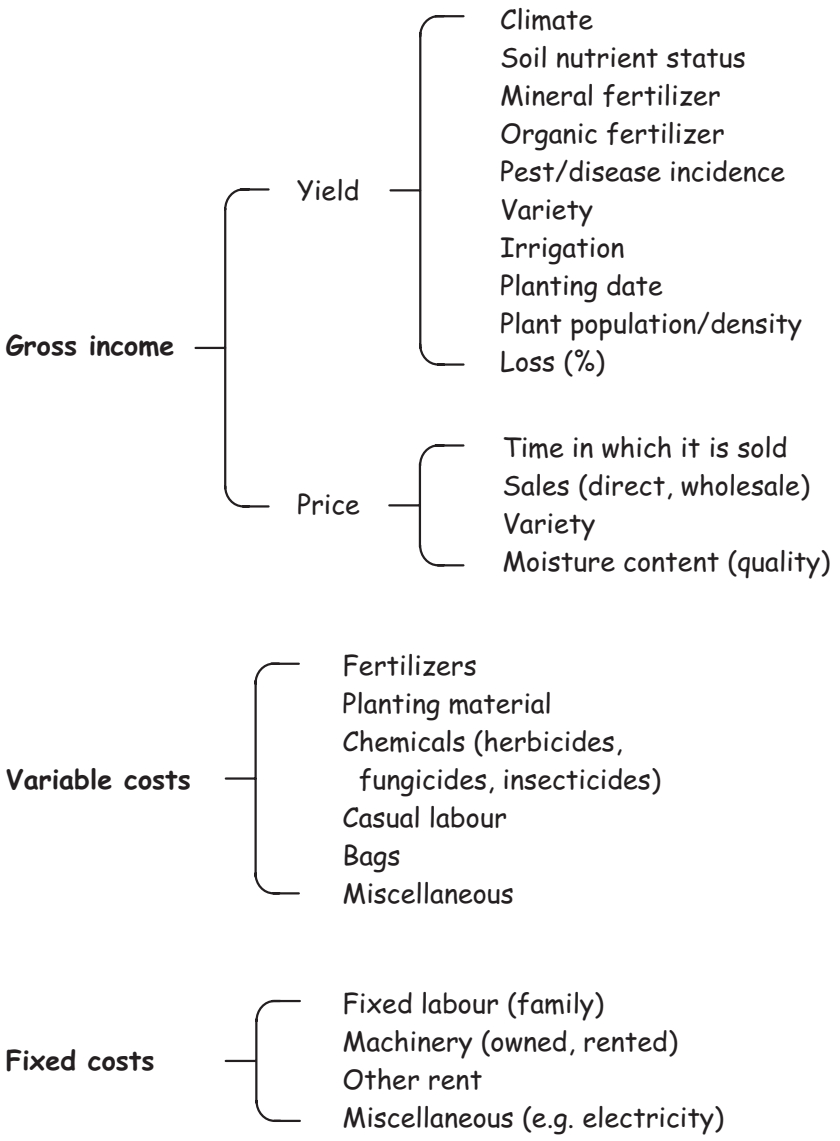
Item	Number or quantity	Unit price ($)	Amount ($)
Income			
Tomato yield (tonnes per ha)	9.00		
Price		142.8	
(a) Total income			**1 285.20**
Variable costs			
Labour (person/days)			
Care of seedbeds	17.06	1.71	29.20
Ploughing	7.50	3.14	23.50
Harrowing	3.00	3.14	9.40
Furrowing	1.00	0.21	0.20
Transplanting	2.00	17.14	34.30
Cultivation	12.00	3.14	37.70
Weeding	36.00	1.71	61.60
Spraying /dusting	14.00	1.71	23.90
Harvesting	10.00	1.71	17.10
Sorting	4.00	1.71	6.80
Sub-total			**243.70**
Materials			
Seeds (g)	150.00	0.07	10.50
Fertilizer (kg)	200.00	0.60	120.00
Fungicide (litre)	3.00	4.80	14.40
Herbicide (litre)	4.00	17.50	70.00
Crates	250.00	0.14	35.00
Plastic covers	3		28.60
Sub-total			**278.50**
Interest on working capital*			+ 15.70
*3% for 3 months		**(b) Total variable cost**	**537.90**
Fixed costs			
Depreciation			8.00
Rent			4.00
(c) Total fixed cost (allocable)			**12.00**
(d) Total cost (b + c)			**549.90**
Gross margin (a - b)			**747.30**
Enterprise profit (a - d)			**735.30**

Machinery repair costs should also be included. Repairs are often allocated relative to the type of machinery used and the time and work requirements. Machinery repair costs can be estimated in the same way as fuel costs. Table 3.1 shows a profitability analysis for a tomato enterprise. The positive profit figure and gross margin per hectare indicates that this enterprise is profitable.

As pointed out earlier, many factors can affect the output and the variable costs of a farm enterprise. To assess these factors it is necessary to have a detailed breakdown of physical and financial information relating to it.

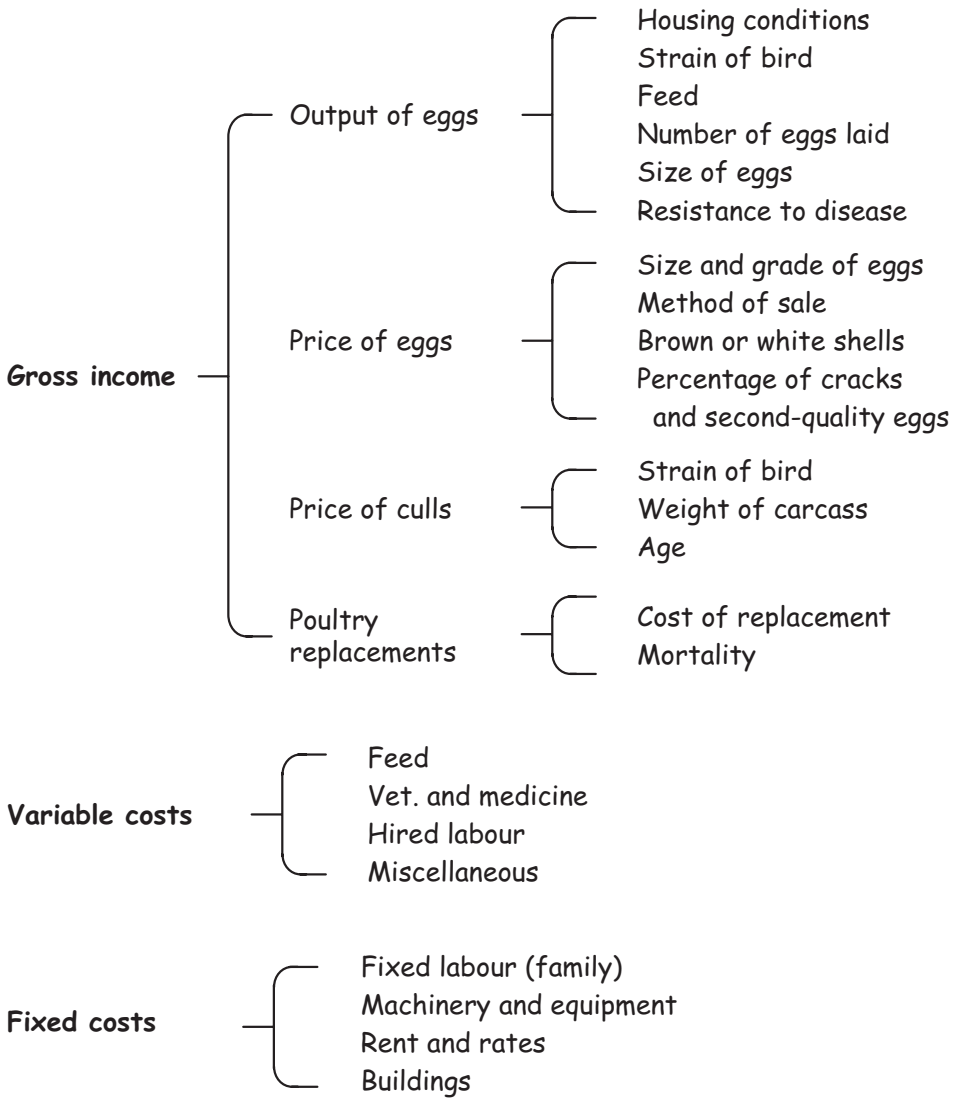
Diagrams of factors affecting gross income and profitability of a crop and livestock enterprise are indicated in Figures 3.1 and 3.2 on the next pages.

Figure 3.1
Factors affecting profitability
(a paddy rice enterprise)



Gross income - Variable costs - Fixed costs = Enterprise profit

Figure 3.2
Factors affecting profitability
(a poultry enterprise)



Gross income - Variable costs - Fixed costs = Enterprise profit

More about variable costs

Table 3.2 — **Assigning the value of key variable inputs, rice production**

Cost items	Methods of assigning or imputing values
Home-grown seeds	Based on the prevailing farmgate price in the area.
Home-produced farm manure	Prevailing price in the village.
Irrigation fee in kind	Based on the value of the produce used as payment.
Hired human labour paid in kind	Based on the amount of produce used as payment converted into cash, using the price per unit of the product.
Land rental in kind	Value of the produce used as payment.
Interest on working capital	Based on prevailing rate of interest.
Interest on fixed capital	Normally charged as depreciation cost in the case of farm investments, such as farm buildings, machineries, tools and equipment. Otherwise current rate of interest could be applied to the value of investments including work animals. If this is used, no depreciation cost should be charged to avoid double counting.
Depreciation cost	Usually straight-line method of applying the rate of depreciation.
Value of unpaid family labour	Family labour is an example of an input that is not bought or hired. It is an important input for most farmers. In order to make meaningful comparisons of different enterprises or of technologies relating to the same enterprise, it is necessary to estimate a cost for family labour (i.e. by valuing family labour at what it would cost to hire such labour). If little hired labour is used in the area, then the *opportunity cost* of labour would not be very high. We say that the cost of family labour is *imputed* (assigned a value). The time required for different farm operations would need to be accounted for and the result multiplied by opportunity cost. The less mechanized the farming is the more relevant it is to impute a value for family labour.

Timing and classification of variable and fixed costs

The classification of costs as variable and fixed also depends on the management decisions being considered and the situation at the time. For example, land rent is variable if the farmer has not yet decided whether to lease additional land. However, once the land has been leased, rent becomes a fixed cost.

Costs incurred in growing any crop can be regarded as fixed, and from here on only the cost of harvesting needs to be taken into account and can be regarded as a variable cost. If the cost of harvesting is higher than the price that the farmer will get from selling the product, the cost will outweigh the income earned. Then the farmer should decide not to harvest. The following cases illustrate the point.

Case 1 (long term)
The farmer has decided to rent land to plant tomatoes (given the information below)

Gross margin, tomatoes in ha per year

Item	Value
Gross income	
Total production (kg)	300
Price per kg ($)	1
Total income ($)	**300**
Variable costs ($)	
Land rent	10
Equipment	15
Seed costs	10
Fertilizer	16
Interest on loans	18
Pesticides	7
Irrigation	24
Hired labour	15
Unpaid labour	50
Other costs	35
Total variable costs ($)	**200**
Gross margin ($)	**100**

The decision to rent the land and produce tomatoes is advisable when total income earned is greater than total costs incurred as seen in Case 1. Now let us look at a second case.

Case 2 (short term)

Now that the farmer has rented the land and has purchased the necessary equipment, a decision has to be taken whether or not to grow tomatoes for the next season

Gross margin, tomatoes in ha per year

Item	Value
Gross income	
Total production (kg)	175
Price per kg ($)	1
Total income ($)	**175**
Variable costs ($)	
Seed costs	30
Fertilizer costs	24
Pesticides	7
Irrigation costs	24
Hired labour costs	15
Other costs	25
Total variable costs ($)	**125**
Fixed costs ($)	
Land rent	10
Equipment depreciation	5
Interest on loans	10
Unpaid labour	50
Total fixed costs ($)	**75**
Enterprise profit ($)	**-25**

In Case 2, only the variable costs need to be taken into account in making a decision. If the total income is greater than the total variable costs, the farmer would minimize losses by continuing production of the crop. The fixed costs are incurred whether or not the farmer continues to produce the crop. As long as the total income exceeds the total variable costs, it would be profitable to continue production.

If the farmer does not produce, the loss will be $75, the amount of fixed costs. Alternatively, if the farmer produces the crop, the loss will be only $50 ($175 - $125). As long as the total income is greater than the total variable cost, production should be carried on to minimize the loss. If, however, the total income is less than the total variable cost, say $100, the loss will be $100 ($75 fixed costs plus $25 ($100 - $125). The farmer in this case should not produce.

By comparison here is an example of a very short-run situation again harvesting tomatoes. Tomatoes have been planted and are about to be harvested. Because of a very low price for tomatoes, the farmer must decide whether or not to harvest. In this situation, all the costs incurred so far are considered fixed and only the costs of harvesting, marketing and other costs to be incurred are important at this time. If the cost of harvesting, marketing and other costs per unit (say per kilogram) are higher than the price that will be derived from selling tomatoes, the farmer should not harvest the crop because the loss will be much higher.

Calculation of interest on working capital

Using the assumptions of ...

- **a 4 month growing season**
- **an interest rate of 17% per annum**
- **variable costs = $1 000**

... calculate as follows:

i) Interest rate for the 4 months

$$\frac{4}{12} \times 0.17 = 5.66\%$$

ii) Convert percentage by multiplying with variable costs

$$0.0566 \times \$1\,000 = \$56.6$$

Example 1

Operating cost calculations

Calculation of the annual cost for a tractor
(tractor bought for $5 000)

Current new value	$5 000
Salvage value	$500
Useful life	10 years
Rate of interest	12%
Tractor use per year	720 hr
Fuel costs	4 litres/hr at $1.50/litre
Lubrification costs	0.06 litres of oil per hour at $ 2.50/litre
Maintenance costs	15% of new value

Annual costs = Depreciation + Interest + Operating costs

$$\textbf{Depreciation} = \frac{\textbf{New value - Salvage value}}{\textbf{Useful life}}$$

$$\frac{\$5\,000 - \$500}{10} = \$450$$

$$\textbf{Interest} = \frac{\textbf{Initial value + End value}}{\textbf{2 (average)}} \times \textbf{Rate of interest}$$

$$\frac{\$5\,000 + \$500}{2} \times 0.12 = \$330$$

Operating costs

fuel: 720 x 4 litre/hr = 2 880 litres x $0.5 = $1 440
lubrification: 0.06 lt x 720 hr x $2.50 = $ 108
maintenance: 15 percent of $5 000 = $ 750
Total operation costs = $2 298

Annual Costs = $450 + $330 + $2 298 = $3 078

Example 2

Operating cost calculations

Calculation of the cost of interest on livestock
(calf rearing during the first 9 months)

Initial value of the calf	$100
Daily costs of feeding, housing, etc.	$2 per day
Rate of interest	10 percent

Calculate the end value ...

initial value: $100
added value: 9 months x 30 days x $2 = $540
End value = $640

Calculate the interest ...

$$\textbf{Interest} = \frac{\textbf{Initial value + End value}}{\textbf{2 (average)}} \times \textbf{Rate of interest}$$

The annual interest rate is ...

$$\frac{\$100 + \$640}{2} \times 0.10 = \$37$$

Then the interest over the 9 months is ...

$$\$37 \times \frac{9}{12} = \$27.7$$

Notes

Unit 3.1 — Training exercise 7
Enterprise analysis

Gross margins for local and hybrid rice that can be planted on the same plot in the same season.

Item	Local rice (ha)	Hybrid rice (ha)
Gross income		
Yield in Kg/ha	1 350.00	2 000.00
Price/kg	0.45	0.45
Total gross income	**607.50**	**900.00**
Variable costs		
Seeds	100.00	50.00
Manure	30.00	30.00
Fertilizer	0	45.00
Chemicals	0	15.00
Transport	15.00	30.00
Other	0	0
Total variable costs	**145.00**	**170.00**
Gross margin	**462.50**	**730.00**

Task

Groups of participants should use the gross margins above to compare the two crops and answer the following questions.

What are the reasons for the difference in gross margins between the crops?

(continued on the next page)

Training exercise 7 (continued)

Can it be concluded that as hybrid rice generates the higher gross margin per hectare all farmers should shift to hybrid rice cultivation?

If not what other factors need to be taken into consideration?

After having answered the questions in this exercise the various groups may wish to discuss their results.

Training slides
for Session 3.1.1
Enterprise profitability analysis

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30 Enterprise profitability analysis

A farm enterprise analysis
consists of allocating income and costs
among individual enterprises

Knowledge of enterprise gross income,
production costs, gross margin and profitability
of all possible enterprises
is essential for extension worker and farmer alike

31 What is gross income?

Gross income is the total value of the product over a production cycle or year
(value of sales can be measured by the amount of money a farmer gets ... but not all that is produced is sold)

Gross income is obtained by multiplying the total volume of the final marketable production by its average farmgate price

Gross income assesses the performance of an enterprise purely in terms of the benefits it yields without considering the costs to produce it

32a Gross income for a crop enterprise
(calculated by season or year)

Item	First crop	Second crop	Average	Total
Hectares (ha)	2	1.5		3.5
Yield per ha in tonnes	6	7	6.5	
Production in tonnes	12	10.5		22.5
Farmgate price per tonne	80	60	70	
Gross income ($)	**960**	**630**		**1 590**
Gross income per ha ($)	**480**	**420**	**450**	

32b Gross income for a livestock enterprise

(calculated for longer than a season or year)

Item	No. and kind of cows	Cost ($)	Total ($)	
Closing valuation (end of year)	5 beef cows	25	125	= 175
plus sales (during the year	2 beef cows	25	50	
minus opening valuation (beginning of year)	2 calves	14	28	= 52
plus purchases (during the year)	2 calves	12	24	
			Gross income ($)	**123**

33 Factors that influence enterprise gross income

Value ...

of farm produce sold directly or via intermediaries
of by-products and produce used again as an input on farm (e.g. maize produced and used as feed)
of produce consumed by the farm family

Gain or loss ...

in value of tree crops and livestock between beginning and end of year (i.e. opening and closing evaluation)
in value of produce stored for later sale (i.e. difference in value of produce between storing it and selling it)

34 Costs of production

Production costs are usually classified as either
variable costs or fixed costs

The classification of a particular cost as
variable or fixed depends partly
on the nature and timing of the farm management
decisions being considered

Some costs are **fixed** in relation to certain decisions
but others are **variable**

35 Variable and fixed costs

Variable costs are short-term costs
(usually within one year or within a production cycle)

They occur only if something is produced,
tend to vary according to size of enterprise,
can easily be allocated to individual enterprises

Fixed costs are long-term costs
(lasting for more than a year)

They remain the same regardless of volume of input
and are not altered by small changes in enterprise size

36 **Variable costs/crop enterprise** (short-term)

Seed. Usually bought but may be a mixture of purchased and home-grown. Even though seed is home-grown, it will have to be given the value at which it might have been sold.
Fertilizer. Normally purchased (but may include manure).
Pesticide. Includes chemicals or biological agents used to control weeds, pests or diseases affecting the crop.
Hired labour. Labour brought from outside the farm.
Draft animals. Covers the number of hours of work.
Fuel. Costs of fuel and lubricants for farm equipment.
Interest. Payment for use on borrowed capital
Miscellaneous costs. Include any other costs attributable to crops not included under other headings.

37 **Variable costs/livestock enterprise** (short-term)

Feed. Purchased or transferred from another enterprise (e.g. maize produced used to prepare farm animal feed).
Veterinary and medicines. All expenses for animal health (including vitamins and minerals for intense production).
Livestock transport. Amount to be transported (small farmers may prefer to take their own animals to market).
Fuel. Costs of fuel and lubricants for farm equipment.
Interest. Payment for use on borrowed capital
Miscellaneous costs. Include any other costs such as ear tags for animal classification, small amounts of purchased forage and larger quantities added to the feed cost item.

38 Fixed costs (long-term)

Some fixed costs can be allocated directly to a specific enterprise ...
(e.g. a maize harvester or cages for chickens)

... others are more difficult to allocate
(e.g. farm machinery)

Labour. Supplied by the family, hired or volunteered.
Machinery and equipment depreciation. The annual cost of capital items is called depreciation and is included to reflect the fall in value of farm machinery in a year.
Builiding depreciation. Includes drainage and irrigation.
Other. Repairs, fuel and oil, utilities, insurance, land rent.

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39 Calculating depreciation

The annual cost of depreciation of a capital item can be calculated as follows ...

$$\textbf{Annual depreciation cost} = \frac{\textbf{Purchase price - Salvage value}}{\textbf{Useful life in years}}$$

Purchase price *is the value of the capital investment at the time of the purchase*

Salvage value *is the value of the implement at the time it has come to the end of its useful life*

40 Calculating enterprise gross margin

Gross margin is a simple, useful and practical tool for assessing the comparative profitability of different farm enterprises. The gross margin for an enterprise is gross income from that enterprise minus variable costs.

Gross Margin = Gross Income – Variable Costs

This is particularly suitable for farmers who are selling increasing amounts of their farm production in the marketplace and using purchased inputs.

41 Procedure for gross margin analysis

1. **Calculate average yield per hectare for each farm enterprise or activity.**
2. **Calculate average input per hectare.**
3. **Calculate gross income for enterprise.**
4. **Calculate variable costs per hectare.**
5. **Calculate gross margin by subtracting variable costs from gross income.**
6. **Compare gross margins among activities to determine which is most profitable.**

42 Analysis of a tomato enterprise

Item	Number or quantity	Unit price ($)	Amount ($)
Income			
Tomato yield (tonnes per ha)	9.00		
Price		142.8	
(a) Total income			**1 285.20**
Variable costs			
Labour (person/days)			
Care of seedbeds	17.06	1.71	29.20
Ploughing	7.50	3.14	23.50
Harrowing	3.00	3.14	9.40
Furrowing	1.00	0.14	0.20
Transplanting	2.00	17.14	34.30
Cultivation	12.00	3.14	37.70
Weeding	36.00	1.71	61.60
Spraying /dusting	14.00	1.71	23.90
Harvesting	10.00	1.71	17.10
Sorting	4.00	1.71	6.80
		Sub-total	**243.70**

Item	Number or quantity	Unit price ($)	Amount ($)
Variable costs			
Labour (person/days)			
		Sub-total	**243.70**
Materials			
Seeds (g)	150.00	0.07	10.50
Fertilizer (kg)	200.00	0.60	120.00
Fungicide (litre)	3.00	4.80	14.40
Herbicide (litre)	4.00	17.50	70.00
Crates	250.00	0.14	35.00
Plastic covers			28.60
*3% for 3 months		***Sub-total***	**278.50**
Interest on working capital*			+ 15.70
		(b) Total variable cost	**537.90**
Fixed costs			
Depreciation			8.00
Rent			4.00
		(c) Total fixed cost (allocable)	**12.00**
		(d) Total cost (b + c)	**549.90**
		Gross margin (a - b)	**747.30**
		Enterprise profit (a - d)	**735.30**

43 Enterprise profit

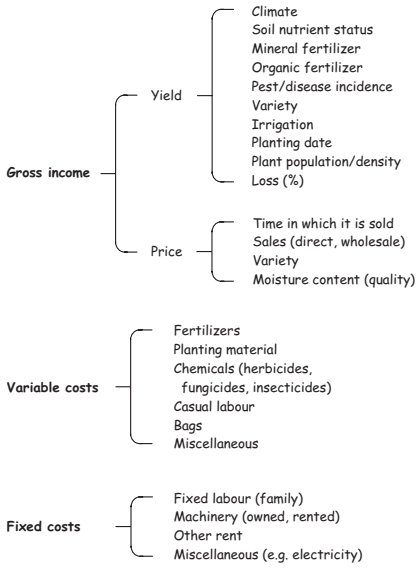
The calculation of profitability consists of deducting all costs incurred for the enterprise (i.e. deducting variable and fixed costs from enterprise gross income)

Enterprise profit calculations assume that nearly all fixed costs can be allocated to the enterprises

Some fixed costs may have to be divided among various enterprises and this may be difficult

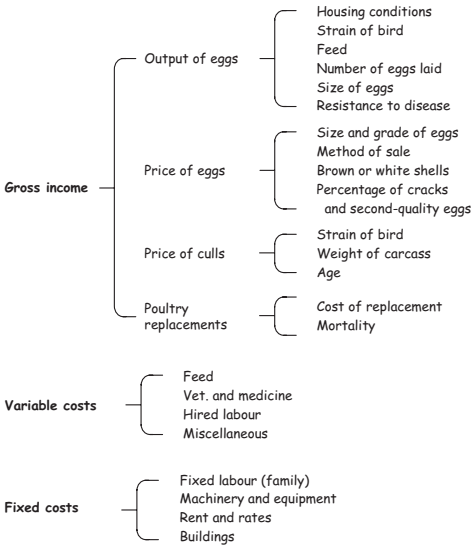
44
Factors affecting profitability

(a paddy rice enterprise)



Gross income - Variable costs - Fixed costs = Enterprise profit

(a poultry enterprise)



Notes

Preparing for session 3.1.2
Whole farm income

Teaching methods
Lecture, discussion, explain calculations

Duration: 30 minutes

Learning support materials
Handout 3.1.2 (Whole farm income),
Slide 45 (Calculating whole farm income)

Notes

Whole farm income

This session discusses the concept and procedures involved in estimating the annual whole farm income. This will help strengthen the knowledge of extension workers in analysing the farm business. While enterprise profitability analysis is limited to a particular enterprise, which is only one part of the farm business, whole farm income analysis gives the overall picture of farm performance. It shows the contribution of individual enterprises to the total income of the farm business.

Knowing how to compute the whole farm income is expected to lead to better decision-making by identifying the economic strengths and weaknesses of the farm business. One of the objectives of better farm management skills is to increase farm household income.

Objectives

At the end of the session, the participants will have:

- acquired knowledge on the methodology used in analysing the whole farm income;
- a better understanding of gross margin and its place in calculating whole farm income;
- understood the contribution of each enterprise to overall income.

Key points

1. Small farmers differ from commercial farmers by the fact that the farm and the household are closely linked.

2. Farm income is measured by gross margin, and profit and loss.

3. Gross margin is gross income minus variable costs.

4. Profit and loss is computed by subtracting total costs from gross income.

5. Farm income is the total disposable income that can be used for family living expenses and for the payment of taxes.

Steps for instruction

1. Distribute Handout 3.1.2 (Whole farm income) to the participants before the start of the session.

2. Introduce the session by mentioning that total farm gross income is the summation of all the enterprise gross incomes.

3. Remind the participants that some fixed costs may not be allocable between enterprises.

4. Discuss why whole farm income is a reward to the farm family for labour, capital and management contributed during the year.

5. Explain why whole farm income is not equivalent to the cash earnings of the farmer.

6. Show Slide 45 (Calculating whole farm income) and explain briefly how to calculate gross margin and whole farm income.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 3.1.2.

Notes

Whole farm income

Whole farm income is the year-by-year profitability of the farm as a whole. It is the reward for labour, capital and management contributed by the farm family during the year. There are two ways of calculating whole farm income: either by using gross margins or conducting enterprise profitability calculations. Whole farm income is calculated by combining the gross margin of each of the farm enterprises and deducting fixed costs. Alternatively, it could be calculated by estimating the enterprise profit for each of the farm enterprises and aggregating to the level of the farm.

Whole farm income measures the strength of the farm business

Gross margin = Gross income - Variable costs

Whole farm income = Total gross margin - Fixed costs

The final income figure reflects the profit of the farm and is the reward for the capital and management contributed by the farm family during the year. Whole farm income is necessary to cover the family's living expenses and to pay taxes. The amount left over after accounting for living expenses and taxes can be reinvested into the farm activities. The whole farm income is not equal to the cash the farmer earns. To know precisely the amount of cash earned, the costs related to family labour, depreciation and interest for the use of the farmer's funds must be deducted from the whole farm income.

Notes

Training slides
for Session 3.1.2
Whole farm income

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45 Calculating whole farm income

To find whole farm income,
first calculate the gross margin
for each of the single farm enterprises ...

Gross margin = Gross income - Variable costs

... then deduct the fixed costs
from the total gross margin for all farm enterprises

Whole farm income = Total gross margin - Fixed costs

Preparing for session 3.1.3
Enterprise and farm efficiency measures

Teaching methods
Lecture, review profitability, group discussion

Duration: 30 minutes

Learning support materials
Handout 3.1.3 (Enterprise and farm efficiency measures)

Notes

Enterprise and farm efficiency measures

Analysis of the farm enterprises, through measures of efficiency, enable a more complete and detailed diagnosis of the enterprise to be conducted. A more detailed diagnosis should result in a more precise application of corrective measures.This session describes some of the efficiency measures that can be used to analyse the causes of low enterprise profitability.

Objectives

At the end of the session, the participants are expected to:

- have an understanding of some common efficiency measures;
- know how to interpret these measures to strengthen enterprise and farm performance.

Key points

1. Farm and enterprise profitability is analysed by comparing gross income and costs.

2. Profitability is a measure of how efficient the farm business is in using the resources available to generate income.

3. Economic efficiency relates to the value of inputs used and the produce sold.

4. Technical efficiency is the quantity of production achieved per unit of resource employed.

5. Common performance measures are: (i) the level of yields and prices achieved, (ii) the quantities of variable inputs used, (iii) the level of fixed costs, (iv) physical and financial measures of efficiency.

6. Yield per hectare and yield per tree are two of the common technical efficiency measures that are used in the diagnosis of enterprise performance.

7. Production per livestock unit is often used to measure livestock efficiency.

8. Examples of measures of economic efficiency are:

   - rate of capital turnover;
   - feed cost per kilogram of production gain;
   - value of the crop per unit of cultivated area.

Steps for instruction

1. Distribute Handout 3.1.3 (Enterprise and farm efficiency measures) before the start of the session.

2. Introduce the session by referring back to the discussion on profitability. Explain how it is used at both enterprise and farm levels. Show how low profitability can be traced to economic and technical inefficiency.

3. Differentiate between (i) economic efficiency (which refers to the value of inputs used and produce sold), (ii) technical efficiency (which measures the farmer's technical performance and success in producing maximum output from a given set of inputs).

4. Point out the different measures of technical and economic efficiency. Note that measures of efficiency for crops differ from those of the livestock. Mention that for the purpose of this training, only the following indicators will be used: (i) yield per hectare, (ii) yield per tree, (iii) yield per animal.

5. Explain in detail the following efficiency measures: (i) rate of capital turnover, (ii) feed cost per kilogram of livestock gain, (iii) crop value per unit of cultivated area. Another method of measuring performance is to conduct a gross margin analysis. Reference should be made to Session 3.1.1.

6. Facilitate a discussion on other indicators of efficiency that have been used by either extension workers or farmers.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 3.1.3.

Notes

Enterprise and farm efficiency measures

As noted in the previous sessions, farm and enterprise profitability is analysed by comparing gross income and costs. Profitability is a measure of how efficient the farm business is in using the resources available to generate income. If a problem of low profitability can be traced to a low level of production, the reasons given might be the lack of farm resources, or alternatively the inefficient use of those resources available to the farmer.

Low prices of products sold or high costs of inputs result in low profitability

If production levels are satisfactory, low profitability may be traced to low prices for produce sold, or alternatively high costs of purchased inputs used. If inadequate resources are employed, the farmer would do well to extend the area of land under cultivation or alternatively increase labour supply, expand livestock, or obtain more capital. If the resource base cannot be increased, then fixed costs should be carefully evaluated. Steps should be taken to reduce those costs that have the least effect on the level of production. This calls for greater efficiency in production, better product prices and lower costs. Efficiency is either economic or technical.

Economic efficiency

This refers to the value of inputs used and produce sold. Economic efficiency can be improved by attaining better prices for products sold and reducing the cost of inputs. This might be done by seeking better market outlets, searching for low cost suppliers and substituting organic inputs for purchased inputs. Excessive costs for inputs and materials can result in low economic efficiency.

Technical efficiency measures production against resources used

Technical efficiency

This is a way to measure the technical performance of crop and livestock management practices. Technical efficiency measures the farm's success in producing maximum output from a given set of inputs. It is often measured as the achievement of maximum output with given inputs or a given output with minimum inputs. In short, it is concerned with physical measurements of input to output.

$$\text{Efficiency} = \frac{\text{Production (output)}}{\text{Resources used (input)}}$$

If enterprise profitability is low and technical efficiency cannot be improved, a conclusion that might be drawn is that the wrong enterprises are being kept. Alternatively, if technical efficiency measures are found to be satisfactory, another explanation for low profitability might be the receipt of below premium product prices. Further investigation might discover that this could be the result of low price cycles, poor marketing practices or inferior product quality. Alternative marketing outlets and marketing tools should then be considered.

The following measures are often useful in assessing the performance of farm enterprises:

- the level of yields and prices achieved;
- the quantities of variable inputs used;
- total fixed costs;
- various physical and financial performance and efficiency measures identified as relevant.

By using these indicators, and in particular measures of efficiency, extension workers would be in a better position to assist farmers to assess their farms.

Low profitability can often be traced to poor efficiency in one or more areas of the farm business. Both technical and economic efficiency measures should be examined.There are a number of technical efficiency measures that can be used.

Crop enterprises. The following measures are commonly used:

Yield per hectare. Most crops can be assessed on the basis of production per unit of land. The most common measures for specific crops are: bags per hectare for rice and maize; kilograms or tonnes per hectare for rice, corn, copra, abaca; piculs per hectare for sugarcane.

Yield per tree. Tree crops are usually assessed in terms of average production per tree. For example, production of coconut is measured in terms of number of nuts per tree or litres of coconut toddy per tree.

Livestock enterprises. Technical efficiency is usually expressed in physical terms, such as litres of milk per dairy cow, number of eggs per layer, kilograms per broiler and number of pigs per litter.

The measures of economic efficiency differ from physical measures primarily because they are expressed either in monetary values or as a rate or percentage relating to capital use. The following are some examples of indicators used to measure economic efficiency:

Feed cost per kilogram of production gain. The feed cost per kilogram of production gain (or per litre of milk for a dairy enterprise) is calculated by dividing the total feed cost by the total kilograms of production (or total litres of milk for a dairy enterprise) and multiplying by 100. The total kilograms per year should be equal to the kilograms sold and consumed minus the kilograms purchased, plus or minus any inventory changes. This measure is affected by both feed and livestock values and should be compared only among the same type of livestock.

Value of crop per cultivated area. This value measures the intensity of crop production. It is calculated by dividing the total value of all crops produced during the year by the area under cultivation. It does not take into account production costs and does not measure profit.

Rate of capital turnover. This measure is an indication of how efficiently capital is being used in production. It is determined by dividing the value of farm production by the total capital used in the farm business. For example, a rate of capital turnover of 30 percent indicates that the value of farm production is equal to 30 percent of the total capital invested. Higher rates of return mean that it takes fewer years to produce products with a value equal to the capital investment.

The rate of capital turnover will vary by farm type. Dairy, pig and poultry farms usually have higher rates. Beef farms tend to be among those that have lower rates of capital turnover. Farms that are predominantly crop based have intermediate values. The rate of capital turnover is an indicator that should be compared only between farms of the same general type.

Many other efficiency factors have been used and others could be derived to suit specific needs. It is of little value comparing only one ratio and taking action to improve it, because this will affect other ratios. The only true criterion is overall efficiency for which no single, universally reliable ratio so far exists.

Notes

Constraints and potentials

This unit shows the importance of analysis of the constraints and potentials of the farm and highlights opportunities for improvement. It is essential that both the extension worker and the farmer understand the strengths and weaknesses of the farm business as a whole as a first step towards a more detailed diagnosis of the performance of individual enterprises. The results of the analysis determine the methods and solutions used to address the identified constraints.

Preparing for session 3.2.1
Analysis of constraints and potentials

Teaching methods
Presentation, trainer/participant interaction, draw a constraints tree, group report to class, training exercise, group presentation, discussion

Duration: 60 minutes

Learning support materials
Handout 3.2.1 (Analysis of constraints and potentials), Slide 46 (Analysing constraints and potentials), Slides 47a and 47b (Identifying constraints and potentials), Slide 48 (Constraints tree), Training exercise 8 (Analysis of constraints and potentials), Worksheet (Analysis of constraints)

Notes

Analysis of constraints and potentials

This session discusses the analysis of constraints and opportunities and how such analyses should be conducted. This is an instrument that can be used to identify weaknesses and potentials within the farming system and its parts. The causes of those weaknesses are also identified as well as strategies for building on potential strengths.

Knowledge of the constraints faced by farmers and the potential for improvement of the farm provide extension workers with a valuable overview of the farm business. The session also provides the skills necessary for application.

Objectives

At the end of the session the participants are expected to:

- understand the purpose of the technique;
- know when to use the method;
- know how to construct a constraints tree to analyse the constraints and potentials of the farm business.

Key points

1. A constraint is a situation or factor that prevents the attainment of the objective or the goals or targets set by the farmer.

2. Some of the constraints may be within the control of the farmers while others are not.

3. Constraint analysis requires a systematic analysis of causes and effects.

4. Constraints may also be related to physical factors, such as soil type, climatic factors, socio-cultural, policy and institutional, over which the farmers have no control.

5. Favourable opportunities need to be identified in relation to the constraints in order to design improved farm plans.

Steps for instruction

1. Distribute Handout 3.2.1 (Analysis of constraints and potentials) among participants before the start of the session.

2. Using Slide 46 (Analysing constraints and potentials) explain the value of such an analysis, how to use it and what it does.

3. Show Slides 47a and 47b (Identifying constraints and potentials) and discuss these in the context of farm business planning. Ensure that participants fully understand both, and ask them for examples from their own experience.

4. Show Slide 48 (Constraints tree). Discuss the construction of a constraints tree. Explain that this provides an effective way to illustrate constraints within a farm system and shows how they tend to influence one another. This then becomes a useful tool to help analyse weaknesses and suggest solutions. Have participants discuss ways to overcome constraints and improve farm performance.

5. Refer to the Worksheet (Analysis of constraints) in Handout 3.2.1 and work with the participants to complete it. Encourage a discussion of the results.

Notes

6. Distribute Training exercise 8 (Analysis of constraints and potentials). Divide participants into groups and ask them to carry out the exercise. Following the exercise, group solutions should be presented to the class where further questions could be raised, and a general discussion should be conducted on the topic following the group presentations.

Evaluation: (i) review objectives and key points, (ii) refer to Handout 3.2.1, (iii) refer to Training exercise 8.

Notes

Analysis of constraints and potentials

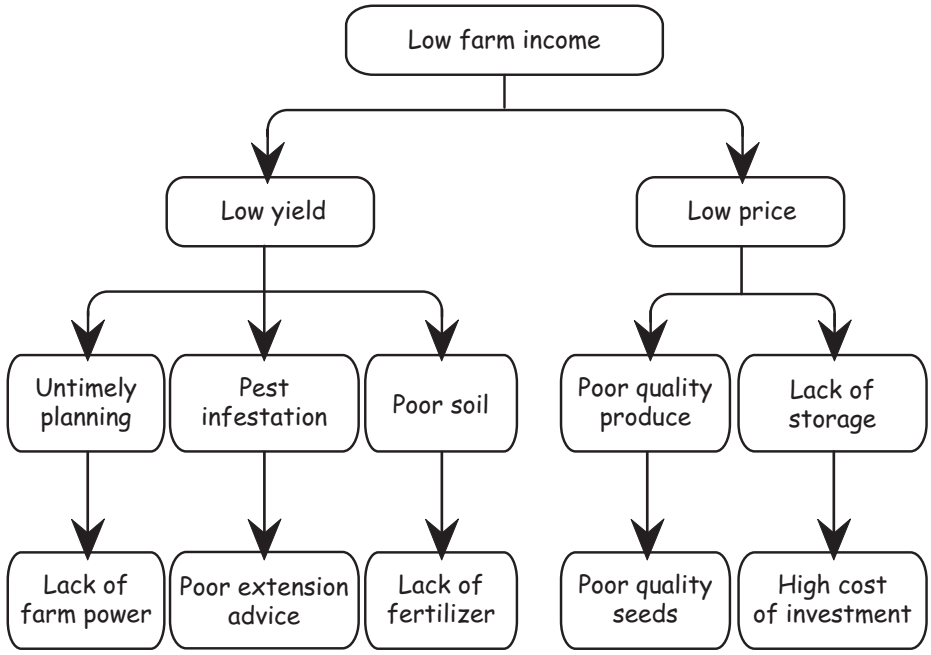
The constraints and potential analysis is an instrument used to identify specific problems within the farm system. It is intended to identify constraints (weaknesses and their causes) and potentials (opportunities for change) both within the system as a whole and within its individual parts. In this way it is possible to develop strategies to overcome weaknesses by identifying potential improvements and possible solutions. The instrument may not necessarily solve all problems that farmers face but can highlight what they might do by themselves and the type of outside assistance is needed.

Analysis of constraints identifies weaknesses in the farm business ...

The diagram below shows how constraints within a farm system interrelate and provides a useful tool to analyse weaknesses and suggest solutions. You will learn about the value of using a constraints tree and how to construct one in this session.

... and potentials provide opportunities for change

A constraints tree



Identification of constraints

A constraint is a situation (weakness) that prevents the goals set by the farmer from being attained. Constraints can be identified by tracing problems to the underlying causes. These can be physical, climatic, economic, institutional, social or political. Some of them may fall within the control of the farmer while others may not.

Analysis of constraints means the identification of causes and effects

The analysis takes into account all factors so that follow-up actions can be undertaken. In most cases there is a need for a systematic analysis of causes and effects. For example, the low profitability of an enterprise may occur as a result of low income, which may in turn result from low yield, low price or combinations of the two. Low yields may be the result of low input use that could occur because of high costs or the unavailability of inputs, lack of technology, pest and disease infestations, a lack of irrigation water and many other factors. On the other hand, low prices may be the result of poor quality production, seasonality of the produce, oversupplies of produce in the market, lack of market information, lack of storage facilities, lack of drying facilities and others.

Constraints may also be related to physical factors, such as soil type and climate, as well as socio-cultural, policy and institutional effects, in which the farmers have no direct control. These types of constraints also need to be pointed out even though they may not be considered as constraints by farmers. Weak access to markets, for example, is often considered as a constraint, but this may in fact be a result of poor infrastructure over which farmers have little control. In cases such as this, constraints on the production and marketing of products that are highly perishable, bulky and that require transport should to be carefully investigated.

Identification of potentials

In planning to improve farm performance, potentials (opportunities) can be considered in light of the constraints identified. Favourable factors that could enhance the success of the farm, such as existing technologies and practices, the energy and motivation of farm family and hired labour, existing market niches, and the availability of support services, should be found and developed.

Potential improvements should alleviate or remove existing constraints and may consist in adjusting husbandry practices at the enterprise level and the introduction of alternative enterprises at the level of the whole farm. Improvements can relate to farm enterprises, the farm as a whole as well as off-farm opportunities. Once improvements are identified, the overall effects on the farm system should be appraised. In practice, many enterprises are interrelated technically as well as economically. For example, higher grain yields may increase the availability of straw as feed for livestock.

Factors that improve the success of the farm should be found and developed

In the presence of the conflicting goals, greater profit is not always a first priority but it is important for business survival.

Example

Analysis of constraints and potentials

1. ***Enterprise.*** Identify the farm enterprise that you are interested in investigating.

2. ***Major constraints.*** Specify major items in each particular enterprise (e.g. low income).

3. ***Sub-constraints.*** Specify other items (e.g. low price, low yields).

4. ***Goals/objectives.*** Based on the constraints, write your specific goals/objectives for each enterprise and/or

management practice. An example might be: "To reduce production cost or to increase profit by a given amount."

5. ***Changes to be made.*** Specify the changes to be made to current practices/enterprise. To guide you in deciding what changes you ought to make are:

   - *Practices.* Can current management practices for the enterprise selected be improved? If so, what are these practices and how can they be carried out? What will be required?

   - *Technology.* What are the current technologies available? What new technologies can be adapted for improving the enterprise?

6. ***Resources needed.*** Analyse both financial and human resources and the possibility of expanding the resource base to increase the scale of the enterprise selected.

Worksheet — **Analysis of constraints**

Enterprise	Major constraints	Sub-constraints	Goals/ objectives	Changes to current enterprise/ practices	Resources needed
(1)	(2)	(3)	(4)	(5)	(6)
Rice	Low income	Low price			
		Low yields			
		High input use			

Example

Questions to help identify potential improvements

Production

Which enterprises can be made more productive through improved production techniques? _____

_____

Which production techniques are available but unknown to most farmers? _____

_____

What will be the changes in costs of production per unit?

_____

What will be the changes in gross production per unit?

_____

What is the effect of this change on the cash flow of the farmer? _____

_____

Is there adequate labour available to make the change?

_____

Are the necessary inputs and materials available? _____

Are the suppliers of key inputs able to provide more inputs of the same quality on time? _____

Will the extra production be sold at the same price? _____

Will the extra production be available for sale or will the farm household use the extra production for home consumption?

_____

_____

If the extra production is used for consumption, is the extra production substituting any other consumption and releasing cash? _____

Will the farm household reduce the production of this other crop (releasing land for alternative production or fallow)?

_____

If extra inputs are available on credit, will the farm household use the inputs on the crop it was intended for? _____

What will be the input requirements and output under conditions of low rainfall and other risks? _____

_____

Marketing

What are the market opportunities that exist? _____

_____

Are there opportunities for increasing sales to existing market outlets? _____

Are there opportunities for selling produce in other markets in the vicinity? _____

Are there opportunities to market produce farther away?

_____

Are there opportunities to diversify production and introduce new enterprises? _____

_____

What are the expected costs and income from doing so?

_____

_____

What is the effect of this change on the cash flow of the farmer? _____

_____

Is there adequate labour available to make the change?

_____

Are the necessary inputs and materials available? _____

Alternatives

A small change may affect the whole farm-household system. Some additional questions are:

- What opportunities are there if the farmers do not have sufficient cash to purchase inputs?
- Could suppliers deliver fertilizer on credit?
- If not, are there other institutions that could provide credit?
- If so what would be the extra cost to the farmer and when will the farmer have to repay the credit?

This shows that each proposed change to the farming system needs to be appraised and an assessment made of the expected impact on all aspects of farm business over time. It also shows the interrelationship between the farm and supporting systems.

The technique should be conducted in the field with groups of farmers. The farmers could be categorized according to farm type and/or technology use. The extension worker has an important role in facilitating group discussions among farmers on constraints and potentials for improvement.

Unit 3.2 — Training exercise 8
Analysis of constraints and potentials

An example of the analysis of a farm according to resources available, limitations and possible solutions

Resources	Limitations	Possible solutions
Land	1. Size 2. Rotation 3. Soil quality 4. 5. 6.	1. Expected changes in legislation increasing access to land 2. Improvements in soil quality 3. 4.
Labour	7. Family size 8. Educational background 9. Skills and technical knowledge 10. Payment 11. 12.	5. Staff training 6. Use of hired labour 7. Improvement in labour management 8. 9. 10.
Machinery	13. Availability of machinery and implements 14. Number of units 15. Work rates 16. Cost of machinery (growthwith inflation) 17. 18.	11. Rented machinery from farmers' groups or cooperatives 12. 13. 14. 15. 16.
Financial resources	19. Unavailability of reasonable credit 20. Inadequate working capital 21. 22.	16. Access to credit through group savings schemes 17. 18. 19. 20.

The items listed above are provided to assist participants in preparing the remainder of this exercise.

(continued on the next page)

Training exercise 8 (continued)

Task 1

Participants in groups should create an imaginary farm, describe the resources available, the type of farm enterprises and technology levels.

Briefly describe the farm

Based on the imaginary farm, complete the worksheet below

Resources	Limitations	Possible solutions
Land		
Labour		
Machinery		
Financial resources		

(continued on the next page)

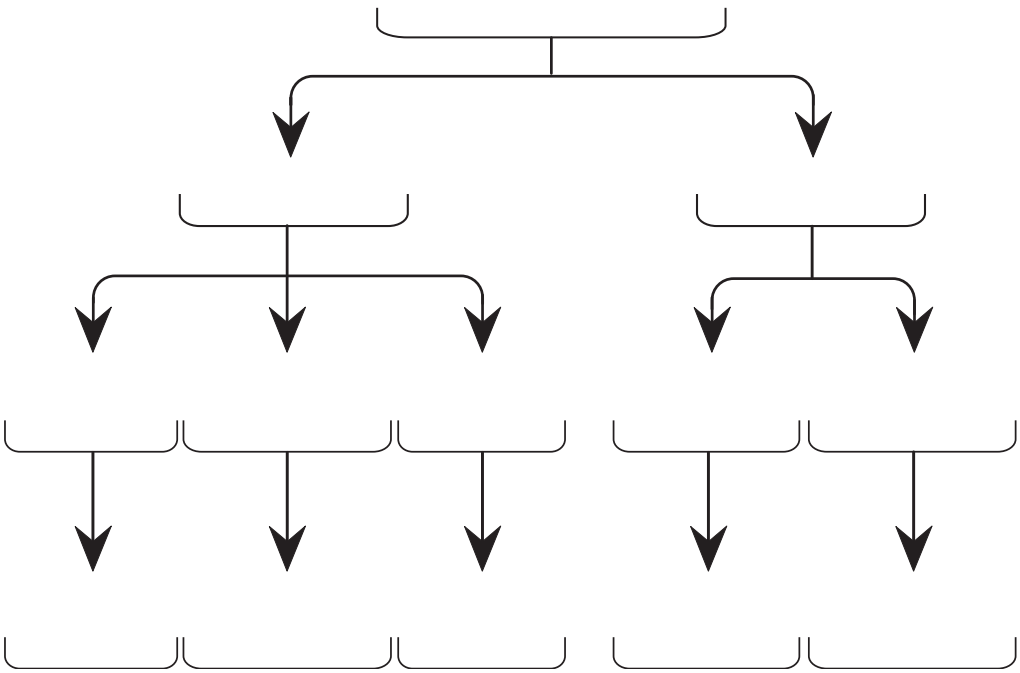
Training exercise 8 (continued)

Task 2

Select a single farm enterprise

Identify the overall constraints on income and profit

Each group should construct a constraints tree to illustrate their answers, using the format below



Upon completion present group findings to the class and discuss.

Training slides
for Session 3.2.1
Analysis of constraints and potentials

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46 Analysing constraints and potentials

The constraints and potentials analysis is an instrument used to identify specific problems within the farm system

It is intended to identify constraints (weaknesses) and potentials (opportunities) both within the system as a whole and within its individual parts

In this way it is possible to develop strategies to overcome weaknesses by identifying potential opportunities for improvement and possible solutions

47a Identifying constraints

Constraints
A constraint is a situation or weakness that prevents the goals set by the farmer from being attained

Constraints can be identified by tracing problems to the underlying causes

Consraints can be physical, climatic, economic, institutional, social or political

Some constraints may fall within the control of the farmer while other may not

47b Identifying potentials

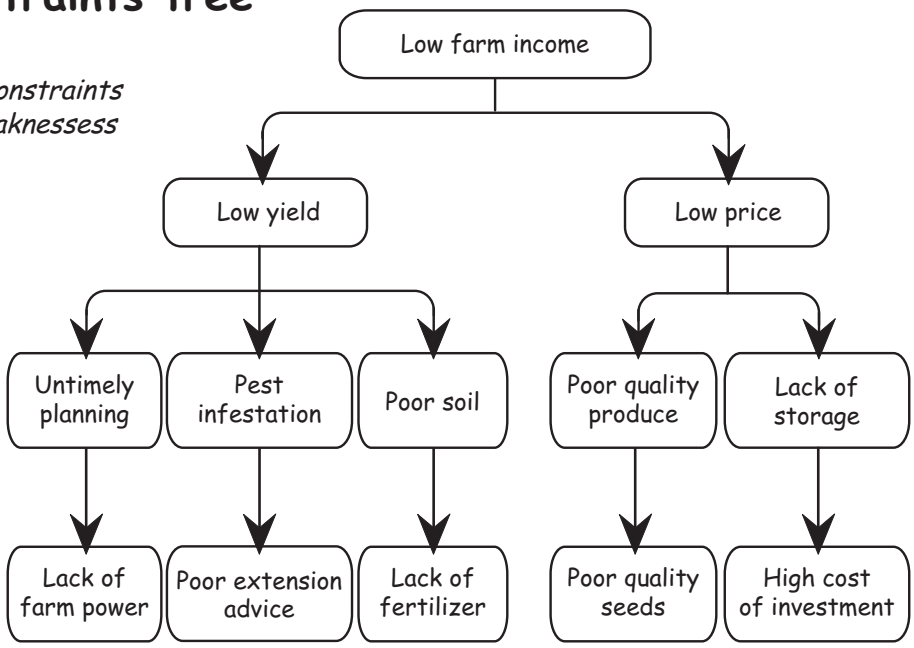
Potentials
Potentials are opportunities that could contribute to the success of the farm business

Favourable factors that could enhance success should be found and developed such as ...

... existing technologies and practices, energy and motivation of the farm family and hired labour, existing market niches, availability of support services

48 Constraints tree

Analysis of constraints identifies weaknessess and ways of overcoming them



Notes

Comparative analysis/field visit

This unit looks at interfarm comparisons of performance. This is a diagnostic technique that uses some of the efficiency indicators discussed in Unit 3.2 as indices for comparing groups of similar farms. Comparative analysis is concerned with past results, but such analysis should give useful insights for farmers and extension workers in the future.

At this point of "benchmarking" is introduced as a practice where farmers who are considered good at doing something are identified and their farm businesses are analysed. The intention is to learn from these farmers, identify strengths and weaknesses, and take steps to improve the performance of the individual enterprise or the farm as a whole.

Here, enterprise profitability analysis is distinguished from farm performance analysis. The control function of management for the entire farm as well as individual enterprises is emphasized. Basic management skills presented in the previous modules are applied in this unit to analyse the performance of farm activities.

By this time the participants should be equipped with the concepts needed to collect farm data for the analysis of farm performance. It is recommended that a field exercise be conducted to consolidate what has been learned. The final session in this module (Planning for a field visit) offers guidlines to ensure that a field exercise contributes to the overall objectives of the programme.

Preparing for session 3.3.1
Benchmarking

Teaching methods
Presentation, group discussion, trainer/participant interaction

Duration: 15 minutes

Learning support materials
Handout 3.3.1 (Benchmarking), Slide 49 (Benchmarking), Slide 50 (Using benchmark comparisons), Worksheet (Benchmarking yields within a district)

Notes

Benchmarking

This session introduces the concept of benchmarking and shows how it is done in a very simple and practical way. The need to understand the concept is reinforced by the fact that there are many farmers who have exceptionally profitable and successful farms. These farmers are often regarded as "leaders" in particular areas of farming.
It is believed that other farmers could improve their own farm performance by learning from these examples.

Objectives

At the end of the session, the participants are expected to:

- understand the concept of benchmarking;
- learn the simple tool of measuring the performance of their farm against the benchmark;
- carry out benchmarking exercises in the field.

Key points

1. Benchmarking is the process of identifying those farmers who are the best at doing something and learning how they do it in order to emulate their performance.

2. Benchmarks can be financial and technical.

3. Performance benchmarks could be calculated for different types of farms, for example, farms with low, average and high levels of profits.

4. Alternatively, benchmarks can be identified by averaging performance data from large groups of farms.

Steps for instruction

1. Distribute Handout 3.3.1 (Benchmarking) before the start of the session.

2. Explain the concept of benchmarking and initiate a discussion among participants of its usefulness. Have the participants suggest examples drawn from their field experience. Offer a formal definition of the term using Slide 49 (Benchmarking) to assist you.

3. Explain the difference between financial and technical benchmarking and proceed to discuss the various ways of setting performance standards for different categories of farms (large/small, specialized/mixed). Provide an example of the use of benchmarking by showing Slide 50 (Using benchmark comparisons).

4. Initiate a discussion on the practical use of benchmarks. The participants should be encouraged to criticize the approach in light of their field experience. The following questions should be addressed: (i) Is it a useful technique? (ii) How best can it be applied? (iii) What are the limitations? (iv) Can these be addressed by effective extension methods?

5. Refer to the Worksheet (Benchmarking yields within a district) in Handout 3.3.1. Explain to the participants that they will be asked to complete this form after the field visit. Answer any queries that they may have.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 3.3.1, (iii) field visit exercise.

Notes

Benchmarking

Benchmarking is the practice of identifying those farmers whose farms are most productive, learining how they manage their farms and understanding how they achieve their success. This involves a detailed study of actual performance on the farms selected in order to improve less successful farms of similar size and farming system. The result of benchmarking is a detailed financial and technical analysis that is intended to identify strengths and weaknesses and steps to improve the performance of the individual enterprise or the whole farm.

Benchmarking is used to compare the performance of different farms

Financial benchmark. This looks at the financial performance of successful farms that can be used for comparative purposes. By monitoring and comparing farm performance with benchmarks, key areas that can improve farm profitability can be identified.

Technical benchmark. This refers to the technical information necessary to assist farmers in defining a benchmark for the inputs required in crop and livestock production.

Benchmarks are a guide to help farmers to position themselves with regard to their crop and livestock enterprises. If the volume and cost of enterprise inputs and materials are seen to differ markedly from the benchmark, corrective actions should be taken by the farmer. Benchmarks can refer to most elements of the farming system including:

- labour and machinery;
- cultivation techniques and varieties;
- marketing practices;
- farm records and production costs;
- yield.

Extension workers should be able to find benchmarks for different categories of farms (large/small, specialized/mixed). There are different ways of setting performance standards. One way is to identify a single benchmark farm within a particular category of farm size and input use. Alternatively, benchmarks can be identified by averaging performance data from large groups of farms. High profit benchmarks could be derived by selecting the farms in that group that are most profitable and averaging their performance measures. In this way farms can be categorized as "weak" or "average" or "better" performing. Further sets of data could be calculated for each subgroup.

Example

Using benchmark comparisons for a single enterprise per hectare, cotton

Item	Individual farm	Benchmark (top 30% of farms)
Yield (kg)	1 800	2 500
Price/kg ($)	0.30	0.28
Gross Income ($)	**540**	**700**
Variable costs ($)		
Labour	46.0	45.7
Seed	3.0	3.1
Fertilizer	24.2	28.3
Other chemicals	33.1	29.2
Packing	4.0	4.9
Transport	6.2	7.6
Total ($)	**116.5**	**118.8**
Gross margin ($)	**423.5**	**581.2**

These figures show that gross income, variable costs and gross margin per hectare are below the benchmark level. Roughly, gross income is 23 percent, variable costs 2 percent and gross margin 27 percent lower than the benchmark figure. A closer look shows that the low gross income is the result of a low yield, and the breakdown of variable costs shows that this may be because of insufficient fertilizer being applied.

The category "other chemicals" are approximately 13 percent above the benchmark level for a yield that is 27 percent below. Consequently it is useful to critically review the type, timing and amount of chemicals used. This is a simple example of how the process of diagnosis can reveal telling signs about enterprise performance.

Worksheet — **Benchmarking yields within a district**

Crop	**Yield/ha**		
	Lower	**Medium**	**Upper**

Notes

Training slides
for Session 3.3.1
Benchmarking

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49 Benchmarking

**Identifying farmers whose farms are most productive,
learning how they manage their farms
and understanding how they achieve their success**

**This involves a detailed study of actual performance
on selected farms in order to improve
less successful farms of similar size and farming system**

*The result of benchmarking is a
detailed financial and technical analysis
which is intended to identify strengths and weaknesses
and steps to improve farm performance*

50 Using benchmark comparisons*

Item	Individual farm	Benchmark (top 30% of farms)
Yield (kg)	1 800	2 500
Price/kg ($)	0.30	0.28
Gross Income ($)	**540**	**700**
Variable costs ($)		
Labour	46.0	45.7
Seed	3.0	3.1
Fertilizer	24.2	28.3
Other chemicals	33.1	29.2
Packing	4.0	4.9
Transport	6.2	7.6
Total ($)	**116.5**	**118.8**
Gross margin ($)	**423.5**	**581.2**

*Comparisons for a single enterprise, cotton

Notes

Notes

Preparing for session 3.3.2
Farm performance analysis

Teaching methods
Lecture, list steps in analysis,
trainer/participant interaction

Duration: 30 minutes

Learning support materials
Handout 3.3.2 (Farm performance analysis),
Slide 51 (Farm performance analysis), Slide 52
(Steps in farm performance analysis)

Notes

Farm performance analysis

This session presents the basic steps the farmer or the extension worker must undertake to conduct a farm performance analysis.

If performance is found to be unsatisfactory, the farmer with the help of the extension worker should be encouraged to make adjustments that lead to improvements. Farmers learn best from the experience of other farmers. Benchmarking suggests a methodology that permits farmers to analyse their farm business in comparison with those farmers who are considered to be successful.

Objectives

At the end of the session, the participants are expected to:

- learn the sequence for undertaking farm performance analysis;
- be able to undertake this analysis by themselves and to interpret the results.

Key points

1. If the farm performance is unsatisfactory, the extension worker must help the farmer make adjustments that will lead to improved performance.

2. There are seven basic steps that the extension worker in collaboration with the farmer is required to conduct in undertaking a farm performance analysis:

    - identify key performance measures;
    - evaluate key performance measures by comparing with other similar farms;
    - identify the best performance for each key performance measure;

- identify the production and marketing practices that lead to "good" performance;
- assess the transferability of the best practices to the particular farm;
- investigate the potential benefits and the implications of using the best practices;
- implement the practice and monitor their performance.

Steps for instruction

1. Distribute Handout 3.3.2 (Farm performance analysis) before the start of the session.

2. Explain the use and relevance of farm performance analysis with the assistance of Slide 51 (Farm performance analysis).

3. Proceed to discuss the steps involved in farm performance analysis. Use Slide 52 (Steps in farm performance analysis) to illustrate the procedures. Explain the seven steps that the extension worker in collaboration with the farmer is required to take when conducting the analysis (see above).

4. Provide examples or ask participants to suggest examples when discussing each of the steps involved.

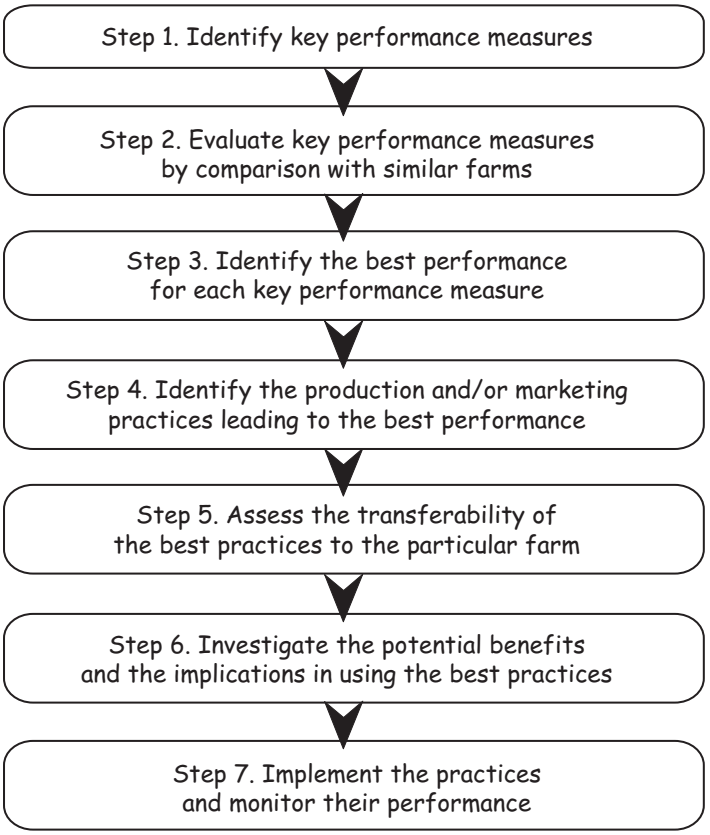
Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 3.3.2.

Notes

Farm performance analysis

Farm performance analysis shows whether the farm is functioning as it should. Analysis of farm performance can be used to identify why certain farms are more profitable than others. Data is collected that accurately reflect the performance of the farm and its enterprises. Standards are selected for measurement. Performance indicators can draw on data collected over time from a particular farm or from other farms located in the area.The basic steps to be followed when conducting a farm performance analysis are listed below.

Analysis of farm performance reveals why some farms are more profitable than others



If farm performance is found to be unsatisfactory, the extension worker should assist the farmer to make adjustments to the farm in a way that leads to improvement. The results of the analysis can be used as an extension tool to provide feedback information to farmers. Farm performance analysis should be conducted periodically.

Consider using the constraints analysis to identify key performance indicators

Step 1

Identify key performance measures

Select suitable comparative farm data (performance measures) taken from a farming system that is closely related to the one under study. Practical examples of key performance indicators are listed below.

Market related indicators	Output–input related indicators
Final market price achieved	Yield per hectare
Quality of harvested produce	Cost per tonne of packaging
Marketing costs	Milk produced per kilogram of feed
Prices attained after taking into account marketing costs	Cost of hired labour

Note: Other efficiency indicators could also be used, such as fertilizer purchases as a percentage of the costs of production, fertilizer costs per $100 crop output, livestock units per hectare of grazing land and total farm income per $100 of total cost of inputs.

Step 2

Evaluate key performance measures by comparison with other similar farms

The most important factor for performance analysis is to obtain comparative information. This might be available from:

Analysis of performance requires comparative information

- farm survey data;
- farm management information publications;
- extension services;
- farmers' associations.

Step 3

Identify the best performance for each key performance measure

This is usually a matter of comparing the performance of a particular farm with that achieved by other farms or by a group of farms. It is likely that performance would be measured in terms of:

- overall profitability of the farm;
- gross margin performance of the enterprises;
- yields and selling prices;
- the quantities of variable inputs used;
- total fixed costs;
- the various physical and financial performance measures relevant to the farm or to the group of farms.

Step 4

Identify the production and/or marketing practices leading to the best performance

Farm business analysis can be used to identify the indicators and their associated values for comparison between farms. The information collected would serve as a preliminary stage of a more in-depth investigation. In particular, extension workers could organize meetings for farmers to discuss the root causes of their performance successes and failures. These factors could be traced to either production or marketing practices, all of which should be discussed at the meetings. This allows farmers who have been identified as achieving high performance in particular areas to explain to the group how this performance was attained.

Step 5

Assess the transferability of the best practices to the particular farm

Analysis of the various key performance measures identified should suggest the extent to which the experience can be transferred. The reasons preventing transfer of relevant techniques may be, for example, unsuitable soils, insufficient rainfall or a lack of required farming skills.

Step 6

Investigate the potential benefits and implications of using the best practices

Having identified the best available marketing and production practices, an analysis of the costs and benefits of implementing these changes could be conducted.

Step 7

Implement the practices and monitor their performance

Once the production and marketing techniques are identified, transfer them to the selected farm and implement them. The final stage would be to monitor the performance of the relevant enterprises to ensure that the changes are improving performance in line with expectations.

Notes

Training slides
for Session 3.3.2
Farm performance analysis

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51 Farm performance analysis

Farm performance analysis shows whether the farm is functioning as it should

It can also be used to identify why certain farms are more profitable than others

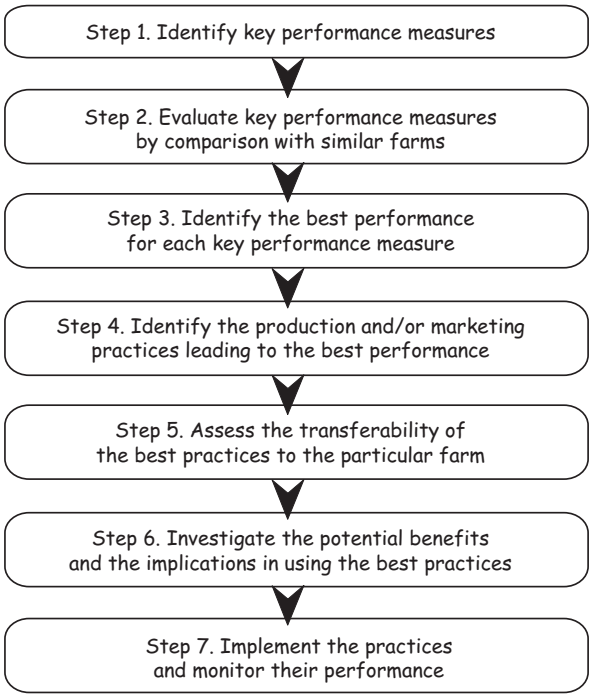
Data that accurately reflect farm and enterprise performance needs to be collected

Standards are selected for measurement

Performance indicators can be evolved from data collected over time

52
Steps in farm performance analysis

Farm performance analysis shows whether the farm is functioning as it should



Notes

Notes

Preparing for session 3.3.3
Farm diagnosis using gross margin

Teaching methods
Review of previous sessions, class presentation and discussion, summarize findings and reach conclusions

Duration: 75 minutes

Learning support materials
Handout 3.3.3 (Farm diagnosis with the aid of gross margins), Slide 53a (Gross margin analysis applied in farm diagnosis), Slide 53b (Possible solutions),Training exercise 9 (Farm business analysis)

Notes

Farm diagnosis using gross margin

The session discusses the use of gross margins in diagnosing farm performance. It is intended to provide the trainee with greater insight into the use of this tool.

Knowing the strengths and weaknesses of the farm can lead to improved performance of individual enterprises and the farm as a whole.

Objectives

At the end of this session, the participants will know how gross margins can be used to identify the strengths and weaknesses of the farming system.

Key points

1. Gross margin can be used to identify the weakness of the farming system. If farm income is low, this might be the result of a number of individual or combined factors:

    - Gross margin per hectare or per unit of output may be too low because of low yields, low prices or excessive variable costs.
    - Farming is not intensive enough or there are not enough high value crops or livestock.
    - Fixed costs may be too high (labour, machinery and power, rent or other overheads).

2. In practice, more than one factor may be wrong on a farm, in which case a combination of solutions may be needed. There should be a proper relation between gross margins and fixed costs.

Steps for instruction

1. Distribute Handout 3.3.3 (Farm diagnosis with the aid of gross margins) to all participants before the start of the session.

2. Have the participants recall the lessons of earlier sessions and review some of the factors that affect output and the variable costs of an enterprise. Mention again some of the advantages of gross margin analysis and its use in identifying weaknesses in the farm organization.

3. Show Slide 53a (Gross margin analysis applied in farm diagnosis) illustrating three different farm business situations. After identifying the problems of (i) low productivity, (ii) low intensity (iii) high fixed costs, discuss the kind of strategies and actions needed to redress the situation. Use Slide 53b (Possible solutions) to illustrate the points of discussion.

4. Distribute Training Exercise 9 (Farm business analysis). Divide the participants into groups and give them about 30 minutes to analyse the information and come up with possible improvements. The participants should also identify other information that they require to conduct a more detailed analysis. The solutions proposed by the groups should be presented to the class and discussed among the participants.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 3.3.3, (iii) refer to Training exercise 9.

Notes

Farm diagnosis using gross margin

Gross margin is a key performance measure widely used to assess the performance of a farm business. As we know, many factors affect output and the variable costs of an enterprise. To assess these factors, it is necessary to have a detailed breakdown of physical and financial information relating to the enterprise. At this stage, assumptions will be made, strengths and weaknesses will be identified and steps taken to improve performance. If farm income is too low, the faults that are likely to be found can be classified under three headings:

- ***Gross margin of output may be too low*** because of low yields, low product prices or excessive variable costs such as animal feed.
- ***Farming is not intensive enough*** because of too few high-value crops or livestock.
- ***Fixed costs may be too high,*** such as for labour, machinery and power, rent or other overheads.

Gross margins help identify physical and financial weaknesses or strengths

Example

Gross margin analysis applied in farm diagnosis

Item	Normal	Low gross margin (1)	Low intensity (2)	High fixed costs (3)
Rice	2.5 ha x $220 per ha = $550	2.5 ha x $110 per ha = $275	3.0 ha x $180 per ha = $540	2.5 ha x $220 per ha = $550
Coffee	0.8 ha x $350 per ha = $280	0.8 ha x $300 per ha = $240	0.8 ha x $300 per ha = $240	0.8 ha x $350 per ha = $280
Bean	0.5 ha x $170 per ha = $85	0.5 ha x $70 per ha = $35	0.5 ha x $150 per ha = $75	0.5 ha x $170 per ha = $85
Maize	1.2 ha x $40 per ha = $48	1.2 ha x $20 per ha = $24	0.7 ha x $30 per ha = $21	1.2 ha x $40 per ha = $48
Gross margin	**5.0 ha = $963**	**5.0 ha = $574**	**5.0 ha = $876**	**5.0 ha = $963**
Fixed costs	5.0 ha x $70 per ha = $350	5.0 ha x $70 per ha = $350	5.0 ha x $70 per ha = $350	5.0 ha x $90 per ha = $450
Profit	**$613**	**$224**	**$526**	**$513**

When analysing the three situations, a number of strategies could be formulated for improvement. Some suggestions are given below:

Problem	How to improve the present system
Low gross margin (1)	• Improve crop yields (by improving fertility and resolving drainage problems, diseases); • Improve post-harvest operations (poor harvest, poor handling); • Improve marketing conditions, improve inputs purchase system (by creating farmer associations or groups).
Low intensity (2)	• Change to a more intensive crop system (e.g. yams and hot peppers); • Improve cultivation techniques (e.g. fertilization, irrigation); • Grow more high-value crops (e.g. yams, hot peppers).
High fixed costs (3)	• Minimize buildings and fencing; • Streamline layout of fields to economize on labour and machinery; • Specialize to ensure full use of expensive equipment and/or buildings; • Check on other overhead expenses.

A low total gross margin on a particular farm may be the result of a low ratio of land under high-value crops, to the area under mixed cropping. Alterantively it could be because of too much land placed under fallow. Gross margins can also be poor as a result of low yields, low prices and high variable costs. After the comparative analysis is conducted, it is useful to analyse the causes of the problem further. This can be done by way of the enterprise analysis as described before in Handout 3.1.1a

Very often the problems of a farm may have more than a single cause, in which case a combination of solutions may be needed. There should be a realistic relationship between the gross margin and fixed costs. High fixed costs associated with items such as labour, machinery or rent of land should be matched by intensive farming (a high gross margin).

Farmers with low intensity systems (i.e. a low gross margin) can only increase their profits if they lower their fixed costs. The results of the gross margin calculations of enterprises from different farms need to be compared very carefully since the gross margin only covers the variable costs from total costs.

It should be noted that valid comparisons can only be made in terms of a production unit common to all of the farms or activities being compared. This unit can be land area, as in the preceeding example, if the land used by each enterprise is equally suitable. It could also be per unit of labour per $100 of capital invested, or per head of livestock. As we have discussed elsewhere, the gross margin per unit of labour is often the most relevant indicator for comparison because labour is often the most limiting resource.

Notes

Unit 3.3 – Training exercise 9
Farm business analysis

The form below when completed provides data on farm enterprise type, the area of land under each crop, the gross margin per hectare and the level of fixed costs for four farms. One of the farms has been selected as a "benchmark" given its high gross margins.

Task

Calculate the profit generated by each farm

Farms	**1 (benchmark)**	**2**	**3**	**4**
		Enterprise		
Rice	2.5 ha x $125 per ha =	2.5 ha x $55 per ha =	3.0 ha x $90 per ha =	2.5 ha x $110 per ha =
Coffee	0.8 ha x $180 per ha =	0.8 ha x $150 per ha =	0.8 ha x $150 per ha =	0.8 ha x $175 per ha =
Bean	0.5 ha x $90 per ha =	0.5 ha x $35 per ha =	0.5 ha x $21 per ha =	0.5 ha x $85 per ha =
Maize	1.2 ha x $30 per ha =	1.2 ha x $10 per ha =	0.7 ha x $15 per ha =	1.2 ha x $20 per ha =
Gross margin				
Fixed costs	5.0 ha x $70 per ha =	5.0 ha x $70 per ha =	5.0 ha x $70 per ha =	5.0 ha x $90 per ha =
Profit				

(continued on the next page)

Training exercise 9 (continued)

Diagnose the problem in comparison to the benchmark farm

Formulate a strategy to address the problems identified

(Answer key on the following page)

Answer key for
Training exercise 9

Farms	1 (benchmark)	2	3	4
		Enterprise		
Rice	2.5 ha x $125 per ha = $312.5	2.5 ha x $55 per ha = $137.5	3.0 ha x $90 per ha = $270	2.5 ha x $110 per ha = $275
Coffee	0.8 ha x $180 per ha = $144	0.8 ha x $150 per ha = $120	0.8 ha x $150 per ha = $120	0.8 ha x $175 per ha = $140
Bean	0.5 ha x $90 per ha = $45	0.5 ha x $35 per ha = $17.5	0.5 ha x $21 per ha = $10.5	0.5 ha x $85 per ha = $42.5
Maize	1.2 ha x $30 per ha = $36	1.2 ha x $10 per ha = $12	0.7 ha x $15 per ha = $10.5	1.2 ha x $20 per ha = $24
Gross margin	**$537.5**	**$287**	**$441**	**$481.5**
Fixed costs	5.0 ha x $70 per ha = $350	5.0 ha x $70 per ha = $350	5.0 ha x $70 per ha = $350	5.0 ha x $90 per ha = $450
Profit	**$187.5**	**-$63**	**$61**	**$31.5**

Training slides
for Session 3.3.3
Farm diagnosis using gross margin

53a Gross margin analysis applied in farm diagnosis

Gross margins help identify physical and financial weaknesses or strengths

Item	Normal	Low gross margin (1)	Low intensity (2)	High fixed costs (3)
Rice	2.5 ha x $220 per ha = $550	2.5 ha x $110 per ha = $275	3.0 ha x $180 per ha = $540	2.5 ha x $220 per ha = $550
Coffee	0.8 ha x $350 per ha = $280	0.8 ha x $300 per ha = $240	0.8 ha x $300 per ha = $240	0.8 ha x $350 per ha = $280
Bean	0.5 ha x $170 per ha = $85	0.5 ha x $70 per ha = $35	0.5 ha x $150 per ha = $75	0.5 ha x $170 per ha = $85
Maize	1.2 ha x $40 per ha = $48	1.2 ha x $20 per ha = $24	0.7 ha x $30 per ha = $21	1.2 ha x $40 per ha = $48
Gross margin	**5.0 ha = $963**	**5.0 ha = $574**	**5.0 ha = $876**	**5.0 ha = $963**
Fixed costs	5.0 ha x $70 per ha = $350	5.0 ha x $70 per ha = $350	5.0 ha x $70 per ha = $350	5.0 ha x $90 per ha = $450
Profit	**$613**	**$224**	**$526**	**$513**

Note: see slide 53b for a list of possible solutions to situations **(1)**, **(2)** and **(3)** above

53b Possible solutions

Problem	How to improve the present system
Low gross margin (1)	• Improve crop yields (by improving fertility resolving drainage problems, diseases); • Improve post-harvest operations (poor harvest, poor handling); • Improve marketing conditions, improve inputs purchase system (by creating farmer associations or groups).
Low intensity (2)	• Change to a more intensive crop system (e.g. yams and hot peppers); • Improve cultivation techniques (e.g. fertilization, irrigation); • Grow more high-value crops (e. g. yams, hot peppers).
High fixed costs (3)	• Minimize buildings and fencing; • Streamline layout of fields to economize on labour and machinery; • Specialize to ensure full use of expensive equipment and/or buildings; • Check on other overhead expenses.

Notes

Notes

Preparing for session 3.3.4
Planning for a field visit

Teaching methods
Presentation,
trainer/participant interaction,
group discussion

Duration: 120 minutes

Learning support materials
Handout 3.3.4 (Planning for a field visit)

Notes

Planning for a field visit

A field visit during the training course allows the participants to develop an ability to recognize and judge the qualities of the farm and its enterprises. The main objective is to provide the opportunity to practice what has been discussed so far in the course. A practical field exercise will alert the trainer to the strengths in participant development and in weaknesses that require correcting. Thus, it will help the trainer to evaluate overall effectiveness at the mid-point of the programme. More specifically the field visit will:

- direct attention to selected topics;
- ensure depth of thought;
- encourage judgement and opinion;
- provide opportunities for shared experiences;
- collect information for later use;
- learn how to interview farmers;
- learn how to analyse the data collected;
- practice reporting what has been seen (observation) and heard through interviewing farmers.

For the trainer

Pre-visit arrangements. It is recommended that the trainer have the necessary arrangements for the field visit in place well before the arrival of the participants. It is important that the farms to be visited are of similar size so that the data collected can easily be compared. Find out before hand the enterprises being grown on the farms that you intend to visit. Interview those farmers who are willing to act as hosts and ensure that they have been fully informed of the purpose of the visit and have the time required to participate. Discuss the requirements of the exercise with the individual farmers to determine how they will cooperate.

Finally, ensure that sufficient transportation will be available, that the needed equipment and materials for the visit are ready, and that arrangements are well in hand for lunches and snacks and for drinking-water during the trip. To avoid last minute problems, double-check all of these items prior to the day of the visit.

About the visit. It will be the responsibility of the trainer to plan the field visit according to the level of development of the participants at this stage of the course. Ample opportunities for exercises at various levels of complexity have been covered to date. Beginning with the less complicated materials to choose from such as (i) What is a farm? (ii) Understanding farm enterprises, and (iii) Farm management as a way to increase profit in Module 1 (**Farm management**); then (iv) Farm data collection, (v) Farm assets and liabilities, and (vi) Asset valuation in Module 2 (**Farm resource assessment**); and finally (vii) Enterprise profitability, (viii) Constraints and potentials, (ix) Benchmarking and (x) Farm performance analysis in Module 3 (**Farm business analysis**). The guidelines for a possibile pre-visit briefing dealing with the comparison of gross margins and interpreting the findings is included at the end of this session.

Preparing the participants

The period in the class schedule after lunch (see Annexes) has been broken down into four pre-visit segments to be conducted by the trainer. (A time has also set aside for team meetings.) The topics to be covered are outlined below and discussed on the following pages. These are:

- field visit structure;
- field data collection;
- follow-up requirements;
- findings, analysis and report (Day 6).

Field visit structure. Divide the participants into teams of three or four. Assign one of the selected farms to each team. Discuss how the visit should be conducted and decide what role each member should play (i.e. who will be the team leader, who will record information and take notes, who will be the main interviewer). Suggest to the class that it might be useful to switch roles in the course of the visit so that each member of a team has the chance to practice interviewing. Ensure that participants understand what is expected of them.

Select from the farm enterprises available those for which data will be collected. The enterprises chosen should be common to the other farms visited so that comparisons of profitability can be made. Facilitate the exercise by answering any queries that the class may have in advance. Once in the field the team leader will have to deal with any unexpected problems that arise. Encourage participants to record data concisely so that it can be used effectively. Stress the importance of validating the information while still in the field.

Field data collection. A field exercise primarily requires that participants collect data on farm enterprise performance. However, the visit should also be regarded as an opportunity to observe at the farm level anything covered in the programme to date. The actual collection of data itself should last about half a day. During this period participants will gain experience interviewing farmers. The participants should be familar with the questions that need to be asked before going out to the farms. The data they collect will be used to calculate gross margins for selected farm enterprises, to compare the gross margins collected on the farm, to identify the reasons for low or high performance and, then, to analyse the overall performance of the farm. The trainer should assist the participants to prepare a checklist outlining the information needed and design a suitable form to record data as it is collected. Ensure that the participants are familiar with the items on checklist before going to the field.

Follow-up requirements. A time should be found while still on the site of the field visit to review the events of the day and ensure that sufficient data has been collected for the field visit recap (Findings, analysis and report). Reviews are conducted and monitored by the team leaders at each farm. These should include: (i) a preliminary analysis of data collected, (ii) a team discussion to record and note the observations of the participants for discussion with the trainer upon return to class, (iii) an exchange ideas on the findings of the visit prior to the Day 6 analysis and report. Team leaders should ensure that enough time is allocated for these reviews.

Findings, analysis and report *(Day 6 recap).* The trainer should begin with a brief presentation to prepare the class for the field visit briefing, and for the analysis and report to follow. Ensure that the various teams convey any lessons learned that may be of help to the class at this time. Discussions should be initiated around various issues that arose during the exercise. Have the participants compare gross margins and interpret the findings. Provide sufficient time for feedback and discussion. Each farm team should then prepare a report of their findings and analysis. Teams can then compare all of the data to arrive at "***the*** benchmark farm" chosen from among those visited (i.e. in terms of yield, gross margin, profitability). Data from the remaining farms can then be compared against this "benchmark". Once this has been done, promote a class discussion around the use of collected data and how the approach to analyzing farm performance might be improved. Team groups should be encouraged to discuss some of the difficulties they experienced in their data collection and analysis.

Class pre-visit briefing

The following guidelines, dealing with the comparison of gross margins and interpreting the findings, outline a possible structure for class presentation and discussion prior to a field visit.

1. Note the key indicators for farm profitability:

    a. gross margin per hectare;
    b. value of production per hectare;
    c. price of product sales;
    d. level of variable costs per hectare;
    e. physical input use per unit of land.

2. If profits are low there are two possibilities:

    a. high fixed costs;
    b. low gross margins for the farm.

High fixed costs. If fixed costs are high the farmer may be using storage facilities inefficiently when compared to others farms in the area. Alternatively, the farm may have too many assets. Maybe the farmer could sell or lease out the assets that are unused or underutilised.

Low gross margin. If the total gross margin of the farm is low, the faults can be traced to one of two causes:

- The gross margin per hectare or per unit of output of selected farm enterprises may be low (due to low yields, or excessive variable costs such as fertilizer or pesticides). There may be a need to increase yields and/or reduce costs.

- The farming system may consist of low value farm enterprises, farming may be too extensive and there may be a need to introduce high-value crops or livestock.

Value of production is a result
of intensity of production, yield and product prices.

Variable cost is a result
of input application level and input prices.

If a problem of low profitability is traced to low yields you can investigate whether this is a result of technical inefficiency, the lack of farm resources, or a mismatch of resources used to the crop being grown. If inadequate resources are employed, the farmer would do well to extend the area of land under cultivation or alternatively, increase labour supply, expand livestock, or obtain more capital. (If the resource base cannot be increased, then fixed costs should be carefully evaluated.)

If production levels are satisfactory, low profitability may be traced to:

- low prices for produce sold;
- excessive costs for purchased inputs used.

Low prices. Product prices are influenced by the quantity and quality of produce, the location of markets and the time when produce is sold. You could enquire what causes the low prices on the farm. It might be selling too early and an oversupply on the market. What do other farms in the area do that is different and that leads to better prices?

From the example given above it is clear that the main issues affecting farm performance are:

- product price
- yield
- level of fertilizer used
- labour efficiency
- input prices

Notes

Planning for a field visit

Objective 1
To provide each participant
with the opportunity to observe
and to practice what has been discussed
in the course until now.

Objective 2
To gain first hand information and impressions,
to understand the farmer's conditions
and farming systems, and the main constraints
and development potentials.

Objective 3
To practice reporting
what has been seen (observation)
and heard from the farmer through interviewing.

Note: *A practical exercise will undoubtedly show areas where you still have questions. Be sure to list these during the field visit so that they can be discussed with the class and trainer during the field visit recap.*

The following is a list of information which may be used individually by participants, by the farm teams for discussion, or as a guide for team leaders during the actual field visit. Topics to be covered are outlined below and discussed on the following pages. These are:

- the field interview;
- recording information;
- digging beneath the data;
- actions to implement change;
- reporting and discussion.

The field interview

1. Secure the confidence of the farmer. Identify yourself, the purpose of your visit and the importance of his or her cooperation.
2. Suggest a suitable place for interviewing. It must be a place free from inconveniences such as direct sunshine or noisy traffic.
3. Be friendly but business-like. The interest of the farmer depends largely on the way you explain what is wanted. Explain the purpose of the visit in a simple but direct manner and the information that is needed and the approximate time the visit is likely to take.
4. Be considerate. Be prepared to have to wait if the farmer is engaged in an important task so that it is apparent that he can not be interviewed at that time.
5. Never argue. If the farmer is antagonistic and does not want to give some data, do not press or argue. Some refusals may be expected. The number of refusals decreases with the tact and effectiveness of the interviewer.
6. Be honest with farmers. Never promise help and other assistance as an off shoot of the study when it cannot be realized immediately.
7. Study your checklist of questions and be completely familiar with it. This will enable you to maintain eye contact with the farmer without being too "bookish" with the questions that you ask.

Recording information

1. When the interview is in progress, ask the questions and record the answers as rapidly as the farmer is willing and able to give the information. Minimize aimless wandering of the mind The interest and cooperation of the farmer is endangered when his or her mind wanders continually to other things between questions.

2. Be direct. Questions should be direct and clear. For example, it is better to ask, "What is the area planted with maize last month?" than to ask, "Now, let's see, what about your maize last month?"
3. Be alert for information volunteered by the farmer. Make liberal use of footnotes, such as explanatory descriptions and verbal information about the practices that are peculiar to the place.
4. Record and convert later. Information should be recorded in the unit given by the farmer. Conversion to different units of measure and other calculations must be done later.
5. Be ready to record answers to questions in case the farmer volunteers something ahead of your question.
6. Devise ways of "rough checks." If the answer given does not seem right in view of other information recorded, you should call it to the attention of the farmer. For example: the area planted with rice, maize, sugarcane, tobacco, etc. may not tally with the total area reported previously. The quantity sold may exceed the quantity produced. Use common sense.
7. Never assume an answer. It is a very grave mistake to assume answers without asking them. Just because several cases have been reported uniformly is no reason to assume that all cases are the same.
8. Be thorough. Fill in all the information needed. By approaching the problem from different angles, it is possible to find some estimates. Example: An estimate of area planted with a crop may be taken through: a) rate of seeding or b) distance of planting.
9. Before leaving, go over the data collected and see if all items are covered.
10. Do not forget to offer your sincere appreciation and thanks to the farmer.

Digging beneath the data

In preparation for the reporting, be prepared to diagnose the root causes of the problems found on the farm. It is only when these causes have been identified, that the farmer will be in the position to make decisions about how to improve farm performance. The following checklist of questions posed should assist you in this task.

Product price. Why is the farmer getting so much less for his products than he used to? Is there a problem of packaging? Or is it quality? The farmer may or may not have any direct influence on the price of the product but could identify those performance and management gaps that do impact on price.

Yield. Why are the yields so low? Identify reasons that for poor performance.

When a farmer is faced with a variety of possible causes, it is useful to check every aspect of the production programme. This would include quality of inputs purchased, planting times, weeding, fertilising, pest control, harvesting times, etc. – in short any aspect of the production programme that may contribute to low yields. These may include, for example, unsuitable soils, insufficient rainfall, the level of fertiliser applied, labour efficiency, lack of the required farming skills or input costs.

Labour efficiency. Does the farmer use too much labour per ha.? Is this an issue of productivity management? Is it a health issue?

Input costs. Is the farmer is paying much more for inputs ($/Unit) than the benchmark. Why?

Actions to implement change

1. The purpose of identifying performance gaps and causes is ultimately to introduce lines of action that can improve performance on the farms.
2. Implementation plans are not just list of good ideas gathered from comparisons of farms. They should reflect the resources needed to implement the change. They should be developed in the context of the farming system. This will go a long way to ensuring that the plans can be implemented and are sustainable.
3. Some of these actions will be technical agricultural actions such as using different seed varieties, different chemicals, and different production programmes, including pest management, fertilisation, etc. Some of the actions will be managerial, such as better management of labour, better handling of products en route to market, better packaging, better timing of sales, storage, etc.
4. In many cases, improved farm performance will require a combination of actions to be taken. Those measures, gaps, causes and solutions that show the greatest or most significant impact on the performance and profitability of the farm should be identified.

Reporting and discussion

1. A brief report should be prepared by each group. The aim of the report would be to describe the farming system, calculate gross margins for the most important enterprises, identify problems, solutions and proposed actions.
2. The main points in the report should be transferred to a flip chart or preferably an electronic version in PowerPoint to be presented to the class.
3. Each group should prepare a short report on its findings, leaving time for discussion. Once all the groups have reported then a general discussion should be held on the key lessons learned. This could also be accompanied by an appraisal of the methodology used. Ways that the data collection and analysis can be improved should be discussed.

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The following is a list of the AGSF series TRAINING MATERIALS FOR AGRICULTURAL MANAGEMENT, MARKETING AND FINANCE

1. Farm planning and management for trainers of extension workers in the Caribbean, 2004 (CD-ROM, English).
2. Horticultural marketing extension techniques, 2004 (CD-ROM, English)
3. Farm planning and management for trainers of extension workers. Asia, 2006 (Hard copy and CD-ROM, English).
4. Integrating environmental and economic accounting at the farm level, 2005 (CD-ROM, English)
5. Curso de gestión de agronegocios en empresas asociativas rurales en América Latina y el Caribe, 2005 (CD-ROM, Español)

In preparation

6. Market-oriented farm management for trainers of extension workers. Africa (Hard copy and CD-ROM, English).

- Farm planning and management for trainers of extension workers. Latin America (Hard copy and CD-ROM, in Spanish)
- Training manuals on farmer business schools. Asia and Africa.

Other work

- FAO Pacific Farm Management and Marketing Series 3, Helping small farmers think about better growing and marketing (Hard copy)*.

* Copies soon to be available from AGSF

Module 3 measures the performance of the farm business. It introduces some basic management tools that can help farmers and extension workers to analyse the farm business. These include farm enterprise analysis, analysis of constraints and potentials, and benchmarking.

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