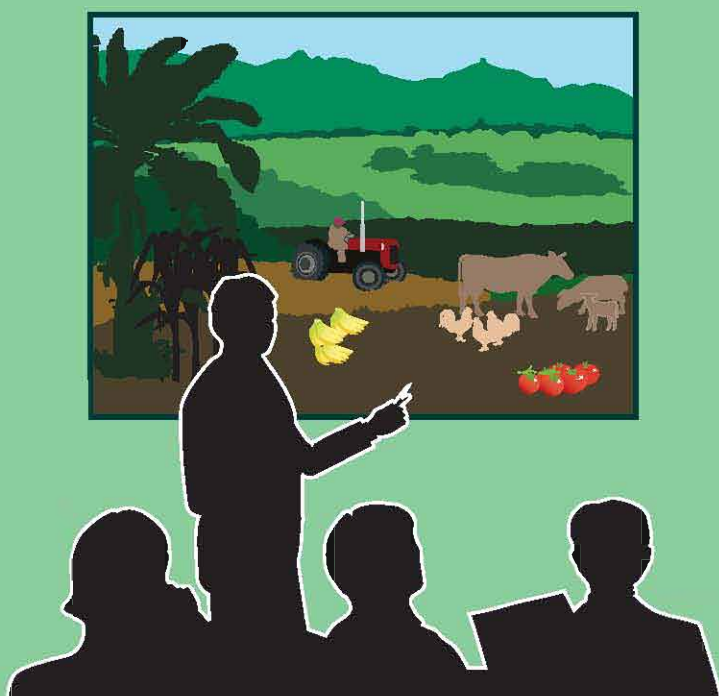


Farm planning and management for trainers of extension workers

TRAINING
MATERIALS FOR
AGRICULTURAL
MANAGEMENT,
MARKETING
AND FINANCE

3

ASIA



OVERVIEW

Annexes • References • Glossary



For further copies of this publication
and the information on FAOs activities
related to farm management
please contact:

Agricultural Management Group
Agricultural Support Systems Division
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00153 Rome, Italy

Fax: (+39) 0657056850

E-mail: AGS-Registry@fao.org

Web site: <http://www.fao.org/ag/ags/home/en/agsf.html>

This publication is also available on the Internet at:
<http://www.fao.org/ag/ags/resources/en/index.html>

Farm planning and management for trainers of extension workers

ASIA

OVERVIEW

Annexes • References • Glossary

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing Management Service, Information Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy or by e-mail to copyright@fao.org

© FAO 2006

Over the past few years the Agricultural Management, Marketing and Finance Service (AGSF) has prepared a collection of materials to form the basis of a series of training manuals in farm planning and management, which can then be adapted for use in various world regions. These are intended for the trainers of agricultural extension workers employed by ministries of agriculture, non-governmental organizations (NGOs), for those in civil society and the private sector who run programmes to help farmers commercialize, or for any who wish to study the subject matter included.

This manual, which focuses on Asia, was adapted from the AGSF collection. The materials were tested and further developed at a workshop conducted in the Philippines for use by extension workers in the region working with small-scale commercial farmers. A common characteristic among extension workers in this region is that they are generally well-educated and holders of university degrees. Similarly the trainers of agricultural extension workers in the region are also well-qualified and experienced in methods of adult education. The materials provided in this manual have been prepared specifically for that level.

We would welcome receiving
any comments or feedback from users
so that improvements can be made over time.

Foreword	iii
Acknowledgements	x
INTRODUCTION TO A TRAINING PROGRAMME.....	1
About this manual	3
Using the manual	7
Opening programme	13
Annexes	19
References	69
Glossary	77
 Module 1	
FARM MANAGEMENT	1
Unit 1.1 The farm and its enterprises	3
Unit 1.2 Farm management as a way to increase profit	21
 Module 2	
FARM RESOURCE ASSESSMENT	1
Unit 2.1 Farm data collection	3
Unit 2.2 Farm resource appraisal	49
 Module 3	
FARM BUSINESS ANALYSIS	1
Unit 3.1 Enterprise and farm profitability	3
Unit 3.2 Constraints and potentials	63
Unit 3.3 Comparative analysis/field visit	83

Module 4

PLANNING FOR THE MARKET 1

Unit 4.1 Making planning decisions 3

Unit 4.2 The process of marketing 15

Module 5

ENTERPRISE BUDGETING AND FARM PLANNING 1

Unit 5.1 Farm enterprise and partial budgeting 3

Unit 5.2 Whole farm plan and budget 61

Unit 5.3 Labour planning 89

Unit 5.4 Cash flow 105

Module 6

FARM INVESTMENT AND RISK 1

Unit 6.1 Investment appraisal 3

Unit 6.2 Managing risk 61

TRAINING AIDS PACKAGE

*Handouts, Training exercises, Answer keys
Training slides, Evaluation form*

Note: The TRAINING AIDS PACKAGE is included in the CD-ROM which can be found in the leaflet accompanying this collection of the AGSF Training materials.

Opening programme	
1	Agriculture in Asia 15
Module 1	
1.1.1	What is a farm? 7
1.1.2	Understanding farm enterprises 17
1.2.1	What is farm management? 27
1.2.2	Why is farm management important? 49
1.2.3	What are farmers' objectives? 57
1.2.4	How do farmers decide? 67
Module 2	
2.1.1	Data and information 9
2.1.2a	Farm records and accounts 25
2.1.2b	A farm map, records and accounts 29
2.1.3	Inventory of farm resources 41
2.2.1	Farm assets and liabilities 55
2.2.2	Asset valuation 67
2.2.3	Farm balance sheet and net worth 75
2.2.4	Sources of finance 87
Module 3	
3.1.1a	Enterprise profitability analysis 11
3.1.1b	More about variable costs 31
3.1.2	Whole farm income 51
3.1.3	Enterprise and farm efficiency measures 59
3.2.1	Analysis of constraints and potentials 69
3.3.1	Benchmarking 87
3.3.2	Farm performance analysis 97
3.3.3	Farm diagnosis using gross margin 109
3.3.4	Planning for a field visit 125

Module 4

4.1.1	The farm planning process	7
4.2.1a	The why and what of marketing	21
4.2.1b	What is supply and demand?	27
4.2.2	Production and marketing problems	41
4.2.3a	Marketing channels, margins and costs	55
4.2.3b	Options for marketing produce	69
4.2.4	Planning for the market	83

Module 5

5.1.1	The use of enterprise budgeting in farm planning	9
5.1.2	Break-even budgeting	21
5.1.3	The use of partial budgeting	35
5.1.4	Preparing a partial budget	53
5.2.1	Whole farm planning	67
5.2.2	Maximizing farm income using available resources	79
5.3.1	Planning farm labour	95
5.4.1	The concept of cash flow	111
5.4.2	Application of cash flow	125

Module 6

6.1.1	Investment decisions	7
6.1.2	Simple methods of investment appraisal	15
6.1.3	Discounted methods of investment appraisal	29
6.1.4	Loan appraisal	53
6.2.1	Risk and risk management	65
6.2.2	Sources of risk	73
6.2.3	Risk management strategies	83
6.2.4	Dealing with risk	99

Module 1

1	Common problems facing farmers	39
2	What is farm management?	40
3	Qualities of a successful farmer	41

Module 2

4	Classification of farm assets and liabilities	58
5	Asset valuation	69
6	Calculating net worth	79

Module 3

7	Enterprise analysis	37
8	Analysis of constraints and potentials	76
9	Farm business analysis	112

Module 4

10	Marketing problems and solutions	46
11	Preparing a marketing strategy	101

Module 5

12	Partial budgeting	56
13	Whole farm budget	82
14	Preparing a labour profile	98
15	Cash flow	131

Module 6

16	Net present value and internal rate of return	40
17	Risk in farming	103

This training manual has been prepared by the Agricultural Management, Marketing and Finance Service (AGSF) of FAO. Many people have helped to produce and adapt material for use in the region. The Agricultural Support Systems Division would like to thank the faculty and staff members of the Department of Agricultural Economics, College of Economics and Management, University of the Philippines Los Baños, who provided their facilities for testing the manual through a Training of Trainers Workshop in collaboration with the Agricultural Training Institute (ATI) of the Philippines. Special thanks go to Narciso R. Deomampo, Cesar B. Quicoy, Corazon T. Aragon, Romeo R. Huelgas, Marilyn M. Elauria and Julieta A. Delos Reyes, of the university for their contribution in writing and testing the manual. We express our appreciation to those colleagues at FAO who reviewed sections of the manual, particularly to John Dixon and Andrew Shepherd. We would also like to thank Walter DeOliveira and Martin Hilmi for their technical contribution. Finally, thanks go to Tom Laughlin for rewrite, design and layout, to Madeline Grimoldi for proofreading and to Fabio Ricci for desktop publication, a CD version and a revised digital presentation. David Kahan was responsible for the design of the training programme, technical editing and overall management and supervision.

INTRODUCTION TO A TRAINING PROGRAMME

This manual is intended for trainers of extension workers as they interact with farmers to find ways to increase their incomes through a better understanding of the principles and tools of farm management and planning. While extension workers generally tend to be technically competent, they often lack sufficient training in economics and its use in farm planning. This manual provides a "remedial" course of training on subjects such as farm business analysis, enterprise budgeting and risk management, all of which will be of help to either subject matter specialists or front-line workers as they assist farmers develop the skills required to compete and succeed in their farm businesses.

It should be clearly stated that this manual is not intended to supplant or replace the ideas or experience of individual trainers, but to complement them. As such, the steps of instruction have been designed as a tool to provide direction, both on subject matter and training methods, as well as a structure for conducting formal training sessions. The materials can also be used by subject matter specialists and by informal groups who desire to improve their management skills without the guidance of a trainer. They can also be used individually by those who wish to read and learn, rather like a programmed text.

Emphasis should be placed on shared learning and any and all involved may contribute. The role of the instructor, for example, can equally be taken by temporary leaders who are members of the group to be trained. Planned training can also be improved by programmed contributions from outside experts.

Course duration

A suggested twelve-day training course, is outlined here, although trainers should be encouraged to adapt the length of the training and the content covered to the time available to them. In general twelve days would be adequate to deliver the entire course (based on an average 7.5 hours per training day). One day is devoted to a field visit where participants gain experience in data collection and analysis. A more detailed breakdown of a complete training schedule is included in the section on Training aids.

Day	Topic
1	Module 1 – Farm management
2	Module 2 – Farm resource assessment
3	Module 3 – Farm business analysis
4	Module 3 – <i>continued</i>
5	Field visit*
6	Module 4 – Planning for the market
	Weekend break
7	Module 4 – <i>continued</i>
8	Module 5 – Enterprise budgeting and farm planning
9	Module 5 – <i>continued</i>
10	Module 6 – Farm investment and risk
11	Module 6 – <i>continued</i>
12	Closing day programme

If the course is being presented in this way it will be spread over two weeks with a break in the middle. However, the complete course may also take place over a longer period with class meetings held only on certain days each week or in the evenings or weekends. A programme conducted in this manner may result in some loss of continuity. This might require additional planning and possibly a rearrangement of the order given in the manual. However, conducting a course between longer breaks has advantages. The participants would have more time to absorb the lessons presented and it would enable them to relate what they are learning to their everyday work. This would help to reinforce the practical value of the programme.

** It is recommended that the trainer have the necessary arrangements for the field visit in place well before the arrival of the participants.*

Subjects covered

The sequence outlined below proceeds from an understanding of the farm context through the various steps involved in the process while introducing the techniques and tools necessary to make sound, rational farm planning and management decisions.

Module 1 describes the farm and its enterprises and defines the role and importance of management, including definitions and functions of management, decision areas in farm management and the decision-making process in farming today.

Module 2 discusses farm resource assessment, including farm data collection and farm resource appraisal.

Module 3 measures the performance of the farm business, which includes enterprise analysis, analysing farm performance, constraints and potentials.

Module 4 introduces the notion of planning for the market, discusses the marketing chain and margins, and planning for the market.

Module 5 looks at enterprise budgeting and farm management planning, such as partial budgeting, break-even budgeting, whole farm plan and budget, labour planning and cash flow budgeting.

Module 6 presents farm investment and risk management, which includes investment decisions, investment and loan appraisal, risk and management under risk.

Note: The modules are built on the four functions of management: (i) planning, (ii) organizing, (iii) directing, (iv) controlling.

Structure of the programme

The modules in this manual are divided into 42 sessions each covering a segment of the training programme. Sessions consist of (i) a trainer's guide, (ii) a handout or handouts for the participants, (iii) an assortment of training slides to use in classroom presentations. Where appropriate, certain sessions include one or more training exercises for the participants to complete during that session.

The trainer's guide gives suggestions and provides a sequence for conducting the session to ensure a smooth delivery. This includes the following:

- a trainer's preparation box preceding each session that lists the teaching methods to be used, class time needed and the learning support materials provided;
- objectives;
- an opening description and rationale;
- key points;
- steps for instruction;
- evaluation.

Reference is made to the use of training slides for classroom presentations in the "trainer's information box" and the "steps for instruction" listed above. The slides to be used are provided at the end of each session. Additional information can be found in the annexes, which include (i) a suggested day-by-day class schedule, (ii) a guide to training programme design, (iii) a section on training methods, (iv) training module evaluation forms.

Note: A collection of materials, entitled "Training aids package", is provided in the CD-ROM in the end pocket of this volume (see also note on page vi). These are intended for use by the trainer in preparing photocopies for classroom distribution, or for making transparencies or opaque copies for overhead projection. This collection includes all (i) handouts, (ii) training exercises, (iii) exercise answer keys, (iv) training slides, and (v) an evaluation form. The training slides are also provided in digital format in the CD version.

Relative importance of the training modules

An understanding of **Modules 1** (Farm management),
3 (Farm business analysis),
4 (Planning for the market)
and **5** (Enterprise budgeting and farm planning)

... are essential to the work of all front-line extension workers
and should be included in training programmes.

Modules 2 (Farm resource assessment),
and **6** (Farm investment and risk)

... are more advanced and could be omitted in abbreviated courses,
although the last topic in the programme (Managing risk)
is useful for most training purposes.

Evaluation

The trainer should end each session with a short evaluation segment that calls upon the full participation of the trainees. This should summarize the achievements of the session and also inform the trainer of ways to improve the course in the future.

After the completion of each module, trainers are advised to conduct an evaluation exercise to assess all aspects of that portion of the programme (see annexes — class schedule and evaluation forms).

In addition, the participants might also be given the opportunity to "bridge the gap" between the classroom and their regular duties as extension workers by committing themselves to specific actions that they will undertake upon their return to work.

Preparation and adaptation

Some trainers may be tempted to think that the material can be dealt with by spending less time in preparation for each session. This is not the case! The trainer must study every session carefully, well in advance, and pay particular attention to adapting the material to local conditions, including local information and local units of measurement. The subject matter must be checked carefully and calculations must be worked through in advance of the training so that they can be explained effectively to the trainees. Slide presentations should similarly be checked and any additional visual aids arranged for use. The handouts must be reproduced in sufficient quantities and distributed to all trainees.

Adequate time should be given prior to each session so that the trainers can assimilate the material to ensure smooth delivery. This process will not only prepare trainers to train others using the material, but can also help them learn new skills and techniques. The advance preparation process alone can be very productive even for specialists to review the subjects prior to classroom use.

The trainees should also be encouraged to prepare themselves in advance by reading the handouts provided and familiarizing themselves with the instructions given. Note that in the section "Steps for instruction" in each trainer's guide it is stressed that handouts should be distributed before the start of that session. (Trainers would be well advised to have the handouts for the next scheduled session ready to be distributed at the end of each previous session.)

The outlines for each training session are written in some detail, but the structure need not be followed exactly. Each trainer must interpret their own programmes. They may choose to leave out some parts and add others, while varying the sequence, the methods used and the pace of the course, based on their preferences and skills, and the needs of the trainees. Participatory techniques should be used to involve trainees whenever possible during the course.

Some points to keep in mind when designing effective training presentations are:

- Communicate effectively with the trainees.
- Make learning effective, active and enjoyable.
- Develop a clear picture of relevant topics.
- Translate chosen topics into precise training solutions.
- Agree on training and development objectives and plans.
- Select appropriate training methods and content to realize objectives.
- Carry out appropriate evaluations of the training as required.

Local languages

Frequently there will be a need to conduct courses in local languages and not in English. It is important for trainers to communicate with participants in their own language when required. Then, of course, all the training materials to be distributed to participants will have to be translated. In addition, whether courses are to be given in a local language or in English, it will often be necessary to adjust such things as names, the crops in question and the sums of money used in order to reflect the local condition. Whenever possible, examples given in the manual should be replaced using materials that are more relevant locally.

Physical facilities

It is important to consider the location of the training. Training of this kind should not take place in a luxurious or expensive environment. The whole focus is on efficient management and this message may be lost if the course itself gives the impression of unnecessary cost. It should also be away from the normal workplace and distractions such as shops and entertainment centres.

The training centre should be in a large flat-floored room with chairs and tables that can be easily moved. It must be large enough to provide adequate space for small working groups as well as general presentations. Ideally the facility would have adjacent rooms large enough to accommodate groups of up to six or seven people comfortably around a table.

If possible both the participants and the trainers should be accommodated near enough to the training centre to ensure group cohesion and possible evening sessions.

Equipment

The following equipment is suggested:

- classroom board;
- flip chart stands (equal to the number of training groups);
- overhead projector;
- computer/laptop with CD-ROM reading and projection capacity;
- ring binders for handouts/materials for each participant.

Materials

The trainer needs to be sure that all materials are ready before starting the programme. While the need for materials varies throughout the course, the following list will be of help:

- handouts punched to fit the ring binders;
- flip chart paper and newsprint;
- heavy paper or light cardboard in five or six varying colours (paper must be porous enough to write on with the available pens and markers);
- writing pads for each participant;
- paper (A3, A4, A5);
- scrap paper strips 21 x 5 cm (A4 cut widthwise);
- thick marking pens in a variety of dark colours (e.g. black, blue, red, green, brown);
- ink pens and pencils;
- hand calculator for each participant;
- prestick (or other means of attaching paper to the wall).

Introducing the participants and trainers

The entire course or single modular teaching courses should start with a formal programme designed to introduce trainees, co-participants and resource persons to one another, clarify the training objectives and the trainees' expectations of the course, and clarify ground rules on the conduct of the training.

The programme should begin by welcoming the participants to the training workshop and setting the training atmosphere.

Objectives

To the ensure that the participants will:



- have learned each other's name and acquired some understanding of the background and specific skills of the group;
- understand what to expect from the training course;
- understand the ground rules for conducting the training;
- recognize the challenges facing Asian agriculture.

Key points

1. Welcome to all those involved in the programme.
2. The trainer learns some things about the participants, such as their names, where they come from, what positions they hold and what kind of educational background and working experience they have, as is relevant to the training workshop.
3. The participants learn what they should expect from the training course, training management team and participants.
4. Establish ground rules to be observed during the training course.
5. Distribute the classroom materials to be used (colour pens, crayons, paper, adhesive tape, etc.).
6. Supply name tags to participants and trainers.

Steps for instruction



1. The programme should begin with a short opening speech of welcome followed by a brief discussion of the challenges to agriculture today. The trainer may choose to use Handout 1 (Agriculture in Asia) as an outline for this discussion. Distribute Handout 1 to the participants at the end of this portion of the programme.
2. After the speech the trainer may begin to distribute the training supplies to the participants in a way that is lively and interesting to assist them in meeting one another. Participants and co-trainers should then be asked to introduce themselves. Have each give their names, state where they come from, mention their position and say something about their educational background and working experience. The trainer may choose to devise a game by which all the participants, including the trainers, can remember the names of each person involved without the aid of name tags.
3. The trainer should ask the participants about their expectations of the course. These could be written on cards to be displayed before the class. Thus making it easier to identify written expectations with similar content and to group them for ease of classification. After collating all the responses, the trainer should identify which expectations can be met and which cannot.
4. Clearly explain the ground rules to be in effect throughout the whole training course such as:
 - attendance/going home;
 - use of mobile phones;
 - sleeping arrangements;
 - meal arrangements;
 - observance of curfew hours, if any;
 - regulations of the training venue;
 - others.

*As the opening programme comes to a close
distribute Handout 1.1.1 (What is a farm?)
for the class to read before the first training session.*

Agriculture in Asia

In this region agriculture is the largest sectoral contributor to the national economy and rice plays a major part in the agricultural gross domestic product. However, the growth in rice production brought about by successful agricultural production-led programmes resulted, by the mid-1980s, in serious problems for many countries here. Over the years, these countries pursued a policy of self-sufficiency in rice production, which led to surpluses generated on the world market, a decline in the international demand for the commodity and a decrease in product price.

The farming population is largely made up of small-scale farmers who cultivate most of the agricultural land. These farmers cultivate small plots and have a limited supply of family labour and access to credit. As a result of these structural difficulties, farm incomes are low.

The economic difficulties facing farmers, arising from this increase in rice production, have been augmented by the challenges brought about by economic liberalization and globalization. Government support to farmers has diminished, and market forces are playing a larger part in determining their future. Greater opportunities now exist for farmers to sell their produce in a broader range of global markets. Globalization has brought about increased trade between countries.

The decrease in farm income among rice producers and the opportunity and need to compete globally has triggered a change towards farm diversification. Farmers are rapidly diversifying into mixed crop—livestock systems and shifting production from staple crops to higher value commodities. In order to improve farm income, farmers require knowledge of market trends and opportunities as well as the skills necessary to manage their farm in an increasingly competitive environment.

Rice plays a dominant role in Asia's agriculture

Farmers are diversifying their farm enterprises

Extension services provided by public sector agencies in almost all countries have traditionally focused on technology transfer. The advisory services provided have consisted mainly of technical messages, such as agronomic practices, pest and disease control, and water management. Farm management and business advisory services are almost non-existent in many of these countries.

The challenge

It is imperative that the agricultural sector in Asia responds vigorously to the challenges posed by structural adjustment, trade liberalization and globalization. The need for a more transparent climate for trade through the elimination of quotas and tariffs and the application of food quality and safety standards internationally have also contributed to the more competitive environment that currently exists. The new economic order necessitates change in every dimension of farming.

There is increasing need to produce for the market

Globalization has brought about opportunities and a potential for higher income earning for all nations. While globalization is generally considered to be positive by opening up new markets for farm produce, there are also impeding factors. Farmers now face increased competition as well as greater risks. For example, there are greater variations of prices and costs. Small farmers are particularly vulnerable to the threat of lower product prices and higher input costs, resulting in a decrease in farm income.

At national level, countries have to concentrate on production that meets the changing demands of domestic and world markets. There is strong pressure for agriculture in the region to produce not only the quantity and quality to satisfy this change but also to remain competitive so that farming can carry on in a sustainable manner.

Farmers who possess the skills to manage their farms both efficiently and profitably and respond to market changes will be in a better position to take advantage of existing opportunities to increase income. There is also a need to revisit the subsistence and traditional production-oriented systems and assist them towards more market-oriented farming.

As producers, farmers require improved technologies and practices that lead to intensification of agricultural production. But farmers must also have the capacity to respond to market opportunities through diversification of farm enterprises (cropping activities, as well as livestock, aquacultural and other non-crop activities).

Efforts must then be directed toward strengthening the capabilities of small farmers. They must move from being simple producers to becoming efficient farm planners and managers involved in commercial farming. The emphasis on the market, increased competitiveness and efficiency calls for the development of business skills. This is what is meant by market-oriented farming.

The need to increase income by taking advantage of market opportunities means farmers must be able to compete in this new environment. Good decision-making is critical when trying to make the most of new market opportunities. This calls for better understanding of how to organize and plan farm activities accordingly. By making informed decisions farmers can become more competitive and thereby increase profits.

*Farmers
need improved
management and
business skills
to increase
profits and
farm income*

ANNEXES

Annexes

Class schedule	21
Programme design	33
Training methods	49
Evaluation form	63

Class schedule

The duration and scheduling of course segments
may need to be adapted
to match trainee requirements and experience.

DAY 1

date

30 minutes	Introduction to the training course*	
------------	--------------------------------------	--

Module 1 — Farm management*Unit 1.1 — The farm and its enterprises*

75 minutes	Session 1.1.1 — What is a farm?	
------------	---------------------------------	--

15 minutes	Session 1.1.2 — Understanding farm enterprises	
------------	--	--

BREAK*Unit 1.2 — Farm management as a way to increase profit*

120 minutes	Session 1.2.1 — What is farm management?	
-------------	--	--

as required	Training exercise 1 — Common problems facing farmers**	
-------------	--	--

LUNCH

as required	Training exercise 2 — What is farm management? **	
-------------	---	--

as required	Training exercise 3 — Qualities of a successful farmer**	
-------------	--	--

15 minutes	Session 1.2.2 — Why is farm management important?	
------------	---	--

30 minutes	Session 1.2.3 — What are farmers' objectives?	
------------	---	--

15 minutes	Session 1.2.4 — How do farmers decide?	
------------	--	--

30 minutes	Evaluation of Module 1	
------------	------------------------	--

Total 330 minutes 5½ hours <i>(+ exercises)</i>

* This segment, which is left to the discretion of the trainer, can also be conducted during the opening programme (see page xix).

** Training exercises 1, 2, 3 may all be scheduled either before or after lunch.

DAY 2

30 minutes	Previous day recap	date
------------	--------------------	------

Module 2 – Farm resource assessment*Unit 2.1 – Farm data collection*

45 minutes	Session 2.1.1 – Data and information	
45 minutes	Session 2.1.2 – Farm records and accounts	

BREAK

45 minutes	Session 2.1.3 – Inventory of farm resources	
------------	---	--

Unit 2.2 – Farm resource appraisal

60 minutes	Session 2.2.1 – Farm assets and liabilities	
as required	Training exercise 4 – Classification of assets and liabilities	

LUNCH

60 minutes	Session 2.2.2 – Asset valuation	
as required	Training exercise 5 – Asset valuation	
45 minutes	Session 2.2.3 – Farm balance sheet and net worth	
as required	Training exercise 6 – Calculating net worth	
30 minutes	Session 2.2.4 – Sources of finance	
30 minutes	Evaluation of Module 2	

Total 390 minutes 6½ hours <i>(+ exercises)</i>

DAY 3

30 minutes	Previous day recap	date
------------	--------------------	------

Module 3 – Farm business analysis*Unit 3.1 – Enterprise and farm profitability*

150 minutes	Session 3.1.1 – Enterprise profitability analysis	
as required	Training exercise 7 – Enterprise analysis	

BREAK

30 minutes	Session 3.1.2 – Whole farm income	
30 minutes	Session 3.1.3 – Enterprise and farm efficiency measures	

LUNCH*Unit 3.2 – Constraints and potentials*

60 minutes	Session 3.2.1 – Analysis of constraints and potentials	
as required	Training exercise 8 – Analysis of constraints and potentials	

Total 300 minutes 5 hours <i>(+ exercises)</i>
--

DAY 4

30 minutes	Previous day recap	date
------------	--------------------	------

Unit 3.3 – Comparative analysis

15 minutes	Session 3.3.1 – Benchmarking	
30 minutes	Session 3.3.2 – Farm performance analysis	

BREAK

75 minutes	Session 3.3.3 – Farm diagnosis using gross margin	
as required	Training exercise 9 – Asset valuation	
30 minutes	Evaluation of Module 3	

LUNCH

	Session 3.3.4 – Planning for a field visit	
40 minutes	Field visit structure	
40 minutes	Field data collection	
40 minutes	Follow-up requirements	
as required	Team meetings*	

Total
300 minutes
5 hours
(+ exercises
and team
meetings)

*Conducted by the individual teams with the trainer on hand to answer questions and supervise.

**DAY 5
FIELD VISIT**

as required	Preliminary analysis of data collected *	date
as required	Team discussions *	
as required	Preparation for day 6 recap *	

* A time should be found while still on the site of the field visit to review the events of the day and prepare for the field visit recap scheduled for Day 6.

DAY 6

as required	Field visit recap – findings, analysis and report*	date
-------------	--	------

LUNCH

Module 4 – Planning for the market

Unit 4.1 – Making planning decisions

30 minutes	Session 4.1.1 – The farm planning process	
------------	---	--

Unit 4.2 – The process of marketing

30 minutes	Session 4.2.1 – The why and what of marketing	
------------	---	--

Total** ___ minutes ___ hours
--

- * If a full morning session is not adequate the field visit recap can continue after lunch where a lighter programme has been scheduled for this purpose.
** Trainer to supply times as required.

DAY 7

30 minutes	Previous day recap	date
------------	--------------------	------

60 minutes	Session 4.2.2 – Production and marketing problems	
------------	---	--

as required	Training exercise 10 – Marketing problems and solutions	
-------------	---	--

BREAK

150 minutes	Session 4.2.3 – Marketing channels, margins and costs	
-------------	---	--

LUNCH

120 minutes	Session 4.2.4 – Planning for the market	
-------------	---	--

as required	Training exercise 11 – Preparing a marketing strategy	
-------------	---	--

30 minutes	Evaluation of Module 4	
------------	------------------------	--

Total 390 minutes 6½ hours (+ exercises)
--

DAY 8

date

30 minutes	Previous day recap	
------------	--------------------	--

Module 5 – Enterprise budgeting and farm planning*Unit 5.1 – Farm enterprise and partial budgeting*

40 minutes	Session 5.1.1 – The use of enterprise budgeting in farm planning	
60 minutes	Session 5.1.2 – Break-even budgeting	
50 minutes	Session 5.1.3 – The use of partial budgeting	

BREAK

60 minutes	Session 5.1.4 – Preparing a partial budget	
as required	Training exercise 12 – Partial budgeting	

LUNCH*Unit 5.2 – Whole farm plan and budget*

60 minutes	Session 5.2.1 – Whole farm planning	
60 minutes	Session 5.2.2 – Maximizing farm income using available resources	
as required	Training exercise 13 – Whole farm budget	

Total 360 minutes 6 hours <i>(+ exercises)</i>
--

DAY 9

date

30 minutes	Previous day recap	
------------	--------------------	--

Unit 5.3 – Labour planning

120 minutes	Session 5.3.1 – Planning farm labour	
as required	Training exercise 14 – Preparing a labour profile	

BREAK

DAY 9 (continued)*Unit 5.4 – Cash flow*

date

30 minutes	Session 5.4.1 – The concept of cash flow	
------------	--	--

60 minutes	Session 5.4.2 – Application of cash flow	
------------	--	--

LUNCH

60 minutes	Session 5.4.2 – Application of cash flow, <i>continued</i>	
------------	--	--

as required	Training exercise 15 – Cash flow	
-------------	----------------------------------	--

30 minutes	Evaluation of Module 5	
------------	------------------------	--

Total 330 minutes 5½ hours <i>(+ exercises)</i>

DAY 10

date

30 minutes	Previous day recap	
------------	--------------------	--

Module 6 – Farm investment and risk*Unit 6.1 – Investment appraisal*

50 minutes	Session 6.1.1 – Investment decisions	
------------	--------------------------------------	--

BREAK

100 minutes	Session 6.1.2 – Simple methods of investment appraisal	
-------------	--	--

LUNCH

120 minutes	Session 6.1.3 – Discounted methods of investment appraisal	
-------------	--	--

as required	Training exercise 16 – NPV and IRR	
-------------	------------------------------------	--

Total 300 minutes 5 hours <i>(+ exercises)</i>
--

DAY 11

		date
30 minutes	Previous day recap	
45 minutes	Session 6.1.4 – Loan appraisal	

BREAK*Unit 6.2 – Managing risk*

45 minutes	Session 6.2.1 – Risk and risk management	
45 minutes	Session 6.2.2 – Sources of risk	

LUNCH

60 minutes	Session 6.2.3 – Risk management strategies	
90 minutes	Session 6.2.3 – Dealing with risk	
as required	Training exercise 17 – Risk in farming	
30 minutes	Evaluation of Module 6	

Total 345 minutes 5$\frac{3}{4}$ hours <i>(+ exercises)</i>
--

DAY 12

		date
30 minutes	Previous day recap	
	*	
	*	
	*	
	*	
	*	

BREAK

	*	
	*	
	*	
	*	
	*	

FAREWELL LUNCH

30 minutes	Closing programme	
------------	-------------------	--

<p>Total** ___ minutes ___ hours</p>

* The scheduling for the last day is left to the trainer. It should be a time used to tie up any loose ends. Participants should be free to exchange ideas and to ask questions where doubts remain and where clarification is required. A time might be included for a final review of the course using the Evaluation form provided in both the Annexes and the Training aids package.

** Trainer to supply times as required.

Programme design

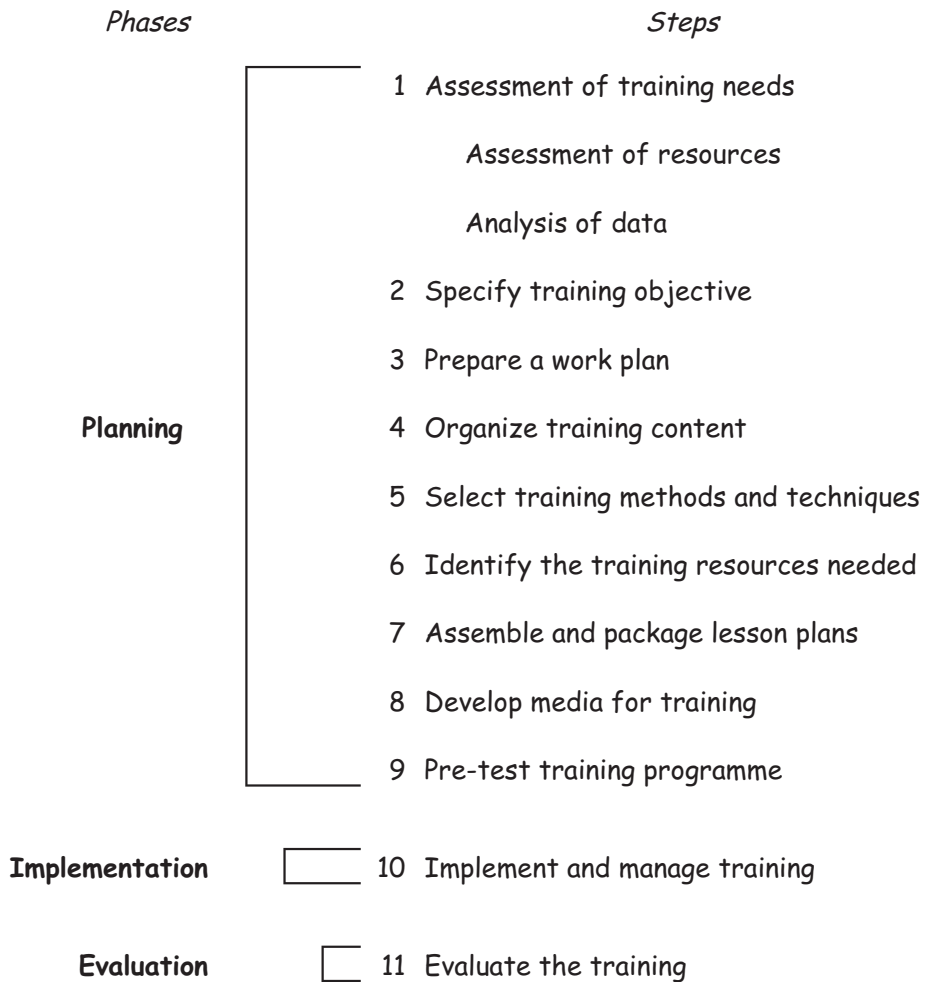
Purpose

Training requires more than just providing information or development of skills. It requires the trainer to have a thorough understanding of the training process and the role and value of proper and systematic planning, and evaluation of the programme. This section has been prepared to remind you, the trainer, of the importance of preparing a well-designed training programme.

The section will provide you with information on how to plan, design and evaluate the training. It sets out the phases and steps in the training process with a list of those aspects that need to be kept in mind. The phases and steps involved should assist you in identifying shortcomings in the process of planning as well as evaluating, with a view to improving future training activities. It concludes with an explanation and guidance on how to apply some of the tools referred to in the training.

Proper preparation is vital to the success of the training programme. More time and energy is usually required at this particular stage of the training than throughout its duration. As you are no doubt aware, preparation is the most challenging aspect of any training and if not adequately addressed can severely jeopardize its success.

Phases and steps in the training process*



Planning determines what you want to achieve and how best to achieve it. Steps on the following pages should assist you in designing a relevant and effective training programme.

* Source of figure: Planning for effective training (SDRE – FAO)

Step 1 Assessment of training needs

The primary step in any training process provides baseline information upon which the training programme is designed and developed. The assessment of training needs requires understanding (i) who, (ii) what, (iii) whom.

Who means the categories of people who have needs (e.g. extension workers or directly training farmers).

What refers to the kind of needs the trainees have (e.g. how to analyse and plan an enterprise; how to plan for the market).

Whom refers to the trainers (i.e. persons with knowledge to define the needs of extension workers or farmers).

In order to assess Who needs "What", you need to look at ...

What is happening? ... **What** should be happening?
What are extension workers doing? ... **What** should they be doing?
 and ...
What knowledge, skills and attitudes are necessary for the **training**?

During the preparation stage of the training design you need to conduct discussions with potential trainees and possibly with their supervisors. Conducting a survey, preparing a questionnaire or simply listening to well-informed extension workers and their supervisors should allow you to assess the interests and needs of the trainees.

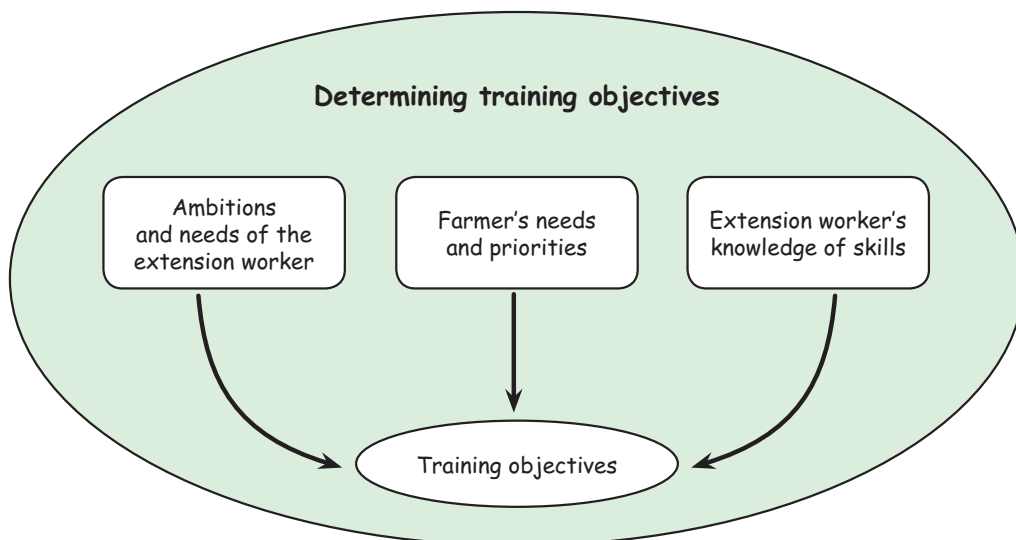
For example, if extension workers say that farmers really want to know more about analysing farm profitability, this should become a priority and a major part of the training design. You, of course, should not plan a training programme based on what you perceive as being a priority but should take into account the needs of the trainees. If this is not done correctly, the extension workers will become uninterested in the training and will feel that you are not concerned about their needs and wants. They will lose all sense of trust in you.

You should try to understand the reasons why extension workers prioritize their needs the way they do. This calls for some understanding of the farming community and the problems that farmers face. Some of this information may be available in reports and in files, or can be obtained from extension staff. Information gathered shows the skills of the extension workers, and needs assessment illustrates their aims and objectives.

Step 2
Specify training objectives
(turning needs into objectives)

Once the training needs have been identified, you should describe those needs as realistic objectives. Remember that the training objectives are the goals that the trainers set out to accomplish through the training. The objectives should help you to develop and conduct the training and provide the trainees with the knowledge and the skills they require. The objectives also provide trainees with a clear understanding of what they will be expected to do as a result of the training. This should help you and the trainees to evaluate what has been learned through the training.

The training objectives are illustrated in the figure below. They should be developed to serve as a guide to learning, a guide to instruction and a guide to evaluation*.



* Communications skills for rural development (SDRE – FAO)

Step 3
Prepare a work plan

A work plan is your plan of operations. It helps you to establish what is needed. An example is given below:

Training staff

How many?

To do what?

When?

Training

Who requires it?

When?

Where?

How long?

Media communications

What is required?

Where will it be obtained?

Equipment

What you need and where?

Stationery and materials

What and where?

Transport required

Where?

When?

Administration

Are secretaries or support staff needed and available?

Finance

Who controls funds?

Are there adequate funds available?

Step 4 Organize training content

The content of a training programme should be derived from the training objectives. You should develop a framework that draws out the content of the training. A good way to develop this framework is to list the objectives and prepare an outline using the descriptions and following the format below:

Must know information	Should know information	Could know information
allows trainees to achieve the objectives set (for example understanding of costs of production, gross margin).	will help the trainee achieve the objectives and will reinforce the learning process (for example risk management).	can be general or advanced, but the lack of which is not likely to prevent achievements (for example appraising investments).

Example A content selection format (to understand farm management and its importance)

Must know information	Should know information	Could know information
The multiple functions of management How to set objectives The process of decision-making	Concepts of input, output, enterprises, production process Internal factors that influence production	Enterprise combinations Technical, economic and institutional restrictions to agriculture

If you are unable to include everything you would like to teach within the time allotted, limit yourself to ensuring that the **"must know"** information is covered.

The **"should know"** and **"could know"** information could be communicated through assignments, handouts or group work activities.

In any case the training contents should build on what the participants already know.

Step 5 Select training methods and techniques

The training content should include learning activities that help the trainees accomplish the training objectives. To help them understand the material, it is necessary to use training methods that allow you to review the key points communicated, use relevant and realistic examples, and restate new ideas in different ways by using familiar words and analogies. It is especially important when communicating to the trainees that there is consistency in the definitions and units of analysis used.

Different methods of training can be used to develop the skills of trainees, to ensure better understanding of the material, and influence attitudes and behaviour. Examples of these are given in the box below.

Training for skill development

If you want the trainees to be able to do something new as a result of training, the following techniques could be used ...

- (i) demonstrations
- (ii) role-playing
- (iii) worksheets and exercises

Training for "understanding"

If you want the trainees to understand a concept or tool, you could provide them with information using ...

- (i) printed materials
- (ii) lectures/trainer presentations
- (iii) diagrams
- (iv) case studies
- (v) demonstrations

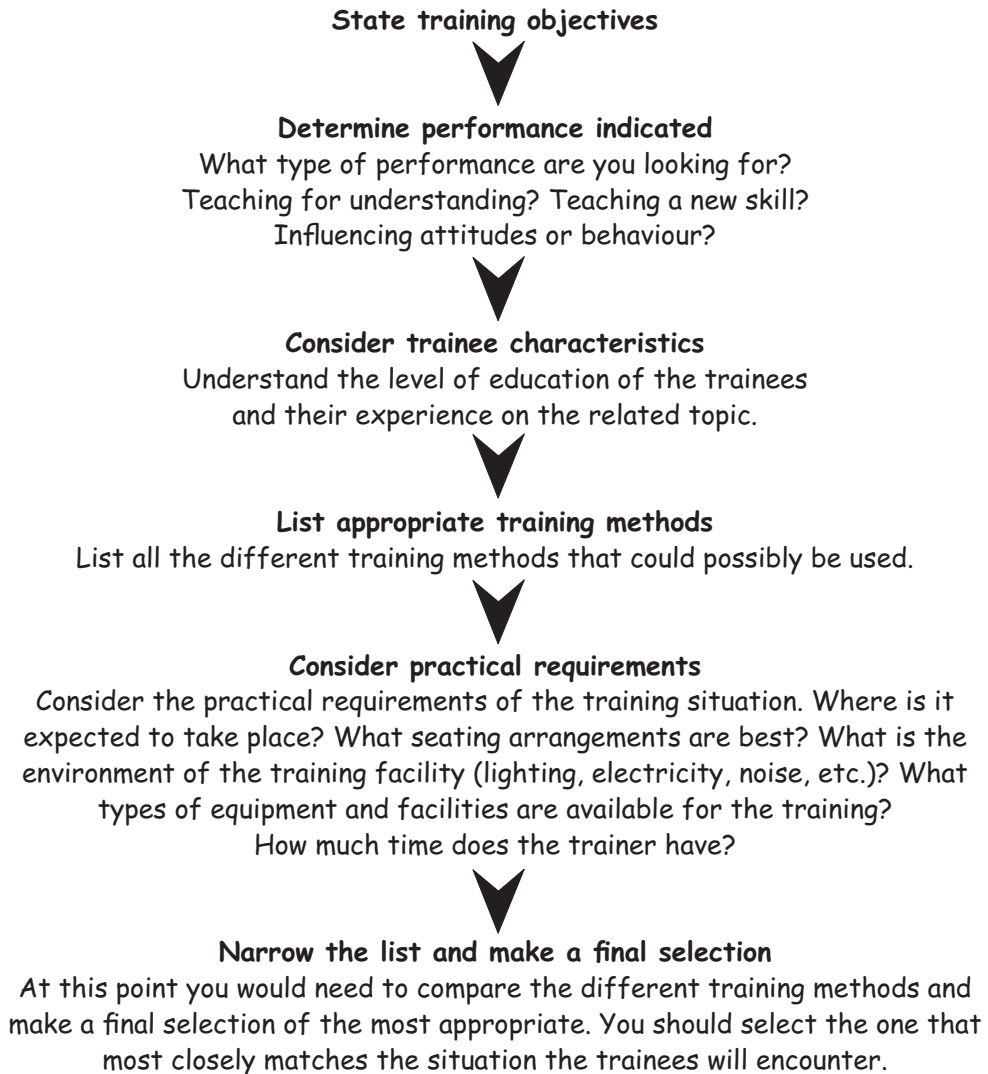
Training to "influence" attitudes and behaviour

If you want to influence the attitudes and behaviour of the trainees, you could assist them in comparing old and new ways by using ...

- (i) demonstrations
- (ii) field visits/study tours
- (iii) role-playing
- (iv) video films
- (v) case studies
- (vi) games and exercises

To influence the attitudes and behaviour of the trainees, it is necessary to use training methods that help you to compare old vs new attitudes and behaviour, arrange opportunities to experiment with new ways of acting, and reinforce and solidify these attitudes over time.

The following process is designed to help you make a good decision regarding which training methods to select*:



* Source: Planning for effective trading (SDRE – FAO)

Step 6**Identify the training resources needed**

Identify the resources needed to conduct the training. You will need to determine what facilities, equipment and materials are required in addition to identifying necessary administrative and personnel support.

Step 7**Assemble and package lesson plans**

Pull together the training objectives, training content, training methods and the training resources into a plan that can be used for conducting the training. The plan should serve as a written record on how the training is intended to be conducted.

Step 8**Develop media for training**

The materials prepared for the training need to be practical and relevant to the day-to-day work of the trainees. The material included in this training manual should provide you with an adequate base of information to address the needs of extension workers in Asia.

Step 9**Pre-test training programme**

A pre-testing of the training programme would ensure that everything — the training objectives, media used for supporting the training programme, teaching methods, etc. — works as intended. During this phase you will identify unexpected problems and will be able to make changes and corrections in time.

Step 10

Implement and manage the training
(implementation involves a number of stages)

Preparation

Know the objectives of the training, be clear on the strategy to apply and know the content of the training. _____

Setting

Ensure a cheerful and relaxed environment that promotes learning. _____

Handling participants

This is a delicate process that requires patience and politeness. The trainees should be allowed and encouraged to participate, and you should try to show appreciation when they do. _____

Climate setting

Set the right atmosphere to relax and welcome participants. _____

Present the objectives

Let the trainees know why they are assembled, what are the objectives of the units and sessions, and what is expected to take place. _____

Openers (breaking the ice)

Introduce warm-up activities and ways for the participants to know each other. _____

Initiate the learning experience

This is the core of the training. Ensure that the participants are handled in a way that promotes participation and allows them to express their ideas by asking

questions. The training discussions also need to be kept on track. Motivation needs to be maintained throughout the training. This can be done by relating the material to real life situations from the trainees' own experiences and keeping their interest by using different types of media. _____

Conduct a refresher training session

The training should finish with a session that reviews the course content, providing trainees with an opportunity to ask questions. _____

Reflect on the experience

Solicit reactions to the material presented as part of a reflection process. Then the trainees should participate in a problem-solving discussion and provide feedback to you and the participants. _____

Discuss lessons learned

At this point the trainees should identify key points that have come out of the experience and the discussion. You should help the trainees draw general conclusions from the experience. _____

Discuss how the trainees might apply what they have learned

Based on the conclusions drawn, the participants should discuss how the information/skills will be useful in their fieldwork. They might also discuss how they propose to overcome difficulties in applying all they have learned. _____

Provide a closure to the training session

Briefly summarize the events of the training, and assess the extent to which the objectives set at the beginning of the session have been met. Try to ensure that the participants leave with a positive feeling about the training. _____

Step 11 Evaluate the training

Evaluation is generally considered the final part of the training process. However, it is best undertaken as an ongoing process conducted throughout the training and on completion of the individual modules. During the programme the evaluation enables adjustments to be made to the training as it proceeds. The training programme should be kept flexible, and if the evaluation shows that certain aspects of the programme are not working, the original plan should be amended and modified accordingly.

A final evaluation should be conducted at the end of the training to enable the entire programme to be assessed. This will provide a basis for reporting on the training while giving guidance for future training of its kind. A format for training evaluation is given at the end of the annexes. Although this has been prepared for module evaluation, it may also be of use for similar kinds of evaluation or for adaptation.

The next section describes some of the tools and techniques that may be used to enhance the quality of the training programme.

Training methods

Training methods

Brainstorming	51
Role-play	52
Buzz-groups	53
Training exercises	56
Tick box discussion	58
Case studies	60

Brainstorming

Aims

- Stimulate wide and free thinking on a topic.
- Cause the group to see the breadth as well as the detail of the topic.
- Encourage everyone in the group to participate.
- Act as a lead into a discussion or subject area.
- Enable the sharing of the maximum amount of experience, training and ideas in the minimum time.
- "Liven up" a session — increase involvement.

Preparation

- Equipment: classroom board, overhead projector or newsprint (depending on whether the trainer wishes to refer to the information subsequently);
- Group size: restrict with the range from 6 to 20 people;
- Time: at the beginning of a topic. Normally not used at the beginning of a course because ideas flow too slowly. It should last 3–4 minutes.

Running a brainstorming session

- Write up topic/subject at top of classroom board, overhead projector or newsprint — keep it in view.
- Ask for one or two word contributions on the topic — whatever comes to mind.
- Ask trainees to free-wheel in their thinking — not to worry if some of their ideas at first seem wild or silly.
- Ask trainees to withhold any judgement on their own or other people's contribution until the end of the session.
- Ask trainees to keep their ideas flowing.
- Suggest to trainees that they "cross-fertilize" and develop the ideas of other members.
- Write up and number contributions as fast as they come — ensure writing is legible.
- Ensure that no contributions are missed.
- Add a contribution yourself occasionally to keep ideas flowing.
- Keep list of contributions in view — it helps to stimulate further ideas.
- Restate or slant the topic slightly if the session gets bogged down.
- Stop the session when you feel you have sufficient coverage of the subject — do not carry on too long.
- Ask trainees to read over the suggestions and take in the overall picture.
- Once the list is complete, the information can be used to highlight or lead into topics for: (i) a talk or lecture, (ii) whole group discussions.

Role-play*

Organization of session

1. "Set the scene". Explain to the participants the aim of the role-play situation followed, and give a brief description of the "play". (*Key point: A written synopsis should be prepared in advance by the trainer.*)
2. Allocate acting roles to individuals who will receive specific written information as to the part they will play and the view they represent. (*Key point: It is important that players should not see each other's information.*)
3. Appoint "recorders" from the audience who should use either written notes, audio tape, video tape or a combination of these.
4. Keep time short for players to plan their inputs. (*Key point: Involve all the participants, including those who will be "the audience", allot groups of trainees to each "player".*)
5. Role-play. Allow action or discussions to develop freely without interruption. (*Key point: Time limit is set for the role-play, e.g. 15 minutes.*)
6. Debriefing session for the "players". (*Key point: This should take place away from the audience and should be led by the trainer. It allows players to "cool off" and drop their role.*)
7. Review the session with the whole group (audience + players) using written record or audiovisual reports presented by recorders.
8. Record conclusions of session. Hold group discussions to be followed by poster session. (*Key point: It is important that a list of outcomes is achieved, related to the situation covered by the role-play.*)

Examples of role-play

- Individual farmers negotiating a business loan with the bank manager.
- Farm-product shop retailer and customer assessing customer requirements.

Make sure your trainees understand why we use role-play:

- to deepen understanding of a subject they have already learned;
- to combine different skills and information;
- to understand the practical application of information they have learned.

* The trainer has an important role in managing the session.

Buzz-groups

Introduction

The buzz-group has become a widely used participative learning technique, and considerable experience has been gained from its use.

Aims

- breaks tension and establishes working relationships;
- focuses attention on subject matter;
- changes attitude and knowledge by sharing ideas;
- creates interaction;
- provides foundations for future session;
- links sessions;
- gives early achievement and recognition.

Benefits

- leaves course members in their "own" seat;
- creates a "comfortable" noise;
- trainers are able to make early observations of participants;
- participants realize they are able to contribute;
- ideas are caught from conversation in subgroups.

Preparation

- The buzz-group question should be clear, concise and, if possible, indicate the action required (e.g. list eight qualities of an effective leader).
- Ideally any new questions should be tested prior to the course to ensure that the desired response is obtained. Prior to the session write up the question on the classroom board or newsprint and conceal it.
- Ensure that felt tip pens, paper and newsprint are available.

Briefing

The order of the content of a briefing is important to ensure understanding of what is required. The following procedure is recommended:

- State purpose and time (e.g. "We are going to work in groups of 3–4 to share ideas for about 20 minutes").
- State what is to be achieved (e.g. a list of eight qualities and abilities) and show a written brief.
- Indicate recording method (e.g. "Which one of you would like to record the points we have just raised?").
- Split groups — three is ideal but supplement with a fourth if required.

Trainers' role during buzz-group sessions

1. Divide the participants into subgroups.
2. Allow groups to work alone for the first 1–2 minutes.
3. Check with each group on their understanding of the questions and that a member of the group is recording. Try to condense the answers into 2–3 words.
4. If possible, withdraw from the room for 5 minutes. The volume of buzz will increase as will the exchange of ideas between groups.
5. Gauge the progress by the level of noise. Visit any quiet group to encourage the thinking.
6. After 10–15 minutes, when noise level declines or when some groups are at the point of finishing their list, introduce newsprint.

Introducing newsprint

- Introduce newsprint to each group so that the ideas can be shared.
- Indicate the size of the writing — point out the size on name cards, newsprint brief or demonstrate.
- Help to select a scribe and suggest that other members of the group help formulate precise answers.
- Emphasize that they are not to worry about spelling.

While writing up

- Assist the groups in finding required words.
- Ensure that the size of writing is maintained.
- Thank scribes.

Hanging newsprint for feedback

- Number sheets in group order (e.g. clockwise around the room).
- Hang sheets in order.
- Allow 1–2 minutes to read through the sheets.

Feedback for buzz-group sessions

Aims

- clarify points made;
- consolidate and summarize;
- stimulate interaction between groups.

Method

- Invite course members to identify areas common to each sheet — trainer to underline.
- Channel any clarifying questions on common areas to quieter members of the group.
- Examine any wide variations between groups, question for clarification.
- Unusual or controversial responses should be directed to groups for discussion, and the trainer summarizes.
- Trainer inserts any key words that have been omitted from lists.
- Summarize key points in answer — indicate any links to future session.
- Indicate in some way satisfaction with the group's work, that the answers are correct and thank the group.

Important remarks

- Ensure that writing is not left to one member of the group for every session.
- Group members can be moved around to balance groups or to align or disseminate information.
- More than one question may be used, but ensure groups allocate appropriate time to each question.
- Newsprint can be exchanged prior to hanging to enable other groups to prepare, challenge or prepare areas requiring clarification.
- Select a group member to elaborate on points, or identify key points in feedback.
- Ensure that brief is clear and understood and that someone is recording.
- Assist quieter groups.
- Listen for noise level cues.
- Spread questions around the group.
- Indicate satisfaction with the answers.
- Encourage interaction.
- Give recognition, particularly to quieter members.
- Don't use groups of less than three or more than four.
- Don't concentrate on one group's work.
- Don't bore by running feedback too long (20—25 minutes maximum).
- Don't provide all the answers and interpretations.
- Don't take up a defensive position during controversy.

Training exercises

Using exercises

- Establish trainees acceptance of new technologies/processes.
- Break down classroom atmosphere by introducing movement and activity.
- Build confidence in handling new situations by trying first in a safe environment.
- Create learning by doing.

There are three phases in operating an exercise: brief (5 minutes), supervise (up to 50 minutes), review (up to 20 minutes).

Brief

- Have a printed set of instructions for the exercise on the overhead projector, flip chart or individual sheets of paper (see planning exercises on following page).
- Explain the details of the exercise such as (i) time available, (ii) result required, (iii) method of work/recording required, (iv) reporting back procedure
- Allocate individuals to groups. Use the overhead projector or newsprint to show group membership.

Supervise

- After ensuring that the groups have the materials required for the exercise and starting work, leave them alone as much as possible.
- If individuals or groups get into difficulty, encourage them to resolve problems without doing the exercises for them.
- Towards the end of the exercise period, check the progress of groups and their readiness to review.

Review

- Use reviews to highlight the learning that has taken place.
- Ask groups to consider what went well and how performance could be improved next time.
- Conclude the review by making positive links to doing the job back at home.

Note: For real learning, an exercise requires at least 45 minutes and may take as long as 75 minutes.

Planning exercises

Plan an exercise where trainees can put a work process or technique into action by:

- working out costs of production (crop and livestock);
- calculating enterprise gross margins;
- working on budgets;
- solving a labour problem.

Process or technique

- should relate directly to course or session aim;
- should be part of the job that has to be done at work;
- should have a definite outcome and be achievable in time available.

Decide format

- Plan outcome of exercise.
- Decide how long it will take.
- Decide how many will work together.

Plan review

- Decide whether a whole group review is necessary.
- Decide what information the group will present to their peers.
- Decide what teaching points you will draw out.
- Plan your conclusion to the exercise.

Decide prior input

- Decide what technical instruction the group will need prior to the exercise to implement successfully the process/technique being taught.
- Identify whether the trainees need to be motivated to want to change behaviour prior to trying out the new process/technique.
- Plan inputs that will enable them to practice.

Plan exercise brief

- Specify time available.
- Specify result required.
- Specify method of working.
- Specify what is to be recorded.
- Specify reporting back procedure.

Tick box discussion

Use a tick box discussion to:

- establish previous experience (especially at the start of a course or session);
- establish current opinions and knowledge;
- to get at individual standpoints and to question common attitudes and beliefs.

When using the tick box discussion there are three phases: brief (5 minutes), tick box (5 minutes), feedback (15 minutes).

Brief

- Handout the tick box sheet (see example tick box sheet on following page).
- Explain what has to be done.
- Ensure individual working (unless the instruction is for pairs).
- Reassure trainees that this is not a test, but a means of developing discussion.

Tick box

- While trainees are completing the tick box sheet, avoid inspecting or overseeing what they are doing.
- Encourage speedy reaction and decision after three or four minutes (e.g. "Has everybody reached answer number ...?").

Feedback

- Initially ask the whole group "which do you feel strongest about?" Then ask individuals to explain their choice.
- After the pattern of discussion has been established, you can go to individuals directly (e.g. "John why have you chosen 1 or 1a?").
- Try to challenge superficial choices. Ask specifically "Why?"
- Try to obtain actual experiences.
- Draw conclusions that link to what is to follow.
- Vary the pattern of taking feedback according to the range of ideas within the group.

Timing

You should be able to operate a tick box discussion within 25 minutes.

Example tick box sheet

<input type="checkbox"/>	There are good trainers and bad trainer teachers and that situation cannot be changed.	<input type="checkbox"/>	Any trainer with proper training and motivation can become very effective.
<input type="checkbox"/>	Good trainers worry about their performance.	<input type="checkbox"/>	Good trainers are so confident about their performance that they never worry.
<input type="checkbox"/>	A good trainer should use visual aids to add impact.	<input type="checkbox"/>	A good trainer who knows his subject does not need visual aids because they distract trainees.
<input type="checkbox"/>	Trainees learn effectively by taking notes of what the trainer says.	<input type="checkbox"/>	Trainees spend their time most effectively by being given notes after the session.
<input type="checkbox"/>	Strict discipline ensures that trainees learn.	<input type="checkbox"/>	Motivation ensures that trainees learn and want to learn.
<input type="checkbox"/>	A successful trainer must always win arguments with trainees.	<input type="checkbox"/>	An effective trainer always listens and accepts a trainee's point of view.
<input type="checkbox"/>	Handing out printed notes encourages trainees to be lazy.	<input type="checkbox"/>	Handing out course notes ensures that trainees make effective use of their time.
<input type="checkbox"/>	Theory should be taught separately from practical work.	<input type="checkbox"/>	Theory and practical work should always be integrated.
<input type="checkbox"/>	Students learn best by watching a skilled demonstration.	<input type="checkbox"/>	Students learn best by trying out a new skill for themselves.
<input type="checkbox"/>	Experienced trainers would be insulted by the presence of a key trainer assessing their performance.	<input type="checkbox"/>	An experienced trainer would be grateful for any help or advice from a key trainer.

Example tick box exercise

<input type="checkbox"/>	A good farmer produces what the customer is used to.	<input type="checkbox"/>	A good farmer produces new products to introduce to the customer.
<input type="checkbox"/>	A farmer's production should be appropriate to his type of farm/location.	<input type="checkbox"/>	A farmer's production should be appropriate to the market.
<input type="checkbox"/>	A good farmer should produce a good product and then market it.	<input type="checkbox"/>	A good farmer should establish a market and then produce what that market requires.
<input type="checkbox"/>	A good farmer tries out new technology.	<input type="checkbox"/>	A good farmer does what he knows how to do best.
<input type="checkbox"/>	Product presentation is more important than product quality.	<input type="checkbox"/>	Product quality is more important than product presentation.
<input type="checkbox"/>	Planning production is of little use because critical factors (e.g. weather, are not predictable).	<input type="checkbox"/>	Planning production is even more important because critical factors are likely to change.
<input type="checkbox"/>	A successful farmer must always be prepared to take risks by borrowing capital.	<input type="checkbox"/>	A successful farmer must always be sure his venture will be successful before borrowing capital.

Case studies

Introduction

The practical case study is a well-established participative learning technique with a great many variations in its method of execution. Trainers may choose to use examples from their own experiences or prepare materials suitable for specific classroom requirements. The notes below summarize the main points that a trainer should be aware of, or be sure to carry out in any practical case study. Variation from the standard approach given in these notes is indicated in course manuals and instruction plans.

The technique will be discussed under the following headings: (i) aims, (ii) preparation, (iii) briefing, (iv) trainer role, (v) feedback, (vi) dos and don'ts.

Aims

To give an opportunity for:

- sharing ideas and experience;
- using existing knowledge to discover new or unthought-of information;
- increasing the absorption of a subject;
- solving problems;
- giving practice in specific techniques;
- developing and modifying attitudes.

Preparation

The question

- One of the most critical points for the success of a practical case study is a clear, unambiguous question that indicates what is expected in terms of discussion, context and presentation of results. To achieve this, questions must be carefully worded in advance and preferably tested prior to a course.
- A typed summary should be made available for each individual.

Classroom

- Ensure that the classroom is comfortable and not occupied by anyone.
- Check heating, working places and lighting.
- Arrange desks for a round-table discussion.
- Ensure there is equipment to take notes.

Choosing groups

Groups should be formed and manned carefully to be well-balanced to achieve aims of the discussion. Remember that:

- Groups smaller than three will obviously have less experience or ideas. In groups bigger than seven, some trainees may "fall out" of the discussion.
- A group can be balanced on the basis of contribution, experience or both.
- A group with few "generators of ideas" can work well; however, poor contribution may be the result of little experience or limited abilities.
- Name cards may help the trainer to form the groups. These cards can be rearranged until a better group structure is formed.
- Use overhead projectors or classroom boards to write group numbers and numbers of classrooms.

Briefing

In order for trainees to understand the objectives better and not interrupt the discussion, the following procedure is recommended:

- Announce that the group will divide into subgroups to discuss a problem.
- Explain which result you are planning as the outcome of a discussion (i.e. a list), a problem solution. Define time allocated for the discussion.
- Distribute handout ensuring it is understood by everyone.
- Define the answer format.
- Read (show) prepared lists of subgroups (classroom, subgroup members, chairman and/or secretary, if necessary) to the trainees.

Trainer role

Trainers must not isolate themselves from the course completely during practical case study sessions. The trainer has an important part to play during discussions and the following procedure is recommended:

- Visit each group after 2—5 minutes to ensure that groups are organized and on track.
- Leave group to work for 5 minutes.
- Enter each group to ensure the first topic is being discussed in sufficient depth, bring in non-contributing members and introduce new thought areas through questioning. Trainers should begin to identify points to emphasize.
- Rarely should the trainer make direct inputs. The role should be one of listening and questioning to guide and draw out.
- Remind groups of time 3—4 minutes before end of syndicate. Check progress of writing up of feedback. Ensure agreement has been reached on who is to report back.

Feedback

Where similar questions have been used, adopt the same procedure as laid down for buzz-groups. Where different questions have been used, only hand in the feedback that is being discussed.

- Ask a spokesperson for the group to identify key points in feedback and explain thinking.
- Underline key points in feedback.
- Encourage members of other groups to challenge by questioning.
- If needed, the trainer identifies specific areas and asks other course members to comment.
- Trainer summarizes feedback, points out key areas — shows links to future sessions or action.
- Where appropriate, indicate satisfaction with feedback and thank the group. Any shortcomings should be dealt with constructively.
- Hang newsprint in chronological order around the room to enable easy reference during the subsequent session.

Dos and don'ts

Do

- prepare written brief to question;
- select groups carefully;
- sit in for short times during group work;
- use course members to give feedback;
- encourage interaction between course members.

Don't

- interfere in groups that are working well;
- take up defensive positions;
- dominate feedback;
- forget to involve quieter members during feedback.

Evaluation form

Please record your thoughts on what has been presented. This kind of information is helpful in making training programmes more interesting and useful. On the following pages you will find a number of questions dealing with a completed training segment. Most questions can be answered by circling a number on the scale to the right of the question. Consider your responses carefully and answer truthfully. Thank you for your help.

Module/Unit/Session/Other _____

Content

1. Relevance of the topic to your job

Not relevant Very relevant

1	2	3	4	5
---	---	---	---	---

2. Clarity of session's objectives

Not clear Very clear

1	2	3	4	5
---	---	---	---	---

3. Level of instruction

Too basic Too advanced

1	2	3	4	5
---	---	---	---	---

4. Lecture coverage

Inadequate Very comprehensive

1	2	3	4	5
---	---	---	---	---

5. Time allotment

Too short Too long

1	2	3	4	5
---	---	---	---	---

6. Emphasis on details

Too brief Too detailed

1	2	3	4	5
---	---	---	---	---

7. Organization and direction

Disorganized Well organized

1	2	3	4	5
---	---	---	---	---

8. Treatment of topic

Useless Useful

1	2	3	4	5
---	---	---	---	---

Comments

REFERENCES

- Baker, J.** 1989. *Agricultural marketing*. Oxford University Press. Oxford.
- Boehlje, M.D. & Eidman, V.R.** 1984. *Farm Management*. John Wiley & Sons.
- Buckett, T.** 1988. *An introduction to farm organization and management*. Butterworth - Heinemann. Paperback by Pergamon Press. N. Y.
- Brown, B.** 2003. *Practical accounting for farm and rural business*. Crowood Press.
- Byram, M.L.** 1986. *Modules for training extension workers with handouts*. University of Massachusetts. Boston.
- CIAT.** 1999. *Identifying and assessing market opportunities for small rural producers*. Colombia.
- Davel, J.A.H. & Van Reenen, M.J.** 1997. *Farm Management – a business approach*. Unisa Press.
- FAO.** 2002. *Training guide on farm management for agricultural extension*, FAO regional office for Asia and the Pacific.
- FAO.** 2002. *Training guide on farm management for agricultural extension*. Bangkok.

- FAO.** 2000. *Understanding and using market information. Marketing extension, guide 2.* Rome.
- FAO.** 1999. *A guide to maize marketing for extension officers* by A. W. Shepherd. AGSF. Rome.
- FAO.** 1998. *Agricultural cooperative development, a manual for trainers.* Rome.
- FAO.** 1997. *Improving agricultural extension, a reference manual, SDR.* Rome.
- FAO.** 1997. *Farm management for Asia: A systems approach* by D.J. McConnel & J. L. Dillon. Rome.
- FAO.** 1996. *Training programme for agricultural planning at the district level in Nepal.* Rome.
- FAO.** 1995. *The group enterprise resource book.* Rome.
- FAO.** 1993. *Planning for effective training, a guide to curriculum development.* Rome.
- FAO.** 1993. *Farm management research for small farmer development* by J.C. Dillon & J.B. Hardaker. AGPS. Rome.
- FAO.** 1993. *A guide to marketing costs and how to calculate them* by A. W. Shepherd. AGSF. Rome.
- FAO.** 1991. *Improving training quality, trainer's guide to evaluation.* Rome.

- FAO.** 1990. *Guidelines for the conduct of a training course in farming systems development.* AGSP. Rome.
- FAO.** 1989. *Horticultural marketing, a resource and training manual for extension officers* by G. Dixie. AGSF. Rome.
- FAO.** *Agricultural marketing extension training papers* (TCP/SAF/0065). Rome.
- FAO and IIRR.** 1995. *Resource management for upland areas in Southeast Asia, an information kit.* Rome.
- Herbst, J.H. & Erickson, D.E.** 1996. *Farm management: Principles, budgets, plans.* Stipes Publishing.
- Johnson, D.T.** 1982 *The business of farming: A guide to farm business management in the Tropics.* Macmillan Tropical Agriculture Series.
- Kains, M.G.** 2002. *A handbook of small farm management.* Dover Publications.
- Kay, R. D & Edwards, W. M.** 1994. *Farm management,* 3rd edition. McGraw-Hill Inc.
- Kindervatter, S. & Range, M.** 1991. *Marketing strategy, training of trainers activities for entrepreneurs.* OEF International.

- Macher, R.** 1999. *Making your small farm profitable*. Storey Books.
- Malcolm, L.R. & Makeham, J.P.** 1986. *The economics of tropical farm management*. Cambridge University Press.
- Mason, J.** 1997. *Farm management*. Kangaroo Press.
- Mortenson, W.P., Klemme, R.M. & Luening, R.A.** 1991. *The farm management handbook*, 7th edition. Interstate Publishers.
- Norman, L. & Coote, R.B.** 1971. *The farm business*. Longman.
- Olson, K. D.** 2003. *Farm management: Principles and strategies*. Iowa State Press.
- Turner, J.** 1998. *Applied farm management*. Blackwell Science.
- Upton, M. & Anthonio, Q. B. O.** 1965. *Farming as a business*. Oxford University Press.

Useful web references

AgriBusiness.

<http://www.developmentgateway.com.au/jahia/Jahiacache/offonce/lang/en/pid/141>

Food and Fertilizer Technology Centre.

<http://www.fftc.agnet.org/library/list/pub/ac.html>

The Farmer-centred Agricultural Resource Management (FARM).

<http://dbtindia.nic.in/farm/page1.htm>

USAID ASIA.

http://www.usaid-ph.gov/environment%20cocoa_usaid.htm

International Rice Research Institute.

<http://www.irri.org/>

Asia Rice.

<http://www.asiarice.org/index.html>

India Extension Services.

<http://www.manage.gov.in/>

International Institute of Rural Reconstruction.

<http://www.iirr.org/Asia/pubasia.htm>

GLOSSARY

A **Accounting.** A comprehensive system for recording and summarizing business transactions.

Accounting period. The period of time over which accounting transactions are summarized.

Amortization. A periodic charge reflecting the decline in the recorded value of an intangible asset over a specific number of years.

Annuity. A series of equal periodic payments.

Appraisal. The process of estimating the market value of an asset.

Appreciation. An increase in the market value of an asset.

Asset. A physical or financial property that has value and is owned by a farm. Assets can be fixed, they are used over several years, for example tree crops. Assets can be current, that is they can be used in a short-time period, such as cash in hand, grain and feeds in store.

Asset valuation based in monetary terms. Regardless of asset nature and purpose, valuation must be consistent throughout, and the same method should be used every time assets are valued.

Asset valuation methods. Assets can be valued using various methods: market value, original cost or purchase price, lower cost or market price, farm production costs, original cost minus depreciation.

B

Balance sheet. A report summarizing the assets, liabilities and net worth of the farm at a specific point in time.

Benchmarking. This is the practice of identifying those farmers who are the best at farming, learning from them, how they do it, so that farm performance can be improved. Financial benchmarking involves looking at financial performance of successful farms. Technical benchmarking refers to technical information necessary to assist farmers in input allocation for crops and livestock.

Break-even analysis. Determining the level of sales at which an enterprise will just recover fixed and variable costs; a zero profit condition.

Break-even price. The selling price for which total income will just equal total expenses for a given level of production.

Break-even yield. The yield level at which total income will just equal total expenses at a given selling price.

Breeding livestock. Livestock owned for the primary purpose of producing offspring.

Budget. An estimate of future income, costs or cash flows.

C

Capital. The collection of physical and financial assets that have a market value.

Capital asset. An asset that is expected to provide services through more than one production cycle and can be used to produce other assets or services.

Capital budgeting. A process for determining the profitability of a capital investment.

Capital investment. A relatively long-term commitment of money to a project expected to generate positive net cash flows over time. For example, the storage of crops for later sale, the buying of a tractor.

Cash budget. A periodic projection of cash receipts and cash disbursements over a specific length of time.

Cash flow. The flow of funds in and out of a farm, or the positive (inflow) or negative (outflow) movement of cash caused by an activity over a specific period of time. Cash flow is used to monitor liquidity, manage and plan, and provide solutions to cash short falls.

Cash flow analysis. An economic method of analysis that employs the positive (inflow) and negative (outflow) movements of cash caused by an activity to determine the relative desirability of the activity. This usually involves discounted cash flow methodology. Cash inflows are generated primarily by the sales of crop and livestock. Cash outflows are such aspects as production costs, family living expenditures.

Cash flow budget. A projection of the expected cash inflows and cash outflows for a business over a period of time.

Cash flow cycle. The periodic movement of cash through an enterprise, caused by investment, operating and financing decisions.

Cash flow statement. A financial statement listing the cash impact of the activities of a business over a specific period of time, separating the cash flows into the areas of operations, investments and financing.

Collateral. Assets pledged as security for a loan.

Competitive enterprises. Enterprises for which the output level of one can be increased only by decreasing the output level of the other.

Complementary enterprises. Enterprises for which increasing the output level of one also increases the output level of the other.

Compounding. The process of determining the future value of an investment or loan, in which interest is charged on the accumulated interest as well as the original capital.

Cost of capital. The weighted average cost to a farm of all forms of long-term financing used; employed as a minimum standard for the return to be earned on a new investment.

Costs of production. Production costs are classified into two categories: variable and fixed costs. Variable costs are short-term costs usually within 1 year or within a production cycle and are defined as costs that occur only if something is produced, tend to vary according to size of enterprise and can easily be allocated to individual enterprises. Examples of variable costs are seed, fertilizer, hired labor. Fixed costs are costs that last more than a year and stay the same regardless of the volume of output and do not tend to alter with small change in the size of an enterprise. Examples of fixed costs are fencing, machinery, rent. The classification of a particular cost as variable or fixed depends partly on the nature and timing of the management decisions being considered.

Current ratio (CR). The ratio of current assets to current liabilities; a common measure of liquidity. When $CR = 1$, assets equal liabilities, little safety margin, little if any liquidity. When CR is greater than 1, assets more than liabilities, there is more safety, more liquidity. When CR is less than 1, liabilities more than assets, liquidity is less.

D

Data. Raw numbers and facts (e.g. prices, costs).

Debt (liability). An obligation to pay amounts due under specified terms, or to provide goods or services to others.

Demand. Demand represents which products buyers are willing and able to buy at certain prices. Demand is affected by the price of produce, taste, preferences, age and culture of buyers, income of buyers, prices of similar produce and the range of produce available.

Depreciation. The decline in an asset's value from its purchase value, through use to obsolescence that is recognized in the accounting system as a periodic allocation (write-off).

Depreciation cost. This is considered to reflect the fall in value of capital items in a time period. The annual cost of deprecation is calculated by subtracting the salvage value from the purchase price, divided by the useful life in years.

Discount rate. The interest rates used in calculating the present value of an amount to be paid or received in the future.

Discounted cash flow. The discounting methodology employed in determining the economic attractiveness of capital investment projects.

Discounting. The process of calculating the reduced value of a future sum of money in proportion to the opportunity of earning interest and the distance in time of payment or receipt.

Diversification. The production of two or more commodities for which production levels and/or prices are not closely correlated.

E **Economies of scale.** A production relationship in which the average total cost per unit of output decreases as output increases.

Efficiency. A measure used to verify the relationship between the resources used and the output (production) achieved. Can be divided into: economic and technical efficiency. Economic efficiency refers to the value of input used and produce sold. Technical efficiency is a way to measure the technical performance of crop and livestock management practices. It measures the farm's success in producing maximum output from a given set of inputs.

Enterprise. The crop and livestock production activities associated with a farm. The activities include such aspects as the production of rice, ducks, goats.

Equity (owners' equity, net worth). The amount by which the value of total assets exceeds total liabilities. The amount of the owner's own capital invested in the business.

F

Factors of production. These are resources that are used farmers, such as natural resources, (e.g. land and water), labour, the work of the farmer, farm family and hired labourers, capital, (e.g. buildings inputs).

Farm. A piece of land on which a farm household undertakes agricultural activities. A farm, apart from the land, may include structures erected on the land, such as wells, irrigation channels, fences, buildings. The farm also includes crops, livestock and other resources to support the livelihood of the farm family. The farm is part of a wider social and local community.

Farm household. Consists of the farmer, the farmer's family and their goals and preferences. The household is both a family and a business involved in production and consumption. It is a social unit, involved in the local community.

Farm inventory. A complete list of all physical assets at a specific point in time; typically of use at the end and beginning of the cropping year. It includes the value of every item of property and the amount of farm liabilities.

Farm management. Making efficient use of available resources and taking decisions to increase profit. It is concerned with achieving the right combination of available inputs in production of crops and livestock.

Farm records and accounts. Operating records such as farm map, inputs and materials, labor, livestock, income and expenses records. Financial records such as balance sheet.

Farmer's decision-making process. The decision process involves a series of steps: identifying the problem and collecting data and information; identifying and appraising alternative solutions; taking the decision, implementing the decision and monitoring the decision.

Farmer's objectives. The farmer's objectives will be influenced by the different goals of the farm household. Some of the objectives thus may conflict with other objectives. For example, the goal of increasing sales may conflict with the goal of ensuring stable food supply to the farm family. Some typical objectives are maximizing profits, increasing production, increasing sales, minimizing costs, avoiding debt, reducing risk.

Financial flexibility. The ability to maintain alternative choices for raising additional capital while preserving a capital structure appropriate to the risks and conditions of a company's business.

Future value (FV). The value that a payment or set of payments will have at sometime in the future, when interest is compounded.

G **Gross income or gross revenue.** This is the value of output of an enterprise. It assesses the performance of an enterprise purely in terms of the benefits it yields without considering the costs to produce it. The gross income is obtained by multiplying the total volume of the final marketable production by its average farmgate price.

Gross margin. The difference between gross income and variable costs, also called income above variable costs.

Gross margin analysis. A method of analysis that determines the relative excess of revenue over variable costs and judges the contribution made toward meeting fixed costs, overhead and profits.

I **Income statement (profit and loss statement).**
A report that summarizes the income and expenses of a business over a period of time.

Inflation. An increase in general in price levels.

Information. Data that has been processed so that it can be understood easily.

Input. A resource used in the production of an output. Inputs are seeds, fertilizers, insecticides.

Internal rate of return (IRR). The discount or interest rate at which the cash inflows and the cash outflows of an investment project result in a net present value of zero.

Inventory valuation. Any adjustment to recorded inventory values to correct differences between historical costs and current prices, also affecting costs of goods sold.

Investment. The commitment of funds for the purposes of obtaining an economic return over a period of time, usually in the form of periodic cash flows and/or terminal value.

K **Key informant interviews.** Interviewing knowledgeable and selected persons, (e.g. farmers, rural traders).

L **Leasing.** The process of contracting for (or buying) the use of assets owned by others over a specific period of time in exchange for a stipulated pattern of periodic payments.

Leverage. The process of using credit to increase the total capital managed beyond the value of owner's equity.

Liability. An obligation to pay a specified amount. Current liabilities are those debts that need to be repaid within the year, for example the principal on a loan, income taxes. Fixed liabilities are debts due over a year, for example payments to buy a tractor, due in installments over several years.

Liquid asset. An asset that can be converted rapidly into cash without suffering a significant reduction in value, usually classified as a current asset.

Liquidity. The degree to which a farm is able to generate cash to meet financial obligations as they come due.

Long-term debt. Any debt obligation of a farm with a maturity of more than 1 year.

M

Market value. The value for which an asset would be sold in an open transaction.

Marketing. The process of exchange between the farmer who sells and the buyer who purchases produce. Marketing involves assembling, sorting, packaging, transporting, storing, selling, processing, financing and taking risks. There are three important elements to marketing: the priority of the buyer, a process of selection and the building of relationships.

Marketing channel. This involves the various stages through which the produce passes from the time it leaves the farm to when it reaches the buyers. A number of marketing channels exist: supply directly from farm to final buyers, supply processing units, supply various retail outlets, supply via contract, etc.

Marketing costs. All transactions that occur along the various marketing channels entail costs. Main costs involved are: produce preparation, packaging, handling costs, transport costs, produce losses, storage costs, processing produce.

Marketing margin. This is the difference between the price of the produce at two different stages in the marketing process. The size of the marketing margin depends on the magnitude of the marketing costs and the amount of profit that buyers or traders make.

N

Net assets. Total assets less current liabilities, as recorded on the balance sheet.

Net farm income. The difference between total revenue and total expenses, including gain or loss on the sale of all capital assets.

Net present value (NPV). The difference between the present values of cash inflows and outflows from an investment, representing the net gain or loss in value expected relative to the interest standard applied.

Net profit. The difference between periodic revenues and related costs and expenses.

Net worth. The difference between the value of the assets owned by an enterprise and the value of its liabilities. Also called equity.

Non-cash items. An expense that does not represent a cash flow during the period (no expenditure of cash), such as depreciation.

O **Operating costs.** Costs for the purchase of inputs and services that are used up relatively quickly, usually in one production cycle.

Opportunity cost. The income that could be received by employing a resource in its most profitable alternative use.

Output. The outcome of a production process. For example rice is the output of a crop enterprise.

Overhead costs. Costs that are not directly related to the type and quantity of products produced.

P **Partial budget.** An estimate of the changes in income and expenses that would result from carrying out a proposed change in the current farm plan. It looks only at those income and expense items that are affected by the proposed change.

Participatory rural appraisal (PRA). Like RRA, but with the participation of local farmers.

Payback period. The length of time it takes for the accumulated net returns earned from an investment to equal the original investment.

Planning. A process of working things out before they happen. It typically involves the formulation of goals, identifying resources, identifying opportunities, estimating gross margins, choosing enterprises, preparing the whole farm budget and putting the plan into action. Typical plans are the whole farm plan, planning for the market, labour planning.

Present value (PV). The current value of a set of payments to be received or paid out over a period of time.

Price-maker. Farmers who can set the price for produce to be sold. This happens where the product is specialized (differentiated) and there are few buyers.

Price-taker. Farmers have no influence over the market price and have to accept the price given in the market. This happens where the number of buyers is large and the product sold is common and undifferentiated.

Principal. The amount borrowed or that part of the original loan which has not yet been repaid.

Profit. The value that remains after all costs, including opportunity costs, have been subtracted from gross income. It represents the farmer's gain.

R **Rapid rural appraisal (RRA).** A series of quick research techniques that generate results of less apparent precision. Typically conducted by a small group of people involved in conducting a rapid appraisal of an agricultural setting.

Rate of return. The level of earning attained or expected from an investment over a period of time.

Risk. A situation in which more than one possible outcome exists, some of which may be unfavourable.

Risk management. This involves anticipating an unfavorable event and reducing the chance of it happening, taking actions to reduce adverse consequences of risk should an unfavorable event take place.

S **Salvage value.** The market value of a depreciable asset at the time it is sold or removed from service.

Sensitivity analysis. A procedure for assessing the risk margin of a decision by using several possible prices and/or production outcomes to budget the results and compare them.

Short-term loan. A loan scheduled to be repaid in less than 1 year.

Solvency. The degree to which the liabilities of a farm are backed up by the assets. The relationship between debt and equity capital.

Sources of financing. Farmer's savings, borrowing from relatives and friends, bank credit, bank overdraft, grants, credit against goods, investments.

Sources of risk. The most common sources of risk are production, technical, marketing, financial, institutional and human.

Supplementary enterprises. Enterprises in which the level of production of one can be increased without affecting the level of production of the other.

Supply. Supply is what producers are willing and able to market at a certain price. Supply is affected by the price of produce, prices of inputs, costs of production, technological factors, climate, storage possibilities, transportation costs, imports and packing costs.

Survey. Interviews carried out with the aid of prepared questionnaires.

T **Terminal value (recovery value).** The value of any asset expected to be realized at the end of its economic life.

V **Value of farm production.** The market value of all crops and livestock and other income generated by a farm business, after subtracting the value of purchased livestock and feed.

W **Whole farm budget.** A projection of the total production, income and expenses of a farm business for a given whole farm plan.

Whole farm income. It is a year-by-year profitability of the farm as a whole. There are two ways of calculating whole farm income: 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 then adding them all up.

Whole farm plan. A summary of the intended volume and kinds of enterprises to be carried out by a farm business.

Working capital. The difference in value between current assets and current liabilities, a measure of liquidity.

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

This manual is intended for trainers of extension workers as they interact with farmers to find ways to increase their incomes through a better understanding of the principles and tools of farm management and planning. It provides a “remedial” course of training on subjects such as farm business analysis, enterprise budgeting and risk management, all of which will be of help to either subject matter specialists or front-line workers as they assist farmers develop the skills required to compete and succeed in their farm businesses.

Farm planning and management for trainers of extension workers

TRAINING
MATERIALS FOR
AGRICULTURAL
MANAGEMENT,
MARKETING
AND FINANCE

3

ASIA



Module 1 FARM MANAGEMENT



For further copies of this publication
and the information on FAOs activities
related to farm management
please contact:

Agricultural Management Group
Agricultural Support Systems Division
Food and Agriculture Organization of the United Nations
Viale delle Terme di Caracalla
00153 Rome, Italy

Fax: (+39) 0657056850

E-mail: AGS-Registry@fao.org

Web site: <http://www.fao.org/ag/ags/home/en/agsf.html>

This publication is also available on the Internet at:
<http://www.fao.org/ag/ags/resources/en/index.html>

Farm planning
and management
for trainers
of extension workers

ASIA

Module 1
FARM MANAGEMENT

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing and Multimedia Service, Information Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy or by e-mail to copyright@fao.org

© FAO 2006

FARM MANAGEMENT

Unit 1.1

The farm and its enterprises

Session 1.1.1 What is a farm? (75 minutes)

Session 1.1.2 Understanding farm enterprises
(15 minutes)

Unit 1.2

Farm management as a way to increase profit

Session 1.2.1 What is farm management? (120 minutes)

Session 1.2.2 Why is farm management important?
(15 minutes)

Session 1.2.3 What are farmers' objectives? (30 minutes)

Session 1.2.4 How do farmers decide? (15 minutes)

*This volume has been designed
as a complete working package which includes all components
of the training programme needed for Module 1.*

*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.*

FARM MANAGEMENT

The farm is a physical and socio-economic unit composed of the farm family. It consists of enterprises that compete for limited resources. The farm resource base is described in terms of land, labour and capital. The farmer is a grower as well as a manager. There is a need for farmers to have better farm management skills especially during times of rapid economic change.

By recognizing farmers as managers, we can understand better how and why they make certain decisions. It is important that as extension workers interact with farmers they understand both the farm environment and the decisions that farmers make so that they can provide relevant and meaningful advice.

The farm and its enterprises

This unit describes the farm and its enterprises. The farm is both a production and social unit. It consists of a resource base described in terms of land, labour and capital. These are often called inputs. The resources produce different farm products. This is done by converting farm inputs into outputs. Most farmers have a range of different products that they can produce. The farm is also a social unit comprising the farmer and the farm family. The farm has a strong interrelationship with the farm household. It is important that extension workers understand this broad concept of a farm.

What is a farm?

The concept of the farm is of central importance in farm management. Its essential feature is its productive resource base. This provides the inputs necessary to produce farm outputs or products. The resources make up the physical boundary of the farm. The farmer and farm family also form a social boundary where decisions are taken. So the real boundaries of the farm consist of both physical and social aspects. Together they form the farm household system that includes the decision-making unit (the farm family), the resource base and crop and livestock enterprises.

An understanding of what constitutes a farm and its enterprises is essential if farming is to be treated as a business. All aspects of the farm, its resources and enterprises have to be well-managed in order to increase productivity and profitability. The concept of a farm in this broader sense is very important for extension workers to understand.

Objectives



The purpose of this session is to assist the participants to visualize the physical boundaries of the farm and its household and the basic spatial arrangements of a farm common to their experience. At the end of this session, the participants are expected to have a better understanding of what constitutes a farm in terms of its physical and social boundaries. The participants are also expected to be able to recognize the farm enterprises. In this way they will gain a broader understanding of the whole system in which the farm operates.

Key points

1. A farm is a basic unit consisting of the physical boundary of the land and the social household unit. The physical unit of a farm business is composed of land, labour and capital assets.
2. Farm enterprises utilize inputs to produce outputs. Sometimes the output of one farm enterprise is the input of another.

Steps for instruction



1. Distribute Handout 1.1.1 (What is a farm?) before the session.
2. Divide the participants into groups. Ask each team to use their experiences as extension workers to identify and describe a different type of farm. Each farm should have a different main enterprise. Allow 15 minutes for discussion.
3. Distribute a posterboard, including coloured pens or crayons, to each group. Ask the groups to draw their selected farm, including the resource boundary and the farm enterprises.
4. Reassemble and give each team an opportunity to report to the class. Discuss the following features of each selected farm:
 - (i) What is the area of each?
 - (ii) What are the enterprises held?
 - (iii) How are the different enterprises interrelated?
 - (iv) What resources do these farms use?
 - (v) Are these farms mainly food production oriented, cash oriented or both? Allow 15 minutes for discussion.
5. Following the discussion, proceed to formally define a farm. Explain that a farm is composed of several enterprises, each with its own inputs and outputs. Show Slide 1 (The farm defined) to illustrate.
6. Show Slide 2 (Resources or factors of production) and discuss. During the discussion ask the participants to provide examples.

Evaluation: (i) review objectives in relation to key points, (ii) present drawings of typical farms and the explanations by each group.

Notes

What is a farm?

A farm is a piece of land on which a farm household undertakes agricultural activities as part of its livelihood. In addition to the land itself, a farm may include structures erected on the land, such as wells, irrigation channels, fences to control livestock, buildings to house livestock or to store farm produce, and a house in which the farm family lives. The farm also includes the crops, livestock and other enterprises to support the livelihood of the farm family. Some of the operations conducted on the farm include the cultivation of fields, the tending of orchards and vegetable gardens, the raising of livestock, as well as combinations of these activities.

Farms in Asia vary in size from small holdings of less than a hectare involved in subsistence production to large plantations covering thousands of hectares. The common feature of the farm is its "unity of management". A good understanding of the farm is of central importance to farm management.

In order to grow a crop or raise livestock, farmers need land and water, labour and capital. These are called resources and sometimes "factors of production". Resources are limited and farmers face problems of choice as to how to combine the resources they have in the best way and at the lowest cost in order to improve their income. Factors of production are described below.

Natural resources. These can be likened to "gifts of nature". They include land, water, soil and rainfall. These are resources that do not come from "human effort".

Land. A typical farm family may own or rent some land for cultivation. The farmer may also have land around the homestead that could be used for growing food, fruit or forage crops. Many farmers have the right to use what is called "communal land". This is land left aside as forest or for cattle grazing.

A farm consists of resources and enterprises

Resources or factors of production are limited

Water. Farmers will have some access to water. These might be springs, dams, wells and rivers or water collected from rainfall. This water may be on the land used by the farmer or it may be from a communal source.

Labour resources. This is human effort. It is needed on all farms. Farmers may have three different sources of labour: (i) the farm family (family labour), (ii) hired labour, (iii) labour provided through cooperation between members of the community where the farmer lives. A farmer may use any or all sources of labour on the farm, depending on the situation. The total effort from labour is provided by people using their skills and the time available.

Capital resources. These are simply resources that are produced as a result of "human effort". Land and labour can often be made more productive if the land is improved. Sometimes land is cleared, cultivated and even irrigated and drained. Supplies of water are often increased by the construction of dams, storage tanks and canals. Improvements on the land and the skills and knowledge obtained by the people are a form of capital.

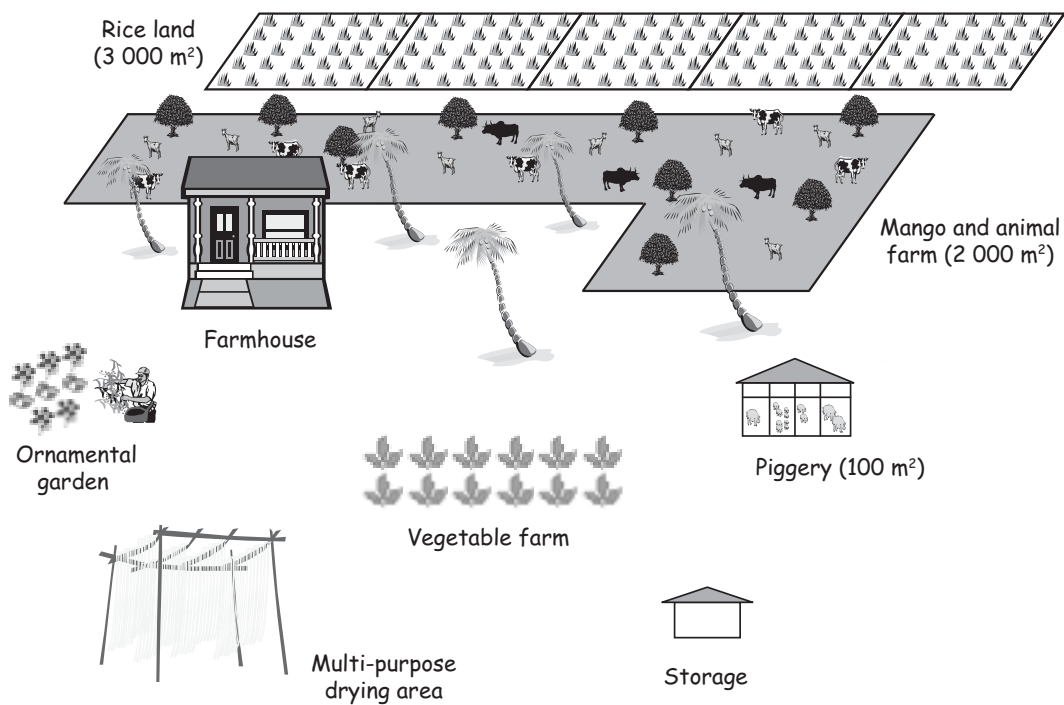
Capital can be divided into two types: durable and stock. Durable capital is made up of items that last for a long time, such as machinery, equipment and buildings. Stocks are inputs and materials, such as cash, seeds, animal feed and fertilizer that are usually used within a season.

Cash is used by farmers both small and large. However, small-scale farmers often use very little cash capital in farming. Most of the capital on their farms is found in kind. These include livestock, tools, equipment, buildings, land improvement measures, as well as stocks of seed, fertilizer and animal feed. Capital is an important resource for all farmers.

Farm resources have two characteristics: (i) they are scarce, (ii) they have alternative uses. The quality and quantity of the resource, the techniques employed and the skills used in obtaining the best possible combination all help to determine the quality and quantity of the final product. They all contribute to production by acting together.

Resources have alternative uses

Figure 1.1 – A typical farm layout



Notes

Training slides
for Session 1.1.1
What is a farm?

1 The farm defined

A farm is a piece of land on which a farm household undertakes agricultural activities as part of its livelihood

A farm may include structures erected on the land such as wells, irrigation channels, fences, buildings for livestock and storage, and a house for the farm family

The farm also includes the crops, livestock and other enterprises (e.g. vegetable gardens, orchards) which are conducted on the farm to support the livelihood of the farm family

Understanding farm enterprises

This session provides trainees with a definition of the farm enterprise and an understanding of the relationship between inputs and outputs. Different types of farm enterprises are also described.

Objectives

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



- define a farm enterprise;
- understand the different types of farm enterprise.

Key points

The farm enterprise is defined. It is noted that a number of outputs can be produced from different farm enterprises, which fall into three broad categories:

- complementary enterprises;
- supplementary enterprises;
- competitive enterprises.

Steps for instruction



1. Distribute Handout 1.1.2 (Understanding farm enterprises) among the participants before the session.
2. Discuss with participants the different types of enterprises found on the farms that they are familiar with.

3. Define farm enterprises with the support of Slide 3 (Definition of enterprise).
4. Explain the physical inputs and outputs of farm enterprises. Discuss the different types of outputs: (i) joint products, (ii) by-products, (iii) products consumed by the farm household.
5. Initiate a discussion on the different types of farm enterprises found on the farm. Use Slide 4 (Types of farm enterprises) to support the discussion. Encourage the participants to provide examples of competitive, supplementary and complementary farm enterprises.

Evaluation: (i) review objectives in relation to key points, (ii) have the participants cite examples of farm enterprise outputs that can also be used as inputs to another farm enterprise.

Notes

Understanding farm enterprises

Definition of enterprise

Farm enterprises are the crop and livestock production activities associated with the farm. These activities include the production of rice, potatoes, yams, beans and livestock.

Generally a farm is made up of several enterprises. Each farm enterprise has its own inputs and outputs. Inputs are the scarce resources used in the production process: the use of the land, the labour of farmers and their families and any workers that may be hired, the mental effort put into planning and managing, the seed for the crops and feed for animals, fertilizers, insecticides and other supplies, tools and implements, and draught livestock or tractors. All the things that go into agricultural production are inputs. The outputs are the crop and livestock products the farm produces.



*The farm
utilizes inputs
to produce
outputs*

Enterprise types

Sometimes the output of one farm enterprise can also be the input of another farm enterprise. For example, a farmer might produce rice, which is not only an output that can be sold to other farmers but also an input for livestock feed. Farm enterprises can be divided into three types: (i) competitive, (ii) supplementary, (iii) complementary enterprises. Each of these categories has different qualities.

Competitive enterprises. Enterprises "compete" when they use the same scarce resources. For example, if a farmer doesn't have enough labour to harvest two different crops at the same time, one crop can be increased only if the other is reduced.

Supplementary enterprises. Enterprises "supplement" one another when they use resources that might otherwise not be used. For example, a farm is located in an area that has early and late rains. It may be possible to grow one crop to use the early rains and a second crop that makes use of the late rains. Rain is a resource that is not left unused. The two crops do not compete for rain because they require the resource at different times of the year. In this case, the two enterprises are supplementary.

Complementary enterprises. Enterprises "complement" one another when they interact in a supportive way. For example, a farmer may keep poultry that produces manure. The manure can be applied as a fertilizer to crop enterprises. This relationship between the livestock and crops shows that the two farm enterprises are complementary.

Notes

Training slides
for Session 1.1.2
Understanding farm enterprises

3 Definition of enterprise

**Farm enterprises are the crop
and livestock production activities
associated with the farm**

Generally a farm is made up of several enterprises

Each enterprise has its own inputs and outputs

**Sometimes the output of one enterprise
is an input for another**

Farm management as a way to increase profit

Farming – as any business – requires management. Management involves making decisions on how to use the resources available to the farmer to produce crops or livestock, or other livelihood activities. Farmers are continually being exposed to changes that compel them to adjust their farm enterprises to increase profitability and become more competitive. These changes stem from the market as well as the development of new technologies and policy changes. They affect the type of enterprises held, the quantity of inputs and materials required and the method and destination of produce sold. Farmers need better farm management skills to respond to these changes.

This unit examines some of the common problems faced by farmers. It illustrates how farm management involves better decision-making in order to address questions such as: (i) Where and to whom to sell produce? (ii) What enterprises to manage? (iii) How best to allocate resources? The unit identifies the qualities of a good farmer, examines factors causing changes in the farmer's environment and underlines the common principles of farm management when undertaking the key farm management functions (diagnosis, planning, implementation, monitoring and evaluation).

What is farm management?

This session highlights the role of the farmer as cultivator or livestock producer and manager. Just like any business, farming requires management. The common problems faced by farmers are identified. This is the starting point for producing a definition of farm management.

It is useful to identify the type of problems that farmers as managers face. Farmers need to possess the skills to be able to respond to these issues and ensure that their farm business is competitive. A good farm manager must be able to recognize these problems and identify the appropriate solutions to increase farm profitability.

Objectives

At the end of this session the participants should:



- understand the concept of farm management and recognize its importance;
- identify and discuss some of the more important functions of farm management;
- recognize the importance of setting objectives;
- understand the steps involved in the decision-making process.

Key points

1. Some of the common problems facing farmers.
2. What is farm management?
3. The risks involved in farming.
4. The limited resources available to the farmer.

5. Some of the typical decisions farmers make on their farm.
6. The qualities of a good farm manager.
7. Factors causing changes in the farmer's environment.
8. Common stages of management (diagnosis, planning, implementation, monitoring and evaluation).

Steps for instruction



1. Distribute Handout 1.2.1 (What is farm management?) among the participants before the start of the session.
2. Facilitate group discussions on the common problems faced by farmers. Ask participants to think about farmers with whom they collaborate in their day-to-day work and recall some of the problems that these farmers face. These might include:
 - lack of capital;
 - high cost of inputs;
 - limited processing technologies;
 - high interest rates of lending institutions;
 - low product prices;
 - uncontrollable weather conditions;
 - occurrence of pests and diseases;
 - underdeveloped marketing system;
 - lack of infrastructure such as farm to market roads;
 - fluctuating prices of farm products.
3. Training exercise 1 (Common problems facing farmers) should be distributed. The problems identified should be ranked in order of importance. The participants working in groups should categorize those problems that are farm management related and within the capacity of the farmer to address. Finally the trainees should identify ways of dealing with these problems.

4. Training exercise 2 (What is farm management?) should be distributed. Participants in groups should be asked to list the main tasks in which farmers are involved. Brainstorm with participants through a question and answer session or alternatively have the trainees work in pairs or small groups.
5. Show Slide 5a (Day-to-day decisions of farm managers) and encourage the participants to develop their own definitions of farm management based on these kinds of decisions. Now discuss with the class some formal definitions of farm management with the assistance of Slide 5b (Some definitions of farm management).
6. Distribute Training exercise 3 (Qualities of a successful farmer) among the participants. Begin by introducing the notion of a "good" farm manager of a "successful" farm business. Initiate group discussions on the qualities that a "good" manager should possess. Some of the characteristics are likely to include:
 - ability to self-organize and motivate people;
 - good understanding of technical issues;
 - ability to communicate with other people;
 - ability to take decisions;
 - willingness to learn new technologies;
 - innovative enterprising and resourcefulness.

Prompt the discussion to cover some of these attributes. Ask each group to present their results to the class. This should be followed by discussion.

7. Note the difference between the farm manager and the farmer-manager. The former only manages the farm while the farmer-manager manages both the farm and the household. Discuss the idea that farm management is more complex than managing an industrial enterprise, note the risks involved in farming and the limited farm resources available to the small-scale commercial farmer. A good farmer-manager should know how to combine these resources in an effort to achieve the business goals.

What is farm management?

The role of the farmer is twofold. The farmer is at the same time producer and manager. The first role of the farmer is to take care of plants and livestock in order to produce useful products. For crops this includes the preparation of the seedbed, the sowing of the crop, the elimination of weeds, the management of soil moisture and measures for the control of pests and diseases. For livestock this includes herding and feeding, protecting from diseases and where necessary providing housing.

Another role of the farmer is that of manager and decision-maker. Where the skills of production are mostly physical, the skills of management are largely mental backed up by will. They involve making decisions or choices between alternatives. The decisions that farmers must make as managers include choosing between different crops that might be planted in each field, choosing the livestock to be kept on the farm, and deciding how to distribute available labour time among different tasks, especially at times of the year when several tasks need to be carried out concurrently. They also involve choices as to what and how many draught animals need to be kept for work in the field.

As agriculture becomes more market driven and commercial in nature, the farmer must develop skills in buying and selling. Farmers must decide whether or not to purchase improved seeds, fertilizers, pesticides and new implements. They must decide whether or not to employ additional labour in farming. They must decide how much of each crop to be kept for home consumption and how much to be sold. They must decide when to sell the produce and to whom to sell it.

*The farmer
is both
producer
and manager*

*As manager
the farmer
needs to
develop new
skills*

*Farm
management
decisions
are diverse*

Some of the day-to-day decisions taken by farmers as managers include:

- making choices of different types of crops and livestock activities;
- using available resources to the best advantage in production and post-harvesting operations;
- selecting the most appropriate technology to use;
- deciding where and to whom to sell produce and at what prices.

*Definitions
of farm
management*

Some common definitions of management include "making decisions to increase profit", "making efficient use of available resources", "using, managing and allocating resources". These decisions imply the following:

- *first*, the existence of a goal or goals;
- *second*, that there are resources that can be used or allocated;
- *third*, that the resources to be used or allocated have more than one possible use.

Farm management is about producing with limited available resources (e.g. land, labour and capital). Farmers need to know how to combine these resources in the best possible way in order to assure the best outcome. They require improved management skills to become more competitive as farming becomes more market driven. Farmers need to develop managerial skills so that they are better equipped to take advantage of opportunities and to make their farms as productive as possible while profits from farming increase.

The farmer, however, is also a member of a family and the local community. While most of the decisions related to farming are made by the individual farmer, decisions are made as part of a family. There is a division of labour within the family and different farming tasks are often carried out by different members. But the ways in which these tasks are divided between family members vary from one culture to another. The farmer desires what is best for all members of the farm household, and they have a direct influence on the decisions taken. Nevertheless, the desire of the farmer to secure a better living for the family is a compelling factor to improve the profitability of the farm business.

Successful management of the farm requires the farmer to have the following qualities:

- the ability to organize and achieve specific goals and targets set by the farm household;
- a good understanding of technical issues involved in the production and marketing of farm products;
- the ability to communicate with people to obtain good information;
- the capacity to make informed and relevant decisions.

Individual farmers may already possess some or all of these qualities. However, in order to achieve their desired objectives, the farmer must develop marketing and production plans and make estimates on future events and forecasts. They also need to adapt their decisions to the changes that regularly occur in the broad environment within which farming takes place. Farmers require the skills and knowledge to adapt effectively to external changes and ensure greater competitiveness.

The farmer and the farm family is the unit of decision-making

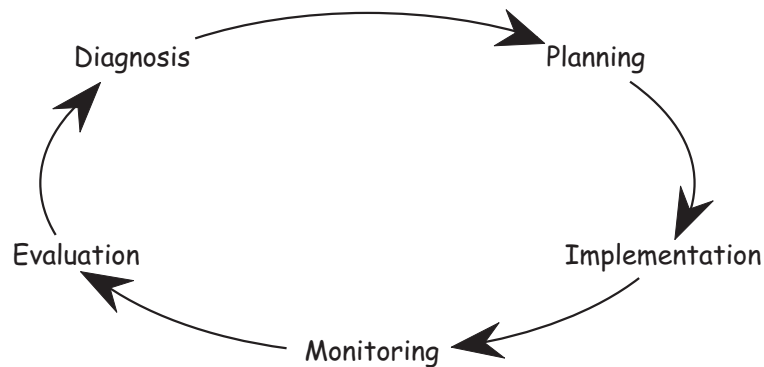
Qualities for successful management sometimes need to be acquired

Farm management takes time and work, and this is just as critical to success as the planting, growing, harvesting and marketing of a crop or a livestock product. Good farmers need to learn from their day-to-day experience and recognize their mistakes, become accountable for their actions and be willing to change their thinking based on new information.

The common functions of management that help farmers deal with changes are shown in the diagram and described below.

Figure 1.2 – The functions of farm management

*Farm
management
is a cycle
of decisions*



Diagnosis. This involves analysis of the current situation of the farm and its enterprises and identifying the constraints and opportunities to increase profitability. It entails analysing the causes of problems and identifying ways of overcoming them. Diagnosis is conducted for a single farm enterprise or alternatively for the whole farming operation.

Planning. This is considered the most fundamental and important principle. It entails deciding on a course of action, policy and procedure, and assessing the future physical and financial performance for each enterprise and for the farm as a whole. Plans are prepared based on resources available and on personal objectives.



Implementation. Plan implementation includes the purchase of the inputs and materials necessary to put the plan into effect and overseeing the process. This is a very important function within the farming context because in dealing with crops and livestock, the farmer is faced with a large number of daily decisions that need to be taken.

Monitoring and evaluation. This involves checking on the actions and progress achieved. Monitoring implies not just scrutiny of the progress of some change in the farming pattern but also checks on the whole system over time. Monitoring is a tool for evaluating the physical and financial performance of the farm business. The results of monitoring are used as inputs in making decisions on the day-to-day activities of the farm.



Evaluation is used to assess the outcomes and impact of the farm business. Evaluation involves making comparisons of the farm business performance over time and between farms. The results are used to identify strengths and weaknesses. The process is a cycle.

Table 1.1 — Overview of farm management decision support tools

Tools	Skills required	Data requirements	Enterprise level			Farm level		
			Diagnosis	Planning	Monitoring	Diagnosis	Planning	Monitoring
Constraints analysis	Basic	Basic				X		X
Enterprise budgeting	Basic	Moderate	X	X	X			
Partial budgeting	Advanced	Complex	X					
Labour profiles	Basic	Moderate				X	X	X
Cash flow	Basic	Complex				X	X	X
Whole farm planning	Advanced	Complex					X	X
<i>Investment appraisal</i>								
Rate of return	Basic	Basic		X			X	
Discounting	Advanced	Complex		X			X	
Sensitivity	Basic	—	X	X	X	X	X	X

Table 1.2 — Objectives, strengths and weaknesses of farm management decision tools

Tools	Objectives	Strengths	Weaknesses
	<i>Diagnostic and budgetary tools</i>		
Constraints analysis	Diagnose the constraints on the farming system and formulate strategies that build on opportunities	<ul style="list-style-type: none"> The exercise is participatory and can be conducted without the collection of quantitative data It is a comprehensive whole farm diagnostic tool that takes into account all factors that affect farm profitability Relatively easy to apply 	<ul style="list-style-type: none"> Requires external facilitation A general weakness with some participatory methods is that they seek to gain consensus among participants Effectiveness depends largely on the skills of the trainer
Enterprise budgeting	Diagnose enterprise profitability; select between enterprises for planning and monitor enterprise performance (gross margins, net margins)	<ul style="list-style-type: none"> Gross margin is simple to use Data requirements are generally minimal It can be used during all stages in the management cycle from planning to monitoring 	<ul style="list-style-type: none"> Often difficult to forecast yields and prices especially when farmers are considering introducing new enterprises Trainers may face difficulties in assigning values for family labour Sometimes different conventions are used for allocation of fixed costs Need for clarity on definitions and methods of analysis Accuracy is needed to relate gross margin to a full production period (e.g. with products that extend beyond a one year time frame: banana, pineapple, livestock) Difficulty in demarking costs as fixed and variable. This requires some judgement (e.g. between casual and permanent labour) Difficulty allocating variable costs between joint enterprises (e.g. for intercropped enterprises, and where forage or pasture is consumed by more than a single livestock species) Requires knowledge by the decision-maker of the most limiting resource (i.e. whether to use return per area of land, per person day)

Table 1.2 – Objectives, strengths and weaknesses of farm management decision tools (continued)

Tools	Objectives	Strengths	Weaknesses
Partial budgeting	<p>Estimate the potential profitability as a result of small changes in technologies of farm enterprises. It gives an idea whether a change is likely to be better or worse in terms of profitability as compared with an existing situation</p>	<p><i>Diagnostic and budgetary tools</i></p> <ul style="list-style-type: none"> • Relevant and useful to assess simple changes • Data requirements are minimal • Accounting is usually straightforward and accurate 	<ul style="list-style-type: none"> • Difficulties in determining all factors that could affect the change • Not always possible to quantify and include in the budget all the factors bearing on the decision • Sometimes confusing to set out the partial budget and avoid double counting • Open to errors in computation
Labour profiles	<p>Help farmers assess whether the supply of labour available to the farm is at least equal to the demands imposed by a given plan</p>	<ul style="list-style-type: none"> • It provides a visual appraisal of labour for individual enterprises and the farm as a whole over different periods of time • It can be approached in a participatory way as a qualitative tool • Provisions can also be made for gender differences • It is a straightforward task to construct a labour schedule 	<ul style="list-style-type: none"> • Demanding of data and may have to rely on farm records • Often difficult to differentiate between the performance of different family members and the demands of the jobs performed on the farm • Difficult to account for seasonal types of work

Table 1.2 — Objectives, strengths and weaknesses of farm management decision tools (continued)

Tools	Objectives	Strengths	Weaknesses
<i>Diagnostic and budgetary tools</i>			
Cash flow	Assess the flow of money into the farm from sales and the flow of money out of the farm through purchases and other payments	<ul style="list-style-type: none"> Useful in determining the financial situation of the farm household as a whole An important tool that complements farm and enterprise profitability Can be conducted as part of a participatory exercise Is straightforward and easy to conceptualize and apply 	<ul style="list-style-type: none"> More useful on a household level than enterprise level Sometimes it is difficult for a family to estimate the sources and uses of cash by recall The information may need to be collected through record keeping Often difficult to estimate household expenses and revenues Respondents often overestimate expenses and underestimate costs
Rate of return	Make decisions about whether or not to buy a capital asset	<ul style="list-style-type: none"> Concerned with a common and important farm management decision Minimal data requirements Easy to calculate 	<ul style="list-style-type: none"> Does not take into account unevenness of cash flows over time Arbitrary depreciation charges may distort time distribution of actual cash flows Discriminates against short-term investments if return on initial capital is estimated and against long-term investments if average capital is used

Table 1.2 – Objectives, strengths and weaknesses of farm management decision tools (continued)

Tools	Objectives	Strengths	Weaknesses
<i>Investment appraisal</i>			
Payback	Make decisions about whether or not to buy a capital asset	<ul style="list-style-type: none"> Concerned with a common and important farm management decision Simple to use and understand Requires minimal data Useful for investments where more distant future returns uncertain 	<ul style="list-style-type: none"> No account taken of distribution of net cash flows during payback period No account taken of subsequent profitability No account taken of other aspects of the investment decision (risk, salvage value, size of investment)
Internal rate of return	Make decisions about whether or not to buy a capital asset	<ul style="list-style-type: none"> Concerned with a common and important farm management decision that deals with the time value of money Rates of return are easy to understand and apply Useful to use to evaluate a single investment 	<ul style="list-style-type: none"> Complex to understand the arithmetic Need to understand when best to apply this method <i>vis-à-vis</i> others Need to set appropriate discount rate for comparison; this is sometimes difficult Requires a negative net cash flow at the outset Application could be laborious as it depends on trial and error Data requirements higher than with undiscounted methods and requires good estimates of future costs and benefits
Net present value	Make decisions about whether or not to buy a capital asset	<ul style="list-style-type: none"> Concerned with a common and important farm management decision, deals with the time value of money Useful to compare competing farm investments Easier to calculate than IRR Not upset by negative cash flow 	<ul style="list-style-type: none"> Complex to understand the arithmetic Need to understand when to best apply this method <i>vis-à-vis</i> others Difficulties in selecting appropriate interest rate for discounting Data requirements are higher than with the undiscounted methods and requires good estimates of future costs and benefits

Unit 1.2 – Training exercise 1 Common problems facing farmers

Tasks

Participants working in groups should categorize problems that are considered farm management related and are within the capacity of the farmer to address.

List main problems facing farmers

Rank main problems according to importance

Each group should then discuss
and agree on ways of dealing with these problems

Unit 1.2 - Training exercise 2

What is farm management?

Tasks

Trainees working in pairs or small groups list what they consider to be the main tasks in which farmers are involved. The answers should be arranged into three categories as listed below.

Planning

Implementation

Monitoring

Unit 1.2 – Training exercise 3 Qualities of a successful farmer

The aim is to think about the qualities that are required for farmers to be successful in managing their farms. Participants should draw on their field experiences, discuss these with other trainees and perform the tasks below.

Tasks

1. Brainstorm within the group and identify the qualities of a successful farmer using the table below as a guide. Some consensus should be reached on the most desirable characteristics. (Examples of some of the qualities are listed below with an indication of a format to record the rankings.)
2. Rank the qualities in order of importance in the blank column.

Qualities of a successful farmer	Ranking/priority
1. Education	
2. Age	
3. Ability to work with people	
4. Knowledge of farming practices	
5. Relevance of technical knowledge and qualification	
6. Knowledge of market and marketing	
7. Experienced in farming	
8. Has wide range of contacts	
9. Willingness to learn	
10. Innovativeness/resourcefulness	
11. Credibility	
12. Has foresight	
13. Enterprising	
14.	
15.	

Use this as background information for a class discussion

Training slides
for Session 1.2.1
What is farm management?

5a Day-to-day decisions of farm managers

**Making choices of different types of crops
and livestock activities**

**Using available resources to the best advantage
in production and post harvesting operations**

Selecting the most appropriate technology to use

**Deciding where and to whom to sell produce
and at what prices**

*Formal definitions of farm management can be based
on the decisions farmers must make*

5b Some definitions of farm management

Making decisions to increase profit

Making efficient use of available resources

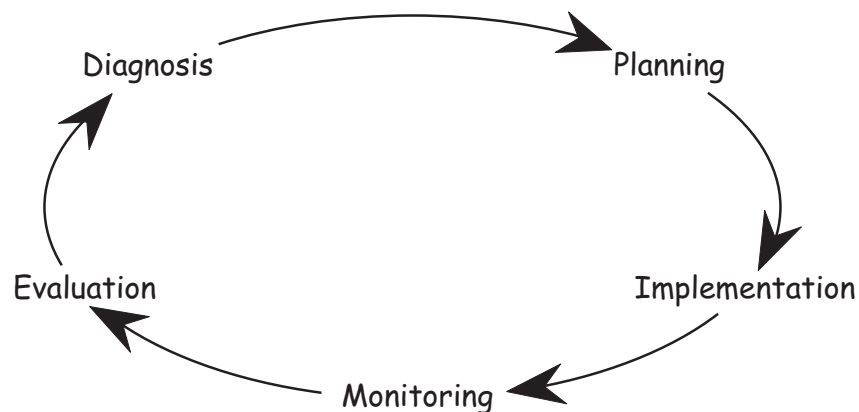
Using, managing and allocating resources

Doing something with limited available resources

Farmers need to develop their skills so that they are better equipped to take advantage of opportunities and to make their farms as productive as possible as profits from farming increase

Module 1, Unit 1.2, Session 1.2.1

6 The functions of farm management



Farm management is a cycle of decisions

Module 1, Unit 1.2, Session 1.2.1

Why is farm management important?

This session describes the changes that are occurring in agriculture and suggests the need for better farm management skills to adapt to these changes.

Farmers operate within a dynamic and constantly changing environment. It is necessary that they possess the skills to make sound farm management decisions for better farm performance.

Objectives



At the end of this session the participants should understand that farm management is valuable in providing farmers with the skills to cope with the rapid changes occurring in agriculture.

Key points

1. The market-related factors that cause changes in the farmer's environment are: (i) changing prices, (ii) changing resource availability, (iii) changing technologies.
2. While farmers as decision-makers are able to control the use of their own resources, they cannot control factors and conditions surrounding them.
3. Improving farm management skills is the best way to prepare farmers to cope with changes in agriculture.

Steps for instruction



1. Distribute Handout 1.2.2 (Why is farm management important?) before the session.
2. Explain that farmers operate within a dynamic and constantly changing environment, and although farmers as decision-makers are able to control the use of their own resources, they cannot control factors and conditions surrounding them.
3. Discuss the changing environment within which farmers work. Conduct a brainstorming session with participants on the type of changes that are occurring and the sources of change. Encourage the participants to provide examples.
4. Bring to the attention of the participants that the changes occurring are linked primarily to market-related factors: (i) changing prices, (ii) changing resource availability, (iii) changing technologies. During the discussion show Slide 7 (Changes in farming practices).
5. Refer again to the functions of farm management (diagnosis, planning, implementation, monitoring and evaluation) from the previous session. Discuss how these aspects of farm management can help farmers deal with a constantly changing environment.

Evaluation: (i) review farm management in relation to key points, (ii) refer to Handout 1.2.2, (iii) ask the participants to give their own examples of the factors discussed.

Notes

Why is farm management important?

Although farmers are able to control the use of their own resources, they cannot control the factors and conditions surrounding them. They have to constantly assess the potential benefits of technologies and reassess the relationship between inputs and outputs. When new technologies are introduced, increases in production take place, and a larger portion of produce reaches the market.

In this event, market prices may fall and affect the relationship between inputs and outputs. Farmers have to respond to these changes effectively. Improving the management skills of farmers is the best way to prepare them to adapt to and cope with the external changes that affect agriculture.

Some of the changes are linked primarily to the following factors:

- changing prices;
- changing resource availability;
- changing technologies.

Changing prices

Prices of inputs and outputs are constantly changing. It is likely that a change in the price of an output (product) will affect the overall profitability of the farm business. A high cost of inputs without a corresponding increase in the price of outputs will translate to lower profits for the farmer. Similarly, the same cost of input coupled with a lower output price will also result in a lower level of profit.

*Farming
is constantly
changing
and farmers
need to take
new decisions*

*Profit
depends on
changing prices
of inputs and
outputs*

The farmer has to adapt to changes that affect agriculture

Changing resource availability

The quantity of the resources available also has a direct affect on the farm business. For example, problems of obtaining capital could limit the use of fertilizers and pesticides. This in turn can affect yield. And yield affects the level of sales made. This often results in lower levels of farm profit. Farmers have to evaluate their decisions in relation to the resources available. A good farmer as manager should be able to determine the combination of inputs that give the highest returns and eventually profit.

Changing technologies

The relationship between input and output changes as technological advances are made. For example, a new variety of rice may become available that produces a yield similar to currently available varieties but with better disease resistance, lower fungicide requirements and, hence, lower production costs. Similarly, a new high-yielding technology may be developed so that with the same or an even lesser amount of input a higher yield can be attained. This change could also reduce the production cost per unit of output. Better farm management practices require that the farmer adopts those technologies where the production cost per unit is lowest so that profit is maximized.

The farmer as manager has to be prepared for these changes and ready to respond to them quickly.

Notes

Training slides
for Session 1.2.2
Why is farm management important?

7 Changes in farming practices

Changes in prices
(higher or lower prices for products
and costs for inputs)

Changes in resource availability
(problems concerning resources may affect yields
and yield affects the level of sales and farm profit)

Changes in technologies and practices
(better farm management practices can result
in increased profit for the well informed farmer)

Preparing for session 1.2.3
What are farmers' objectives?

Teaching methods
Brief presentation, brainstorming, list results,
formal class discussion, summarize findings
and draw conclusions

Duration: 30 minutes

Learning support materials
Handout 1.2.3 (What are the farmers'
objectives?), Slide 8 (Farmers' objectives),
Slide 9 (Understanding farmers' objectives),
Slide 10 (Commercial farming)

Notes

What are farmers' objectives?

The objectives of farmers are presented in this session. The conflicting nature of these objectives is highlighted. Special emphasis is placed on the goal of increasing profit, which can often satisfy other goals that farmers set.

It is important for extension workers to realize that farmers have different goals and some may appear to compete. When conflicting goals emerge, profit is not always the number one priority. However, profit is important to ensure the survival of the farm business and the future of the farm family in agriculture. Finally, it should be realized that the money generated from the farm business can help the farm family realize some of their other goals.

Objectives



Participants should recognize the importance of profit as an objective of farmers, even though it may not be the foremost goal. Profit is important to ensure the sustainability and survival of the farming business in a changing world.

Key points

1. Farmers' objectives are both social and economic in nature as well as immediate and long term.
2. The "human element" in farming is important. An increase of profit may not be the main objective.
3. It is important to understand the significance of farm profit and how it is needed to ensure survival and sustainability of the farm business.
4. In the long term, farm profit must be sufficient to cover family expenses and production costs related to the farm.

Steps for instruction

1. Distribute Handout 1.2.3 (What are farmers' objectives?) among the participants before the start of the session.
2. Begin with a discussion on objectives of farmers and why is it important to know them. Discuss how the farm has dual roles: production and consumption. Show Slide 8 (Farmers' objectives).
3. List the objectives of farmers on a posterboard or flip chart. The trainees are likely to include some of the objectives listed below. Use the list to prompt the participants into discussion.
 - profit maximization;
 - increased production;
 - increased sales;
 - minimized costs;
 - avoidance of debt;
 - achieving a "satisfactory" standard of living;
 - reduction of the risks involved in farming;
 - transference of the farm to future generations;
 - ensuring stable food supplies for the family.
4. Present Slide 9 (Understanding farmers' objectives) that summarizes the discussion. Highlight some of the consumption goals of the farmer. Make reference to the "human element" of farming. Discuss why it is important for extension workers to understand the expectations of farmers and their families.
5. Through discussion with the participants show how farmers' objectives may compete or conflict. Draw out examples of conflicting goals from the participants.

What are farmers' objectives?

For a more complete understanding of farm management, it is important to recognize the human element of farming — the expectations of farmers and their families, their goals and preferences. Farming is both a way of life and a business. The farm family is involved in both production and consumption. Examples are:

- The farm is a production unit where crops are grown and livestock are reared.
- The farm as a business utilizes inputs and materials (fertilizer, labour, machinery).
- The produce from farming is both sold on the market and used for family consumption (staple food, milk, eggs).
- The farm family is also a unit of consumption. It consumes products produced by other farmers and purchased in the market.

On a farm the connection between production and consumption is closely linked. Farm households have more than a single purpose and with it different goals that guide their choices between alternative actions. Some of these are:

- maximizing profits;
- increasing production;
- increasing sales;
- minimizing costs;
- avoiding debt;
- achieving a "satisfactory" standard of living;
- reducing the risks involved in farming;
- transferring the farm to the next generation;
- ensuring stable food supplies for the family.

Both production and consumption are objectives of farmers

Profit is the difference between income and costs

Farmers' objectives often conflict

Often the pursuit of one objective could conflict with another. For example, the goal of increasing sales may conflict with the objective of ensuring stable food supply for the family. The volume of produce sold in the market is often the surplus of produce above family consumption requirements. Similarly, trying to avoid debt may conflict with the goal of maintaining a satisfactory standard of living.

In most cases, Asian farmers lack the necessary capital to finance their farm operations. Maintaining a high standard of living often entails additional expenses beyond the financial reserves of the farm family. In order to generate the income necessary to raise the standard of living, there is often a need to expand farm operations and this in turn could require additional financing. The two objectives are often in conflict.

Extension workers need to understand farmers' goals. The questions to ask are:

- To what extent do farmers aim at maximizing profits?
- To what extent are farmers willing to take risks?
- Do farmers desire more leisure time?

Extension workers need to understand farmers' goals

All decisions that farmers make relate to their goals and objectives. The goals and objectives affect their enterprise decisions: (i) What to grow? (ii) How to grow? (iii) How much to grow? (iv) For whom to grow? Farmers may have more than a single goal and these goals guide their choices between different courses of action.

The goal of profit maximizing may not be so important for the farmer. The farmer may prefer to select an enterprise that produces a lower but more stable profit. For example, a decision taken to select a farm enterprise that maximizes profit might result in the detrimental effect of wider variations in yields from year to year. The non-financial goals of farmers and their families also need to be realized. Therefore, a better understanding of the reasons behind many farmers' decisions is important. These considerations limit the extent to which profit is the main driving force.

Although farmers have multiple and often conflicting objectives, they need to generate a minimum level of profit. Profit is important to bring about a good living for the farm family. It generates the capital needed for reinvestment in the farm. It also provides the purchasing power for medical and health services, education, recreation and food. In the long term, farm profit must be sufficient to cover both production costs related to the farm and family expenses. Thus the commercial nature of farming is vital.

After minimum profit levels are attained, other objectives can be pursued. The bottom line is that market-oriented farming requires a business approach in order to survive. The challenge facing farmers in times of competition is how to increase profitability.

Profit is important for commercial farming

Notes

Training slides
for Session 1.2.3
What are farmers' objectives?

8 Farmers' objectives

Profit maximization

Farm expansion

Increased output/sales

Reduce costs

Avoid debt

Reduce risk

*The ultimate goal is to ensure
a stable food supply for the family
and to attain a satisfactory standard of living*

9 Understanding farmers' objectives

Extension workers need to ask ...

**To what extent do farmers
aim at maximizing profits?**

**To what extent are farmers
willing to take risks?**

*It is important
for extension workers to
understand the expectations
of farmers and their families*

**Do the farmers desire
more leisure time?**

Module 1, Unit 1.2, Session 1.2.3

10 Commercial farming

Farmers have multiple and often conflicting objectives

**Farm profit must be sufficient to cover
production related costs as well as farm expenses
before other objectives can be pursued**

**Profit generates the capital needed to invest in the farm
and provides money to pay for health, education,
recreation and food**

*Minimum profit is needed for the farm business to survive
... the challenge is how to increase profitability*

Module 1, Unit 1.2, Session 1.2.3

Preparing for session 1.2.4
How do farmers decide?

Teaching methods
Lecture, trainer/participant interaction
and discussion

Duration: 15 minutes

Learning support materials
Handout 1.2.4 (How do farmers decide?),
Slide 11 (Steps in the decision-making process)

Notes

How do farmers decide?

Steps in the decision-making process are discussed in this session. In agriculture the decision-making process is seen to be different from most businesses because of the biological nature of farming as well as the time involved in producing an output.

Farmers make decisions every day of their lives. Extension workers have an important role in supporting them. An understanding of the farmers' decision-making process should provide extension workers with greater insight into the life of the farmers, their motives and the type of decisions they make.

Objectives

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



- know the steps in the decision-making process;
- recognize the difference between the decision-making process in agriculture and that of other business enterprises.

Key points

1. Steps in the decision-making process:
 - identify the problem and collect data/information;
 - identify and analyse alternative solutions;
 - make the decision and adopt the best alternative;
 - implement the decision;
 - follow up and monitor the decision.
2. Decisions based on the time horizons taken into account are short-, medium- and long-term decisions.

Steps for instruction

1. Distribute Handout 1.2.4 (How do farmers decide?) to the participants in advance of the session.
2. Explain how farmer decision-making is related to the objectives or goals set.
3. The trainees need to understand that their job as extension workers is to support farmers in making decisions that help them to achieve their objectives. They also need to understand that this process requires a number of steps to be taken by the farmer. Show Slide 11 (Steps in the decision-making process). This should provide extension workers with greater insight into the farm management decisions that farmers make.
4. Introduce the idea that the decision-making process in agriculture is different from most other businesses because of the biological and environmental nature of farming and the usually longer gestation time of the production process.
5. Explain the different time horizons concerned when making short-, medium- and long-term decisions, and show how they affect decision-making.
6. Initiate a discussion of the decision-making process. Ask participants to discuss their experiences with farmers and to think about how farmers in practice actually do decide.

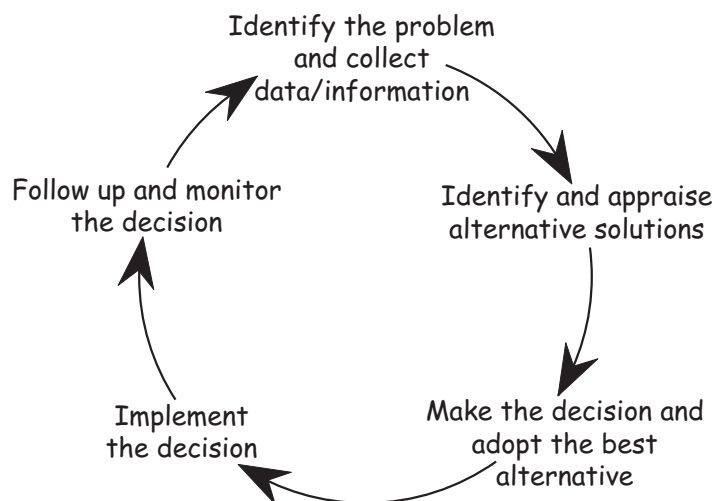
Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 1.2.4.

Notes

How do farmers decide?

Farmers continually make decisions relating to their farm business. The steps taken in the decision-making process are shown in the diagram and discussed below. It is the role of extension workers to support them in this process.

Figure 1.3 – Steps in the decision-making process



How farmers make decisions

Step 1

Identify the problem and collect data/information

Recognize the existence and nature of the problem. This calls for the collection of data on current farm performance as the basis for making improvements to the farming system. For example, data could be collected to analyse farm performance in comparison with other similar farms in the vicinity. The problems identified might be the result of the use of obsolete or inappropriate production techniques, constraints on marketing and limited alternative market channels.

Step 2**Identify and appraise alternative solutions**

Possible solutions to the identified problems may include increasing the use of purchased inputs and materials, and introducing improved bio-fertilizer and pest management methods. The consequences of the alternative actions would be evaluated to assess their likely effect on farm performance.

Step 3**Make the decision and adopt the best alternative**

Which of the alternatives is most likely to improve farm performance? Since it is rare that all the information required in making a decision would be available, selection often requires judgement by the farmer before a decision is made. The final decision, therefore, will frequently reflect the farmer's attitude towards risk and, more specifically, the perceived risks of each of the alternatives.

Step 4**Implement the decision**

Farmers have a role in implementing decisions and enforcing the action needed to ensure that they are followed. On a small farm, very often different members of the farm family undertake the planning and implementation of tasks.

Step 5**Follow up and monitor the decision**

Once the first four steps have been completed, it is useful to review the results of the decisions made. Having identified the changes, it is important to continue monitoring progress to ensure that the new plans are being followed and that revised targets are being achieved.

Time horizons

There are three different time horizons within which decisions are taken in agriculture. These are:

Short term. These are decisions concerned with the daily organization of farm operations, such as sowing, weeding, fertilizing, harvesting and storage. They also involve culling of stock, veterinary interventions and artificial insemination of livestock.

Medium term. These are concerned with the annual organization of the farm, for example preparing the cropping plan, deciding on the amount of labour to use, and whether to introduce new crop varieties and animal husbandry practices.

Long term. These decisions relate to the long-term nature of the farm, for example whether or not to expand farm size through purchasing or leasing land, and whether or not to construct buildings and/or purchase machinery and equipment.

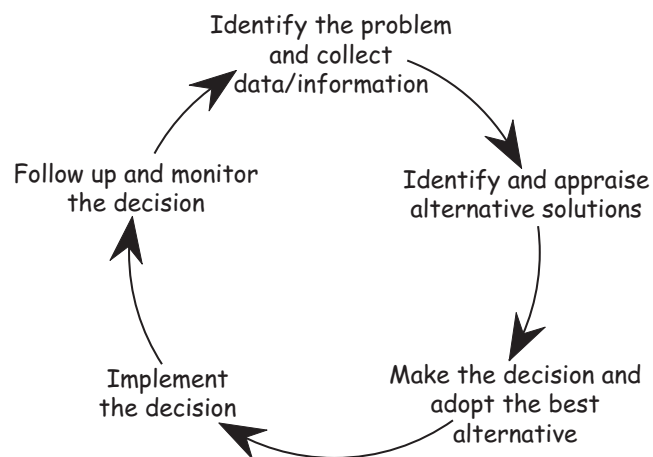
Short-term decisions are operational in nature, medium- and long-term decisions are concerned with capital investments. This concept will be further discussed in Module 6 (Farm investment and risk).

*Farm
decisions
change
over time*

Notes

Training slides
for Session 1.2.4
How do farmers decide?

11 Steps in the decision-making process



How farmers make decisions

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 1 describes the farm and its enterprises and defines the role and importance of farm management. It discusses the functions of management, the type of decisions that farmers take, farmer's objectives and goals and the decision-making process that farmers follow in making better farm management decisions for today's competitive business environment.

Farm planning and management for trainers of extension workers

TRAINING
MATERIALS FOR
AGRICULTURAL
MANAGEMENT,
MARKETING
AND FINANCE

3

ASIA



Module 2 FARM RESOURCE ASSESSMENT



Farm planning
and management
for trainers
of extension workers

ASIA

Module 2
**FARM RESOURCE
ASSESSMENT**

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing and Multimedia Service, Information Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy or by e-mail to copyright@fao.org

© FAO 2006

FARM RESOURCE ASSESSMENT

Unit 2.1

Farm data collection

Session 2.1.1 Data and information (45 minutes)

Session 2.1.2 Farm records and accounts (45 minutes)

Session 2.1.3 Inventory of farm resources (45 minutes)

Unit 2.2

Farm resource appraisal

Session 2.2.1 Farm assets and liabilities (60 minutes)

Session 2.2.2 Asset valuation (60 minutes)

Session 2.2.3 Farm balance sheet and net worth
(45 minutes)

Session 2.2.4 Sources of finance (30 minutes)

*This volume has been designed
as a complete working package which includes all components
of the training programme needed for Module 2.*

*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 RESOURCE ASSESSMENT

Farm data collection is important as a source of information on farm performance not only for farmers but also for government and non-governmental organizations. Records of assets and liabilities and careful preparation of balance sheets give a clear picture of financial standing. This information can improve the quality of the diagnosis of farming problems and the identification of constraints and opportunities. It is also useful for planning and analysing at policy and programme levels.

Farm data collection

This unit discusses the importance of farm data and its use as information to enable farmers to make better decisions. Farm management decisions on what to grow, how to grow, and where and when to sell require reliable data from various sources. Farmers need data to make informed choices. Reliable farm data are essential to enhance competitiveness of the farm business and to increase profits. The different sources of data available to farmers and various methods of data collection to use are also discussed.

Data and information

This session defines data and differentiates it from information. The different types of data and information available to extension workers and farmers are also listed and described. Elaboration of the two sources of data, (i) primary, (ii) secondary, is given as well as common methods of farm data collection.

Data is needed for farmers and extension workers to enable better informed management decisions regarding farm operations. It is essential for both farmers and extension workers to collect appropriate data so that the right type of information is available to improve their decision-making capability.

Objectives

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



- understand the difference between data and information;
- learn the process of transforming data into information;
- understand the different sources and uses of data;
- recognize the types of information needed for market-oriented farming;
- understand the different methods that could be employed in collecting farm data;
- understand the importance of data and information gathering in planning and analysing the farm business.

Key points

1. Data refers to raw numbers and facts such as prices, costs and quantities.
2. Information is processed data.
3. Information is crucial for better decision-making.

4. The two major sources of data are primary and secondary.
5. Data can be collected as cross-sectional or time series.
6. Data can be quantitative or qualitative.
7. Different types of data are required: technical, economic, social, political and institutional.
8. The common methods of collecting data are:
 - B surveys
 - B rapid rural appraisal (RRA)
 - B participatory rural appraisal (PRA)
 - B informant interviews

Steps for instruction



1. Distribute Handout 2.1.1 (Data and information) before the start of the session.
2. Define data and explain the way data can be converted into information. Show Slide 12 (Data and information). Explain that data refer to raw numbers and facts, such as prices, costs and quantities, and that information is processed data.
3. Show Slide 13 (The processing of data) and discuss the importance of information for effective decision-making.
4. Using Slide 14 (Sources of data) explain the difference between primary data (farmers) and secondary data (government publications, NGOs and private agencies) and discuss further whether sources of data can be obtained.

5. Discuss the different methods of collecting data: (i) farm management surveys, (ii) rapid rural appraisal, (iii) participatory rural appraisal, (iv) informant interview or focused dialogue. Show Slide 15 (Methods of data collection). Encourage discussion of the different methods and verify if participants are familiar with them or alternatively if they are new to them. Provide time to describe and explain new methods. Outline in which situations each method is best suited and provide examples.

6. Explain that farmers rely heavily on their personal experience as an additional source of data and information. It should be emphasized here that experience can be effectively supported by the provision of supplementary data.

7. Show Slide 16 (Technical and physical information) and Slide 17 (Economic, social, institutional and political information) in turn and encourage discussion among the participants on where they can obtain this kind of information locally. Ask them to recount their data collection sources.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 2.1.1.

Notes

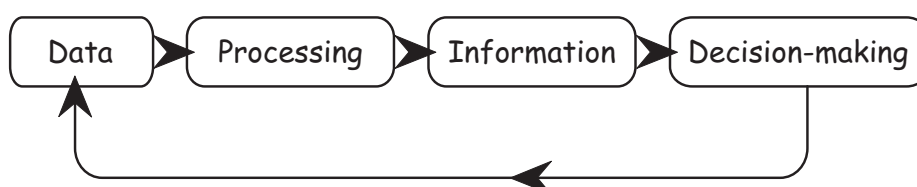
Data and information

Farmers are continually exposed to new data that affect how their farms are organized, what, how and when products are produced, and what type and quantity of inputs should be used.

Data refer to the raw numbers and facts such as prices, costs and quantities. Information is data that is processed in a way that is useful for decision-making. The relationship between data, information and decision-making is shown in the diagram.

Data are raw numbers, and information is processed data

Figure 2.1 – The processing of data



Primary and secondary data

Primary data are collected directly from farmers and include data on production, yield, rates of fertilizers and chemicals.

Secondary data are based on published statistics and are taken from sources such as government ministries, public organizations, banks and the private sector. Examples of the type of secondary data collected might include national production levels, product prices, input costs and agricultural policies.

Primary and secondary data are the two main sources

Methods of data collection

The most common methods for collecting farm data are:

Surveys. This is a method used in particular in farm management. With the help of a prepared questionnaire, surveys are carried out by enumerators who interview farmers. The results often provide information on background conditions that can be found in a given area. However, surveys that require travel costs, and personnel and logistic support may be expensive.

Rapid rural appraisal (RRA). As the name implies, these are quickly conducted appraisals of the agricultural setting, often using small teams, which include identifying constraints and opportunities in farming. RRA consists of a series of techniques for "quick and dirty" research that produces results that are sometimes less precise than more comprehensive surveys. However, they are often of great value because they are generated quickly.

Participatory rural appraisal (PRA). This is similar to RRA, but with the explicit participation of local farmers. PRA can be used, for example, to obtain information about village conditions and to assess the production potential, economic feasibility and social acceptability of particular technologies. Monitoring and evaluation of specific project activities can also be done in a timely and focused manner using PRA techniques.

Key informant interviews. This is the process of collecting data from selected persons, including farmers, with specific knowledge about particular types of farming. Visiting key informants and local organizations are not only useful to gather information, but also provide an excellent opportunity for raising awareness and building relationships for cooperation.

A checklist of possible key informants and their knowledge base is shown in Table 2.1.

Table 2.1 – Checklist of possible key informants

Key informants	Knowledge base
Extension/development workers	General farming situation, macro- and micro-level constraints
Research workers	Potentials, opportunities
Village elders	Historic developments, tradition, customs, consensus
Priests	Religious obligations, beliefs, taboos
Women	Gender issues, decision-making, family member roles
Local businessmen, traders, merchants	Marketing channels, banking, loan conditions, prices, trade regulations, transport, storage facilities
Women farmers	Socio-religious-cultural and economic constraints on them as producers
Progressive farmers	Development opportunities, adoption of new technologies, prerequisites for adoption
Staff of development projects or agencies	Local experience
Managers of processing factories, commodity delivery schedules	Demand projections, pricing, quality issues, quota systems

Identify those who are in the best position to assist in making better decisions

The data collected are often supplemented by quantitative measurements such as field area, yields and input use.

Sources of data and information

Most farmers rely heavily on personal experience. However, current market prices and past information on price trends are useful forms of information. Information is available from the following sources:

Farm records are a source of historical information

Farm records. The best source of historical production and marketing information is farm records. Crop yields, livestock production and cost information generated from farm records form the basis for information on productivity and profitability and indicate how successful farmers are in managing the farm.

National statistics are aggregated farm level data

Production and market information. Historical yield and price information is often available from national statistical services. This information is very useful. National data is sometimes calculated as an average of the information collected from a number of farms. As such it does not tell farmers what level of yields or prices that they can expect. Comparing historical farm yields to that of similar farms in the same area is an additional source of information and is often an effective way of improving farm performance.

Other farm information. This includes information from the agricultural statistics services, national extension services, and other government agencies as well as consulting advisory services, newsletters, magazines, agricultural suppliers and neighbours. These are all valuable sources of information for the farmer.

A checklist of categories of data to facilitate decision-making is shown in Table 2.2.

Table 2.2 – Checklist of data and information

General information	Specific data
<p>Technical and physical</p>	<p><i>Soil characteristics</i> (soil type, texture, soil analysis) <i>Climate and weather</i> (rainfall, relative humidity, temperature, hurricanes, droughts) <i>Land characteristics</i> (slope, topography, elevation) <i>Production capacity</i> (yield per acre or per hectare) <i>Production technology</i> (fertilizer and diseases control, seed variety, harvest and post-harvest operations) <i>Labour inputs</i> (source of labour, seasonal labour distribution, gender)</p>
<p>Economic</p>	<p><i>Buyers</i> (quality requirement, terms of payment) <i>Supply and demand conditions</i> <i>Sources of credit and conditions</i> (terms of payment, interest rate)</p>
<p>Social</p>	<p><i>Community culture</i> (customs, beliefs and traditions) <i>Community organizations</i> (farmer cooperatives, associations, civic and religious groups) <i>Community facilities and services</i></p>
<p>Institutional</p>	<p><i>Support service organizations</i> (both public and private)</p>
<p>Political</p>	<p><i>Government policies and priorities</i></p>

A wide range of data is required for better d

Notes

Training slides
for Session 2.1.1
Data and information

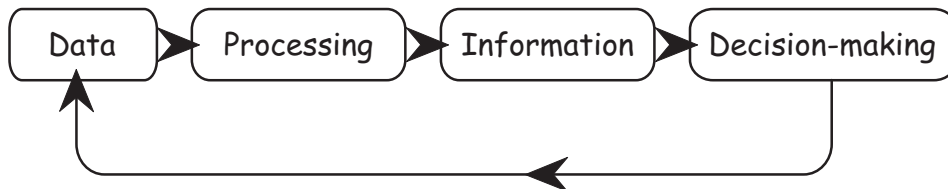
12 Data and information

Farmers are continually exposed to new data and information that affect how their farms are organized
(what, how and when products are produced and what type and quality of inputs should be used)

Data refer to raw numbers and facts
(such as prices, costs and quantities)

Information is data that can be processed in such a way that it becomes useful for decision making

13 The processing of data



The relationship between data, information and decision-making

Module 2, Unit 2.1, Session 2.1.1

14 Sources of data

Primary and secondary data
are the two main sources

Primary data

Collected directly from farmers and include data on production, yield, rates of fertilizers, chemicals

Secondary data

Based on public statistics from sources such as government ministries, public organizations, banks, the private sector

Module 2, Unit 2.1, Session 2.1.1

15 Methods of data collection

Surveys

(used in particular in farm management with the help of a prepared questionnaire)

Rapid Rural Appraisal (RRA)

(quickly conducted appraisals of the agricultural setting)

Participatory Rural Appraisal (PRA)

(similar to RRA but with the participation of local farmers)

Key informant interviews

(interviews with those having specific knowledge)

Module 2, Unit 2.1, Session 2.1.1

16 Technical and physical information

Soil characteristics

(soil type, texture, soil analysis)

Climate and weather

(rainfall, humidity, temperature, hurricanes, droughts)

Land characteristics

(slope, topography, elevation)

Production capacity

(yield per acre or per hectare)

Production technology

(fertilizer and disease control, seed variety, harvest and post-harvest operations)

Labour inputs

(source of labour, seasonal labour distribution, gender)

Module 2, Unit 2.1, Session 2.1.1

Farm records and accounts

This session explains the uses of farm records and accounts and discusses the various types of farm records needed to help the farmer in managing the farm. Farm records and accounts not only aid the farmer and the extension worker in evaluating farm performance, but are also useful for policy-makers and other government agencies that are concerned with improving the welfare of farmers and the entire agricultural economy.

Objectives



At the end of the session participants are expected to:

- know the many uses of farm records and accounts;
- know the different types of farm records needed to help the farmer in managing the farm.

Key points

1. Farm records and accounts can be used as tools to assist farmers in:
 - evaluating the farm's financial position in relation to its objectives;
 - measuring economic performance;
 - controlling the daily routine operations of the farm;
 - evaluating alternative strategies for controlling the available resources;
 - financing the farm;
 - meeting legal requirements.
2. Farm records are also used by policy-making bodies and other government agencies.

3. Operational or physical records serve the everyday management requirements of farmers and are aimed at providing information to better manage specific activities, enterprises and farm operations.
4. Financial records can be used as data sources for statistics, tax purposes and as a basis to evaluate the farm. The most commonly used financial records are balance sheets.

Steps for instruction



1. Distribute Handout 2.1.2a (Farm records and accounts) and 2.1.2b (A farm map, records and accounts) before the start of the session.
2. Underline the importance of farm records and accounts and the fact that they can be used as tools to assist farmers in farm decision-making. Show Slide 18 (Uses of farm records and accounts). Ensure the attention of the participants by asking them whether records are kept by farmers in the districts or municipalities that they are responsible for. The trainer should further ask the participants, "Being extension workers, what have you done to encourage farmers to keep records?"
3. Show Slide 19 (Most commonly used records) and bring to the attention of the participants the two types of farm records emphasized in this session. These are operating or physical records (a farm map, and records for field material, inputs, labour, machinery and equipment, livestock/poultry, marketing, income and farm expenses) and financial records (balance sheets). The balance sheet will be discussed in greater detail in Session 2.2.3.

4. Explain the importance of farm records. Ask participants what their views are on this and why they regard farm records as important. Following the discussion, show Slide 20 (Importance of farm records and accounts). Review the key points of the slide with the participants. Ensure that they adequately understand the use, relevance and importance of farm records.

5. Ask the participants to review the sample formats given in Handout 2.1.2b (A farm map, records and accounts) and compare them with the descriptions found in Handout 2.1.2a (Farm records and accounts). Have the participants discuss the type of data that they would require (for each of the formats) and how they would record it.

6. Explain the value of drawing a sketch map of the farm and show its use in planning and monitoring. Get comments from the participants of some of the difficulties in preparing a farm map and initiate a discussion on its potential use. Show Slide 21 (Sketch of a farm).

7. Briefly introduce the subject of a financial record and describe its potential use in analysing the financial performance of the farm.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 2.1.2a and Handout 2.1.2b.

Notes

Farm records and accounts

Farm records provide useful information for extension workers to help farmers increase farm profits, adjust farm practices, select enterprises, determine the best use of available resources, obtain credit and formulate production plans. Accounts are drawn up and are used to measure the performance of the farm.

More specifically, farm records and accounts can be used to assist farmers in:

- evaluating the farm's financial position in relation to its objectives;
- measuring the outcome of farm management decisions and enabling farmers to compare their performance with other neighbouring farms;
- regulating the daily routine operations of the farm and enabling the farmer to know what has been spent and done at any given time during the year;
- evaluating alternative strategies for controlling the available resources and thereby helping the farmer to identify where the enterprise is strong and where it is weak;
- financing investments;
- meeting legal requirements.

Apart from its potential use in farm management decision-making, farm records are sometimes used to formulate national policies, programmes and action plans. Various types of farm records are needed to assist the farmer to monitor and evaluate farm performance. Physical and technical records help the farmer diagnose the various aspects of the farm and prevent emerging problems. Some of the most commonly used farm records are outlined on the following pages.

Farm records are necessary ...

... for better decision-making ...

... to assist farmers in the tasks leading to better management ...

... are useful to formulate national policies and plans

Operating or physical records

These serve the needs of everyday farm management and are aimed at managing specific activities or separate operations. A series of blank record forms in Handout 2.1.2b (A farm map, records and accounts) can be used for collecting everyday farm data. Some of the most common non-financial records are discussed below.

The farm map. Often a sketch of the most important features of the farm. Alternatively it could be based on aerial photos. Fields should be properly identified and the size determined to assist in planning activities for possible investments such as land levelling, irrigation or drainage systems. An example of a simple farm map is shown in Handout 2.1.2b.

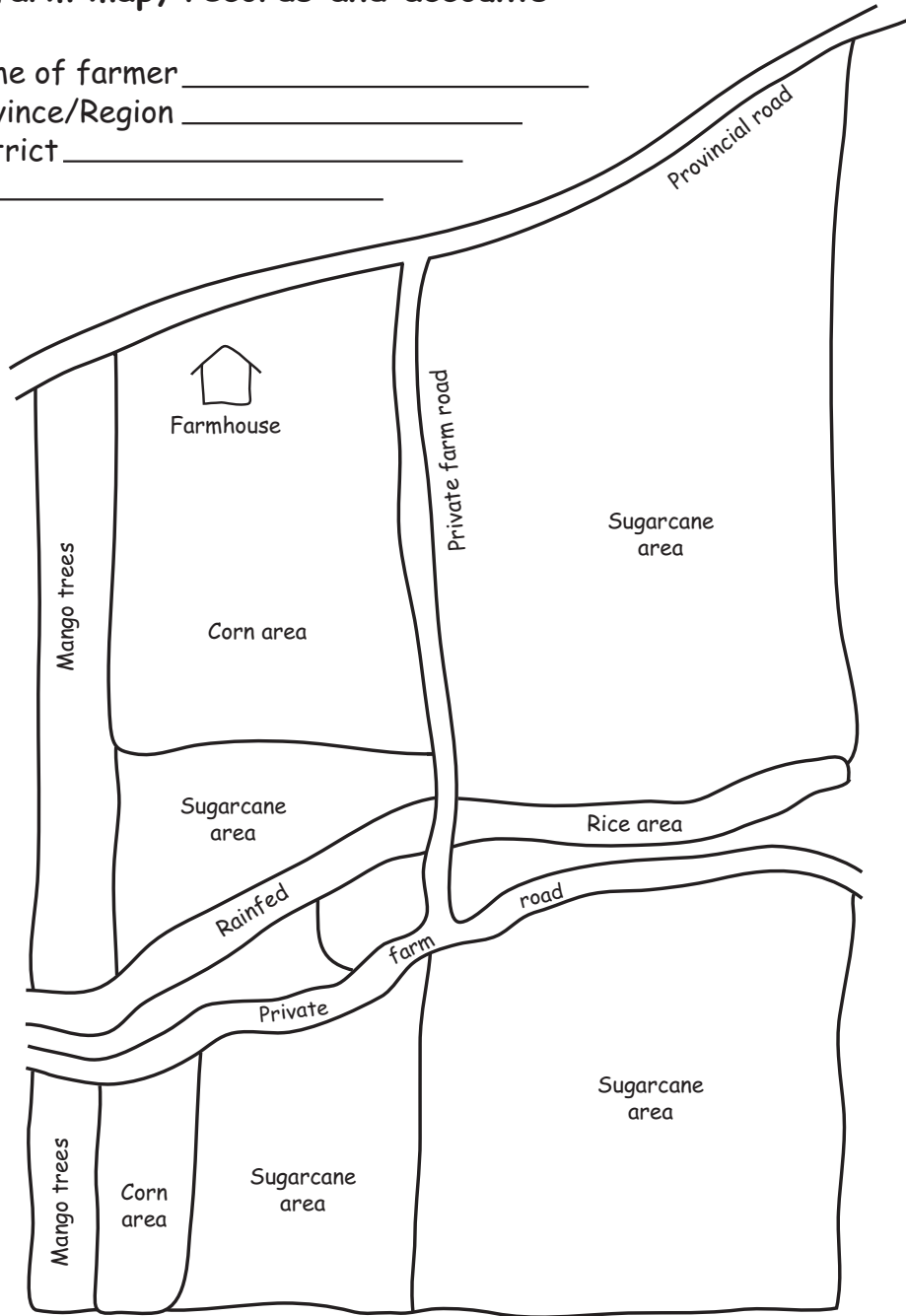
Field material input records. Provide the farmers with valuable information on various material inputs (e.g. seeds, fertilizer and pesticides) and cultural practices used in the production process.

Labour records. Show basic information relating to the number of person-days used for a particular task and the corresponding monetary value.

Livestock/poultry records. Information kept by the farmer on feeds, concentrate use, veterinary supplies and miscellaneous items. These records provide the livestock producer with facts to design, implement, monitor and evaluate current livestock enterprises as well as to detect, diagnose and prevent emerging problems.

A farm map, records and accounts

Name of farmer _____
Province/Region _____
District _____
Lot _____



Note: a simple farm map, like the one above, can be drawn by hand

Record form – Field material input

Enterprise _____ Area planted _____				
Date	Input	Quantity	Price per unit (\$)	Value (\$)
Total				

Record form – Labour

Enterprise _____ Area planted _____						
Date	Operation	Family (person/days)	Hired			Total labour (days)
			per/days	\$/day	value	
Total						

Record form – Livestock/poultry

Type _____ Number raised _____									
Date	Operation	Feeds		Concentrate		Veterinary supplies		Others	
		qty	cost (\$)	qty	cost (\$)	qty	cost (\$)	qty	cost (\$)

Record form – Income

Enterprise _____		Area planted _____					
Date	Description	Sold			Value of produce (\$)		
		quantity (kg)	price per unit (\$)	value (\$)	consumed	stored	given away
Total							

Record form – Farm expenses

Enterprise _____		Area planted _____		
Date	Description	Number/ quantity	Price per unit (\$)	Value (\$)
Total				

Notes

Training slides
for Session 2.1.2
Farm records and accounts

18 Uses of farm records and accounts

**Evaluation of the farm's financial position
in relation to its objectives**

Measurement of economic performance

Regulate daily routine operations

Control available resources using alternative strategies

Financing investments

Meeting legal requirements

19 Most commonly used records

Operating or physical records

(a farm map, and records for field material, inputs, labour, machinery and equipment, livestock and poultry, marketing, income and farm expenses)

Financial records

(the most commonly used financial statement is the balance sheet which summarizes the assets used and the sources of finance invested in these assets at a given point in time)

Module 2, Unit 2.1, Session 2.1.2

20 Importance of farm records and accounts

Farm records and accounts provide information for extension workers to help farmers ...

Increase profits

Adjust practices

Select enterprises

Best use available resources

Obtain credit

Formulate production plans

Farm records assist farmers in the tasks leading to better management

Module 2, Unit 2.1, Session 2.1.2

Inventory of farm resources

It is useful for both extension workers and farmers to understand the importance of conducting a farm inventory. This is often an important first step in analysing the farm business. Comparison between beginning and end of year inventories illustrates how the financial position of the farm changes over time.

In this session the need for taking a farm inventory, recording resources and methods of valuation is explained. It is important that information be collected efficiently and in a timely manner. This requires a systematic listing of farm assets so that all aspects of the farm are covered. A well-conducted farm inventory provides the basis for a thorough financial assessment of the farm business.

Objectives

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



- know what a farm inventory is, why it is useful and the best time to conduct the exercise;
- understand the importance of taking a farm inventory;
- know the components of the farm inventory;
- know how to conduct a farm inventory and assign values;
- understand the methods of valuation and computation of depreciation of farm machinery, buildings, tools and equipment.

Key points

1. *Definition:* The farm inventory is a complete list of all physical assets at a specific date.
2. *Use:* It is essential at both the beginning and end of a season or year. The ending inventory of the previous year serves as the beginning inventory of the current year. A comparison between the beginning and end of the year shows how the financial position of the farm has changed after one production cycle or year.

3. *How:* There are different methods of assigning values to the farm inventory and the calculation of depreciation for some of the items that wear or tear over time.
4. *Timing:* The appropriate time to take the inventory is about one to two weeks before the start of the new crop year, when most farm products have been harvested and disposed.
5. A visit to a farm prior to making an inventory is recommended. If there is time, participants should be given a chance to talk with the farmer(s). A farm visit should involve the following:
 - B Make a general inspection of the farm assets.
 - B List items of property according to main groupings: land, farm buildings, draught animals and livestock, machinery, tools and equipment, farm inputs on hand, crops on hand and standing.
 - B Indicate the year when each item of property was acquired and its acquisition cost.
 - B Indicate total useful life of each item from year of purchase.
 - B Calculate rate of depreciation and determine its value.

Note: If a farm visit is not possible, encourage the participants to draw on their experiences to generate the information necessary to formulate a farm resource inventory.

Steps for instruction



1. Distribute Handout 2.1.3 (Inventory of farm resources) before the start of the session.
2. Define the farm inventory and show Slide 22 (Inventory of farm resources). Explain the usefulness of taking the farm inventory at the beginning and end of the year. Discuss the most appropriate time to take the inventory, pointing out the advantages of taking an inventory at the beginning of the year.

3. The participants should be taught how to conduct a farm inventory by explaining to them the series of steps to be followed. Show Slide 23 (Visiting a farm prior to inventory).
4. Explain the concept of capital asset, salvage value and capital depreciation. It should be pointed out that there are several methods of calculating depreciation, but for the purpose of the training and for ease of understanding, only the straight-line method will be taught.
5. The participants should be informed that when calculating depreciation, especially using the straight-line method, assignment or determination of salvage value is often arbitrary because there is no universal formula that can be used for this. For simplicity and ease of application, 10 percent of the purchase price is sometimes assigned as salvage value for vehicles and machinery and 5 percent for tools and equipment.
6. Show how depreciation is actually computed by way of a concrete example. Ensure that participants fully understand the process by calling upon them to compute depreciation for one or two farm assets.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 2.1.3.

Notes

Inventory of farm resources

The farm inventory is a complete list of all physical assets at a specific point in time. The list indicates the value of every item of property. The kinds of farm properties will vary depending on the type of farm enterprise.

A farm inventory is essential at both the beginning and end of a farming year. The "ending" inventory of the previous farming year is useful as the "beginning" inventory of the succeeding year. Comparing the beginning and end of the year inventories shows how the financial position of the farm has changed after one production year.

The appropriate time to take the inventory is about one to two weeks before the start of the new farm year when most farm products have been harvested and disposed. During this period, farm products, inputs and materials on hand are low so that the measurement of quantities and the estimation of values of various items is easier.

Preparing to make a farm inventory

If your instructor has arranged a farm visit it will help the class prepare an inventory of farm resources. When making a farm visit do the following:

- Make a general inspection of farm assets.
- List resources according to main assets: land, farm buildings, draught animals and livestock, machinery, tools and equipment, farm inputs and crops on hand, including standing crops.
- Determine and list the year when each asset was acquired, its costs and total useful life. (The explanations on the following pages and in Table 2.3 show how a farm inventory is completed.)

The farm inventory lists all the physical assets on the farm

Table 2.3 — A sample form for estimating the value of farm assets

Items	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Year of purchase	Year of purchase	Purchase price (\$)	Total useful life	Salvage value (\$)	Annual depreciation value (\$)	Accumulated depreciation value (\$)	Beginning (no.)	Beginning (value)	Ending (no.)	Ending (value)
Land	1995	1995	1 000					1 ha	1 200	1 ha	1 200
Buildings	1995	1995	5 000	10	500	450	3 150	1	1 850	1	1 400
<i>Machinery/equipment/tools</i>											
Plough	1998	1998	100	5	0	20	80	1	20	1	0
Harrow	1999	1999	100	5	0	20	60	1	40	1	20
Sprayer	2000	2000	120	5	0	24	48	1	72	1	48
Tractor	1999	1999	1 000	10	100	90	630	1	370	1	280
Others											
Work animals	1998	1998	300	5		60	240	1	60	1	0
<i>Production inputs</i>											
Fertilizer	2002	2002	20					50 kg	20	0	
Seed	2002	2002	10					50 kg	10	0	
Chemical	2002	2002	5					1 l	5	0	
								Total	3 647	Total	2 948

Table 2.3 outlines the steps to be taken when preparing an inventory of farm resources. It also provides a format suitable for completing an inventory. The following is a column-by-column explanation of each work item. (The information provided for a tractor will be used for the required estimates and for the series of calculations that follow.)

Column (1)

List the items according to main groupings
(land, buildings, machinery/equipment/tools, supplies)

Column (2)

Indicate the year each asset was purchased
(a tractor was purchased in 1999)

Column (3)

Indicate the purchase price/acquisition cost of each item
(the cost of the tractor was \$1 000)

Column (4)

Indicate the total useful life of each item
(the life span of the tractor is 10 years)

Column (5)

Estimate the salvage value of each item

The salvage value is estimated to be 5% of the purchase price for equipment/tools and 10% for buildings, vehicles/machinery.

The salvage value of the tractor is ...

$$10\% \times \$1\,000 = \$100$$

The financial strengths of a farm business can be appraised by using an inventory of farm assets

Column (6)

Compute the annual depreciation for each item

There are several ways to calculate depreciation, the most

$$\text{Annual depreciation} = \frac{\text{Purchase price} - \text{Salvage value}}{\text{Years in use}}$$

simple and commonly used method is shown below.

Then the annual depreciation of the tractor is ...

$$\frac{\$1\,000 - \$100}{10 \text{ years}} = \$90 \text{ per year}$$

Column (7)

Compute the accumulated depreciation

(assume that the exercise is being conducted in 2006)

$$\text{Accumulated depreciation} = \text{Annual depreciation} \times \text{years in use}$$

The accumulated depreciation of the tractor from 1999 to 2006 is equal to ...

$$\$90 \times 7 \text{ years} = \$630$$

Column (8)

Indicate the quantity or number of units of the item at the beginning of the year
(the number of tractors is one)

Column (9)

Compute the beginning value
(value at the start of the year)

Beginning value = Purchase price - Accumulated depreciation

The beginning value of the tractor
as of January 2006 is equal to ...

$$\$1\,000 - \$630 = \$370$$

Column (10)

**Indicate the quantity or number of units
of the item at the end of the year**
(the number of tractors is still one)

Column (11)

Compute the ending value
(value at the end of the year)

Ending value = Beginning value - Annual depreciation

The ending value of the tractor
as of December 2006 is:

$$\$370 - \$90 = \$280$$

Notes

Training slides
for Session 2.1.3
Inventory of farm resources

22 Inventory of farm resources

**The farm inventory is a complete list
of all physical assets at a specific point in time**

**The list indicates the value of every item of property
and the amount of farm liabilities**

**An inventory is essential
at both the beginning and end of a farm year**

*A beginning and end of year comparison
shows how the financial position has changed
after one production year*

Farm resource appraisal

This unit deals with the importance of obtaining accurate information on farm resources and the need to value them properly. Farmers must know the type, quality and quantity of resources available (assets) and the obligations or debts owed by the farm (liabilities) to ensure that all resources are managed properly.

Farm assets and liabilities

A thorough discussion of the concept of farm assets and liabilities is presented in this session. This includes some of the typical assets that can be found on a farm. This is followed by a discussion of the current and long-term liabilities.

Farm assets are of great value to the farmer because they can be sold to generate cash. This improves the "liquidity" of the farm business. However the extent to which this can be done in practice depends on the nature and type of farm assets found. Similarly, knowledge of farm liabilities is also important because it affects directly the financial stability of the farm and the profitability of the farm business.

Objectives

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



- understand the concept of farm assets and their different types;
- classify farm assets according to type (fixed and current assets);
- understand the concept of farm liabilities and their different types;
- classify farm liabilities according to type (current and short-term liabilities).

Key points

1. Assets are resources invested or earned by a farm. They are what the farmer owns.
2. Fixed assets are long-term assets and are used for several years.
3. Current assets are those assets that can be used during the next accounting period or can be converted to cash without having a negative effect on farm operations.

4. The following are typical assets of a farm:
 - land, buildings and machinery;
 - livestock and poultry;
 - standing crops (production in progress);
 - harvested crops (production completed);
 - stocks;
 - receivables;
 - cash;
 - money on deposit;
 - money invested or lent.
5. Liabilities are obligations to others or debts incurred by the farm.
6. Current liabilities must be paid within the next 12 months.
7. Long-term liabilities are those due for payment over one year or beyond the date of the balance sheet. Typical liabilities are:
 - (i) long-term loans, (ii) short-term loans, (iii) money owed for goods used by the farm.

Steps for instruction



1. Distribute Handout 2.2.1 (Farm assets and liabilities) before the start of the session.
2. Define assets and distinguish between fixed and current assets. Concrete examples should be given so that the participants can easily understand the concepts. Ask the participants to give examples of the two types of assets and write them down.
3. Define liabilities, give examples and classify them into current or short- and long-term liabilities. Discuss the classification based on the time duration over which they are to be paid. Have participants give examples of typical farm liabilities and write them down.

4. Summarize the previous discussion on assets and liabilities using Slide 24 (Farm assets and liabilities) for illustration.
5. Go on to show Slide 25 (Classification of farm assets and liabilities) and draw a similar outline of assets and liabilities on the classroom board. Then have the participants fill in the examples that they had previously written down.
6. Distribute Training exercise 4 (Classification of farm assets and liabilities). The participants should work independently on this exercise. After the exercise, initiate a classroom discussion and upon completion show the appropriate answer (see Training aids).

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 2.2.1, (iii) refer to Training exercise 4.

Notes

Farm assets and liabilities

Assets

Assets are what the farmer owns. They are resources invested in the farm that can be used in the future. Assets can be divided into fixed and current assets. They are classified based on the ease by which they can be turned into cash. This is called liquidity. Both forms of assets have a strong influence on farm operations.

Fixed assets. These are long-term assets. They are bought to be used for several years. They form the basis of a farm's profitability. Usually, they are not maintained for long periods of time. Selling fixed assets can seriously affect the farm operations. These assets include farm property, livestock and tree crops, long-term credits or contracts that farmers have with suppliers and market outlets.

Current assets. Current assets are short term. Examples include cash in hand, money on deposit, livestock for sale, and grain and feeds in store. Current assets can be converted to cash without having a detrimental effect on the farm business. The shorter the period the more liquid the assets are.

The list below shows typical assets of a farm:

1. *Land, buildings and machinery.* Basic resources that are considered as fixed assets if owned by the farmer.
2. *Livestock and poultry.* Assets that are either used to produce saleable produce (e.g. milk and eggs) or are sold directly as breeding stock.
3. *Growing crops.* Costs incurred for crops that are still in the process of being produced. For example crops that have not yet been harvested and are still lying in the field.

Assets are resources that can be used in the future

4. *Harvested crops.* Crops that have been harvested and are currently being stored on the farm.
5. *Input stocks.* Value of the material inputs used for the production of produce (e.g. fertilizer, sprays, fuel, spare parts, bags).
6. *Debt.* Money owed to the farmer for the sale of produce and services.
7. *Cash.* Money at hand.
8. *Money on deposit.* Money that is kept in a bank or other financial institution.
9. *Money lent.* Money tied up with other individuals.

Liabilities

Liabilities show the debts, loans and money that are used to finance the assets of the farm. These are divided into current liabilities and fixed liabilities.

Current liabilities (short term). Those debts that have to be repaid over the year and within the time frame of the balance sheet. These include repayments of the principal on loans due within the year and taxes that have not as yet been paid out.

Fixed liabilities (long term). Liabilities due for payment over the year or beyond the date of the balance sheet. They consist of contracts on inputs and supplies, and long-term loans and taxes on capital appreciation that can occur from land sales.

The example on the opposite page shows some typical farm assets and liabilities and provides a form for listing them.

***Liabilities
are debts,
loans and money
used to finance
farm assets***

Example
Classification of farm assets and liabilities

ASSETS	LIABILITIES
<i>Fixed assets</i>	<i>Fixed liabilities</i>
Land and physical improvements	Long-term loans
Farm buildings	Mortgages
Farm machinery	
Draught animals	
Tools and equipment	
<i>Current assets</i>	<i>Current liabilities</i>
Cash on hand	Accounts payable
Cash in bank account	Short-term loans
Accounts receivable	Interest payable
Crops on hand for sale	
Livestock/poultry for sale	
Farm supplies on hand	

Notes

Unit 2.2 – Training exercise 4

Classification of farm assets and liabilities

Task

On the basis of previously studied material, trainees are asked to classify the following into assets and liabilities using the following list.

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Fattening cattle 2. Credit to buy fuel 3. Bank credit for machinery (payable in five years) 4. Plastic containers/sacks 5. Credit for shed construction (payable next year) 6. Sales of crops on credit | <ol style="list-style-type: none"> 7. Pigs 8. Bank credit for seed purchase 9. Advance payment for produce (received within the year) 10. Interest on short-term loans 11. Farm building 12. Hand tractor 13. Fertilizer and other chemicals |
|---|---|

ASSETS	LIABILITIES
<i>Fixed assets</i>	<i>Fixed liabilities</i>
<i>Current assets</i>	<i>Current liabilities</i>

(Answer key on the opposite page)

Answer key for
Training exercise 4

ASSETS*Fixed assets*

Fattening cattle
Plastic containers/sacks
Sales of crops on credit
Fertilizer and other chemicals

Current assets

Pigs
Hand tractor
Farm building

LIABILITIES*Fixed liabilities*

Credit to buy fuel
Bank credit for seed purchase
Advance payment for produce
Interest on short-term loans

Current liabilities

Bank credit for machinery
Credit for shed construction

Training slides
for Session 2.2.1
Farm assets and liabilities

24 Farm assets and liabilities

Assets

The resources invested or earned by a farm ...

which are either **fixed assets** (long-term)
or **current assets** (short-term)

Liabilities

The debts, loans and money used to finance
the assets of the farm ...

which are either **fixed liabilities** (long-term)
or **current liabilities** (short-term)

Asset valuation

The importance of asset valuation in preparing the balance sheet is covered in this session. Money is the common unit of measurement that covers a wide range of the kinds of assets to be found on a typical farm. Valuation of farm assets allows a monetary assessment of the overall value of the farm to be made. Some commonly used valuation methods are discussed with suggestions of when and where to apply them.

Objectives

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



- know the different methods of valuation;
- know which one to select to value different types of assets found on the farm.

Key points

1. The most appropriate method to determine the value of a particular asset depends on its nature and purpose.
2. Regardless of the method used, consistency is needed to ensure that the same method can be used again at another point in time.
3. The most commonly used methods of valuation are:
 - market value;
 - purchase price (original cost);
 - purchase price vs market value;
 - production cost;
 - purchase price minus depreciation.

Steps for instruction



1. Explain why asset valuation is important to determine the farm business performance and to plan the farm. Point out that money is the only unit of measurement common to a wide range of the types of assets found on a typical farm.

2. A thorough discussion of commonly used valuation methods should be conducted. These include: (i) market value, (ii) purchase price (original cost), (iii) purchase price vs market value, (iv) production cost, (v) purchase price minus depreciation. Emphasis should be made on the characteristics of the items to be valued and the appropriate valuation method to be applied. Show Slide 26 (Methods of valuation).

3. Distribute Training exercise 5 (Asset valuation). The participants should work independently on this exercise. Provide adequate time for the participants to complete the exercise. After the exercise initiate a classroom discussion and upon completion show the appropriate answer (see Training aids). Ask the trainees to justify their answers and discuss them with the class.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 2.2.2, (iii) refer to Training exercise 5.

Notes

Asset valuation

Assessment of farm assets is the first step towards preparing the balance sheet. All assets are expressed in monetary terms. Money is the only unit of measurement that is common for the wide range of assets that can be found on the farm. The most appropriate method to determine a particular asset depends on its nature and purpose. Regardless of the method used, consistency must be maintained and the same method should be used every time assets need to be valued.

Assets that can easily be sold on the market (e.g. as stocks of finished products) are valued by the market price that they obtain. However, assets, such as machinery, breeding livestock and land that are not sold or purchased, are often more difficult to value and less direct methods need to be used. The following are commonly used methods of valuation:

- market value;
- purchase price (original cost);
- purchase price vs market value;
- production cost;
- purchase price minus depreciation.

Market value. This method values an asset based on its current market price. It can be used for many types of assets but works particularly well for items that could be sold in a relatively short period of time and for which current market prices are available. Some examples are crops and livestock.

*Assets
can be valued
in numerous
different ways*

Purchase price (original cost). Items that were previously purchased can be valued at their original purchase cost. This method works well for those items recently purchased and for which records of their cost are still available. Feed, fertilizer and fuel supplies are normally valued in this way.

Note: Items such as buildings and machinery, which normally lose value or depreciate over time, are valued differently. Livestock raised on the farm and crops under cultivation cannot be valued using this method because there is no purchase price.

Purchase price vs market value. This method values an item at both its original cost and its market value, and the lower value is selected. The method has the advantage of minimizing the chances of placing too high a value on any item (e.g. land may increase in value because of inflation). Valuing land at cost price eliminates any increase in value over time caused by general increase in prices.

Production cost. Items produced on the farm can also be valued at their cost of production. Cereals, root crops, fruit crops and livestock reared can be valued by this method if records on the costs of production are kept. Established crops not yet ready to be harvested (e.g. tree crops) are usually valued in this way. This method is often preferred in place of having to assess yields and prices, which are notoriously volatile because of climatic changes. These uncertainties can affect drastically the yield of the crop before harvest and the price of sales.

Purchase price minus depreciation. Assets that provide services over a period of years but lose value over time because of age, use or obsolescence are valued at the original cost less all previous costs of depreciation (e.g. machinery, buildings, purchased breeding livestock). Each year the value of the item would be reduced by the amount of depreciation for that year.

Unit 2.2 – Training exercise 5 Asset valuation

Task

Trainees must decide which of the valuation methods to use ...

Market value
Purchase price (original cost)
Purchase price vs market value
Production cost
Purchase price minus depreciation

... when evaluating the following assets ...

Crops for sale
Feeds produced on farm
Farm equipment
Animal shed
Farmland
Milk for sale
Stored fertilizer
Tractor

Asset	Valuation method

(Answer key on the following page)

Answer key for
Training exercise 5

Asset	Valuation method
Crops for sale	Market value
Feeds produced on farm	Production cost
Farm equipment	Purchase price minus depreciation
Animal shed	Purchase price minus depreciation
Farmland	Market value
Milk for sale	Market value
Stored fertilizer	Market value
Tractor	Purchase price vs market value

Training slides
for Session 2.2.2
Asset valuation

26 Methods of valuation

Market value

(based on current market price)

Purchase price (original cost)

(previously purchased items valued at original cost)

Purchase price vs market price

(values an item at both its cost and market value
and the lower value is selected)

Production cost

(items produced valued at cost of production)

Purchase price minus depreciation

(assets that provide services and lose value
over time are valued at original cost less all
previous depreciation costs)

Farm balance sheet and net worth

The balance sheet is discussed here. The session then goes on to explain the concept of net worth and how it can be calculated and interpreted. Net worth and the current ratio are important indicators that measure the financial progress of the farm and its liquidity.

Balance sheets often have to be prepared in order for farmers to obtain bank loans. Therefore it is relevant for farmers to know how balance sheets are constructed and to understand their use. If farmers are unable to prepare their own balance sheets, extension workers should be able to assist them in doing this.

Objectives



At the end of this session, trainees are expected to know how to construct a balance sheet, calculate net worth and current ratio, and how to interpret these indicators.

Key points

1. A balance sheet is a financial statement of the farm business taken at a single point in time. Its main principle is that total assets and liabilities must balance.
2. Net worth is the difference between the value of total assets owned and the value of liabilities. Knowing this helps farmers to assess their capacity to take risks and to estimate their wealth.
3. Net worth can change for a number of reasons: (i) assets can be used to produce crops and livestock, (ii) there are changes that occur regularly in an asset's value, (iii) gifts are often received, (iv) assets are sometimes sold at less than their value.
4. The current ratio is the ratio of current assets to current liabilities. The current ratio is equal to one when current assets are equal to current liabilities. A current ratio greater than one implies that the farm is more liquid. A current ratio of less than one implies that the farm business is less liquid.

Steps for instruction

1. Distribute Handout 2.2.3 (Farm balance sheet and net worth) before the start of the session.
2. The trainees should understand that the balance sheet is a financial statement of the farm at a particular point in time. Show Slide 27 (Farm balance sheet and net worth).
3. Point out that net worth simply shows the amount of money left to the farmer should farm assets be sold and farm liabilities paid. Explain that net worth is an important measure of the financial progress of a farm.
4. Introduce the concept of current ratio. Explain that it is an indicator of the liquidity of the farm business. Show how the ratio should be interpreted. Show Slide 28 (Calculating net worth and current ratio)
5. Distribute Training exercise 6 (Calculating net worth). Participants should work by themselves. Once completed allow them time to discuss their solutions. Then show the appropriate answer (see Training aids) and elaborate the results to the class.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 2.2.3, (iii) refer to Training exercise 6.

Notes

Farm balance sheet and net worth

The most well-known financial statement is the balance sheet. The balance sheet is one of a number of financial statements that summarizes the assets used by the farm and the financial resources invested in these assets. It is a record of the assets and liabilities on the day the balance sheet is compiled. The main principle of the balance sheet is that total assets and total liabilities always have to balance. The difference between assets and liabilities represents the net worth of the farm.

The balance sheet provides a picture of solvency. If liabilities exceed assets, the net worth is negative and the farm is insolvent. As a result of changes in net worth, balance sheets prepared at different stages of the annual production cycle cannot be compared directly.

The balance sheet is a "snapshot" of the financial situation of a farm at a particular point in time

Example An end of year balance sheet

Inventory date 31/12/2006

ASSETS		(\$)	LIABILITIES		(\$)
<i>Fixed assets</i>			<i>Fixed liabilities</i>		
Land		10 000	Bank loan		10 000
Buildings		8 000			
Breeding livestock		4 000			
Total fixed assets		22 000	Total fixed liabilities		10 000
<i>Current assets</i>			<i>Current liabilities</i>		
Debtors		700	Overdraft		1 000
Fertilizer in store		800	Creditors		1 000
Cash		300	Short-term loans		500
Seed in store		1 200			
Total current assets		3 000	Total current liabilities		2 500
Total assets		25 000	Total liabilities		12 500

Net worth is the difference between the value of the total farm assets and the total liabilities. In other words, it is the residual value of the farm if it were sold and all liabilities paid. It also represents the equity owned by the farmer. This calculation is usually conducted by using the balance sheet.

$$\text{Net worth} = \text{Total assets} - \text{Total liabilities}$$

Then, substitute the numbers from the previous page ...

$$25\,000 - 12\,500 = 12\,500$$

This result shows:

1. *Farm liquidity or working capital.* Cash left over after the current assets have been sold and the current liabilities have been paid off;
2. *Farm solvency.* Ability to repay debts;
3. *Farm net worth.* Owner's share of the farm.

A correct balance sheet also shows how the net worth, when added to total liabilities, must equal the total assets.

$$\text{Total assets} = \text{Net worth} + \text{Total liabilities}$$

If this does not occur, the balance sheet will need revision.

Knowing the net worth helps farmers to assess their capacity to take risks. It provides an estimate of total wealth. It is also useful for financial institutions by indicating whether the farmer has collateral to take out loans.

Net worth estimates the farmer's wealth

Net worth can change over time for a number of reasons. A common change comes from using assets to produce crops and livestock. The profit from these production activities is then used to purchase additional assets or to reduce liabilities. The net worth will also change if there is a change in the value of the asset or if gifts are received or an asset is sold for more or less than its estimated value.

For example, if \$2 000 is used to purchase new farm machinery, the net worth does not change. There is now \$2 000 less in current assets (the cash used to purchase the machine) but an additional \$2 000 in fixed assets (the machine). This shows that the net worth changes only when:

- the farmer puts additional personal capital into the farm;
- the farmer withdraws capital from the farm;
- the farm shows a profit or loss.

Current ratio

The current ratio is the ratio of current assets to current liabilities. It is an indicator of the liquidity of the farm. Current assets can be sold or turned into saleable products quite quickly, and the farmer would more easily be in a position to generate cash to repay debts.

The current ratio is calculated as follows ...

$$\text{Current ratio} = \frac{\text{Current farm assets}}{\text{Current farm liabilities}}$$

The higher the ratio the more liquid the farm.

*Net worth
over time
can change*

*Current ratio
is the ratio of
current assets
to current
liabilities*

Current ratio equals 1. This means that current assets equal current liabilities. While there are sufficient current assets to cover current liabilities, there is no safety margin.

Current ratio greater than 1. This means that current assets are greater than current liabilities. There is a safety margin that allows for price and other changes.

Current ratio less than 1. This means that current assets are less than current liabilities. The farm is less liquid and the risk is greater

On the one hand, a farm that concentrates its production during one or two periods of the year should have a high current ratio at the beginning of the year as no new production would be available for sale until much later in the year. This would be a prudent financial strategy. On the other, dairy producers with continuous sales throughout the year can operate safely with lower current ratios. The structure of the farm business can determine its potential financial position.

Notes

Unit 2.2 – Training exercise 6 Calculating net worth

Background: a list of assets and liabilities (end of current year)

Item	(\$)	Item	(\$)
Savings	190	Sales	100
Taxes	140	Short-term credit	120
Buildings	1 300	Insurance	40
Cash	20	Produce in process	60
Bank loan	1 320	Livestock production (milk)	160
Livestock for sale	260	Materials in store	30
Land	2 470	Creditor	250
Finished produce	680	Machinery and equipment	1 120
Bills to be paid	20		

Tasks

Place the items listed above in the appropriate spaces
in the form provided and calculate the net worth.

Inventory date ___/___/___

ASSETS	(\$)	LIABILITIES	(\$)
<i>Fixed assets</i>		<i>Fixed liabilities</i>	
Total fixed assets		Total fixed liabilities	
<i>Current assets</i>		<i>Current liabilities</i>	
Total current assets		Total current liabilities	
Total assets	<input style="width: 50px;" type="text"/>	Total liabilities	<input style="width: 50px;" type="text"/>

$$\frac{\text{Net worth}}{\text{(Net worth)}} = \frac{\text{Total assets}}{\text{(Total assets)}} - \frac{\text{Total liabilities}}{\text{(Total liabilities)}}$$

(Answer key on the following page)

Answer key for
Training exercise 6

Inventory date ___/___/___

ASSETS	(\$)	LIABILITIES	(\$)
<i>Fixed assets</i>		<i>Fixed liabilities</i>	
Buildings	1 300	Bank loan	1 320
Land	2 470		
Machinery and equipment	1 120		
Livestock production (milk)	160		
Total fixed assets	5 050	Total fixed liabilities	1 320
<i>Current assets</i>		<i>Current liabilities</i>	
Savings	190	Taxes	140
Cash	20	Creditor	250
Livestock for sale	260	Bills to be paid	20
Material in store	30	Short-term credit	120
Finished produce	680	Insurance	40
Sales	100		
Produce in process	60		
Total current assets	1 340	Total current liabilities	570
Total assets	6 390	Total liabilities	1 890

$$\frac{4\ 500}{\text{(Net worth)}} = \frac{6\ 390}{\text{(Total assets)}} - \frac{1\ 890}{\text{(Total liabilities)}}$$

Training slides
for Session 2.2.3
Farm balance sheet and net worth

27 Farm balance sheet and net worth

The balance sheet

A financial statement of the farm business

It summarizes the assets used and the sources of finance
invested in those assets at a given point in time

Net worth

The difference between assets and liabilities

If liabilities exceed assets the net worth is negative
and the farm is insolvent

Preparing for session 2.2.4
Sources of finance

Teaching methods
Lecture, trainer/participant interaction
and discussion, summarize findings and draw
conclusions from participants

Duration: 30 minutes

Learning support materials
Handout 2.2.4 (Sources of finance),
Slide 29 (Possible sources of financing)

Notes

Sources of finance

This session presents different sources of capital that farmers could utilize if they need additional financing.

Farmers should be aware of the difference between working capital and investment loans. Finance is often needed at the beginning of the season in the form of working capital. In some situations farmers may also find themselves without adequate finance during the season. However once the agricultural production cycle has begun any disruption will reduce the farm's potential profitability. Knowledge of the different sources of finance available to farmers is necessary for profitable farming.

Objectives



At the end of this session the participants are expected to know about potential sources of financing as well as their advantages and disadvantages.

Key points

1. Sources of finance (capital) are the financial resources used in the production process.
2. Understand the different sources of finance.
3. Some possible sources of financing are:
 - individual savings;
 - borrowing (friends, relatives, others);
 - credit against goods;
 - bank credit;
 - investments (private, other business);
 - grants;
 - bank overdraft.

Steps for instruction



1. Explain that knowing the potential sources of financing is good practice for a farmer. Initiate a discussion among participants on the need to know the various sources of finance available to farmers. Develop the discussion by asking the participants at what time of the year farmers usually require finance.

2. Proceed to describe sources of financing with the aid of Slide 29 (Possible sources of financing). Have the participants interact among themselves and add other sources of financing that are not listed in the slide. Ask them to describe their experiences with possible sources of finance in the farming areas in which they work.

3. Identify the advantages and disadvantages of each. Ask participants to comment on their contribution. This should open the way for further discussion.

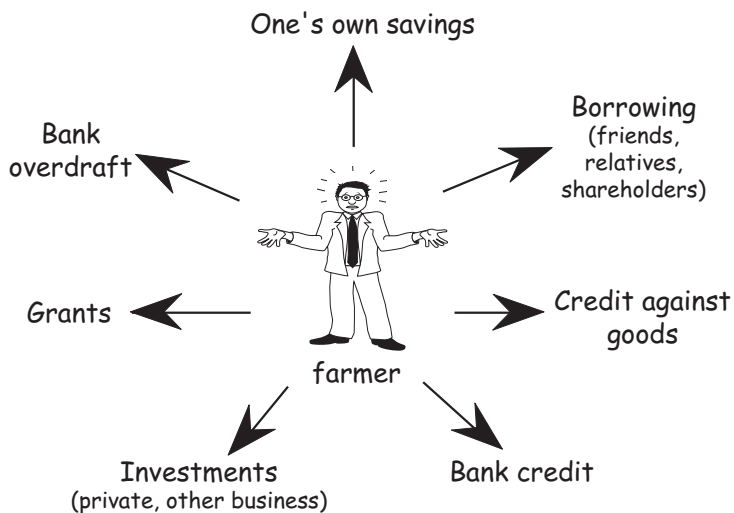
Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 2.2.4.

Notes

Sources of finance

Sources of finance are often essential to maintain the existing farm operations and to expand the scale of farm enterprises and the farm as a whole. Before the farmer can begin or expand an enterprise, finance is required. The aim of this session is to gain a better understanding of the different sources of finance and the strengths and weaknesses associated with them. Some possible sources are shown in the diagram below.

Figure 2.2 — Different sources of finance



To define the appropriateness of a source, it is necessary to identify the advantages (strengths) and disadvantages (weaknesses) of each. Extension workers could be asked to prepare a table listing all possible sources of finance for a particular farm. From this list, they could identify the advantages and disadvantages of each source of finance for a particular farmer.

A checklist of possible sources of finance is shown in Table 2.4 on the following page.

Finance is needed to begin or expand an enterprise ...

... and farmers should be aware of sources of finance before they need them

Table 2.4 – A checklist of sources of finance

Sources of finance	Advantages	Disadvantages
One's own savings	<ul style="list-style-type: none"> • freedom of actions • no interest charges 	<ul style="list-style-type: none"> • limited availability
Borrowing from relatives or friends	<ul style="list-style-type: none"> • low interest rates or no charge • freedom of actions • requires no formal justification • flexible in terms of repayment 	<ul style="list-style-type: none"> • possible misunderstanding of the problems • possibility of uneasiness arising between relatives or friends
Borrowing from shareholders	<ul style="list-style-type: none"> • low interest rates or no charges • flexible terms of repayment 	<ul style="list-style-type: none"> • restricted freedom of action
Credit against goods	<ul style="list-style-type: none"> • reduces the working capital requirement 	<ul style="list-style-type: none"> • can only be taken against specific goods
Bank credits	<ul style="list-style-type: none"> • available 	<ul style="list-style-type: none"> • usually requires formal justification • high interest rates • rigid terms of payment
Investments	<ul style="list-style-type: none"> • free grant • interest free 	<ul style="list-style-type: none"> • prolonged terms of payment
Overdraft	<ul style="list-style-type: none"> • can be obtained if necessary • bank interest can be reduced 	<ul style="list-style-type: none"> • repaid from money coming into account • possible immediate repayment of capital
Others	<ul style="list-style-type: none"> • 	<ul style="list-style-type: none"> •

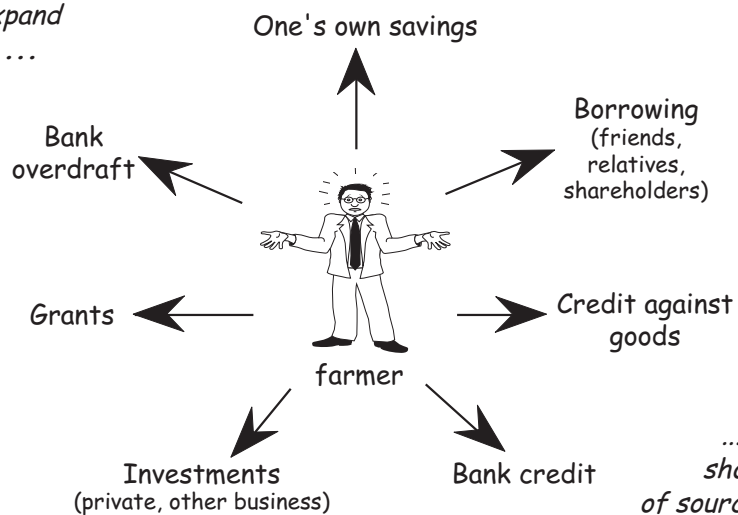
Farmers need to consider the advantages and disadvantages of different sources

Notes

Training slides for Session 2.2.4 Sources of finance

29 Possible sources of financing

*Finance is needed to
begin or to expand
an enterprise ...*



*... and farmers
should be aware
of sources of finance
before they need them*

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 2 discusses the different types and sources of data available to farmers and extension workers and methods of data collection. The usefulness of conducting an inventory of farm assets and liabilities and the methods that can be used in doing so is explained. It concludes by showing how this data can be used in assessing the financial performance of the farm business.

Farm planning and management for trainers of extension workers

TRAINING
MATERIALS FOR
AGRICULTURAL
MANAGEMENT,
MARKETING
AND FINANCE

3

ASIA



Module 3 FARM BUSINESS ANALYSIS



Farm planning and management for trainers of extension workers

ASIA

Module 3 FARM BUSINESS ANALYSIS

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing and Multimedia Service, Information Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy or by e-mail to copyright@fao.org

© FAO 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.

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.

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.

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.

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

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

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 ...

$$\begin{array}{r}
 \text{Sweet potatoes: } 3\,500 \text{ kg} \times \$ 0.35 \text{ per kg} = \$1\,225.00 \\
 \text{Farm consumption: } 225 \text{ kg} \times \$ 0.35 \text{ per kg} = \$ \quad 78.75 \\
 \hline
 \text{Gross income} = \$1\,303.75
 \end{array}$$

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.

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.

Costs of production can be classified as variable and fixed

*Variable costs
change as
production
increases*

Example
Variable costs of a crop enterprise

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.

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

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.

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 ...

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

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 ...

$$\text{Gross margin} = \text{Gross income} - \text{Variable costs}$$

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 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.

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

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

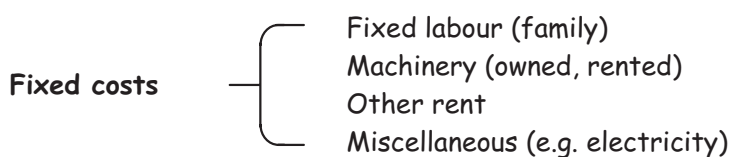
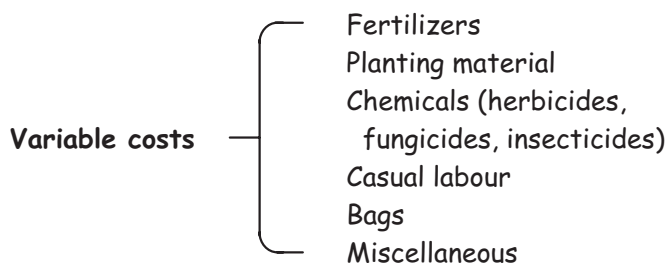
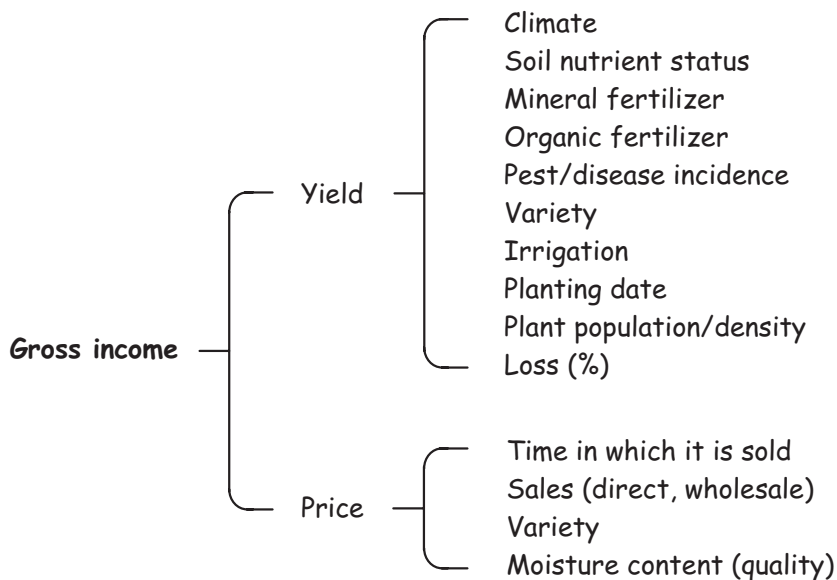
Item	Number or quantity	Unit price (\$)	Amount (\$)
<i>Income</i>			
Tomato yield (tonnes per ha)	9.00		
Price		142.8	
(a) Total income			1 285.20
<i>Variable costs</i>			
<i>Labour (person/days)</i>			
Care of seedbeds	17.06	1.71	29.20
Ploughing	7.50	3.14	23.50
Harrowing	3.00	3.14	9.40
Furrowing	1.00	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
<i>Sub-total</i>			243.70
<i>Materials</i>			
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
<i>Sub-total</i>			278.50
Interest on working capital*			+ 15.70
(b) Total variable cost			537.90
<i>Fixed costs</i>			
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.

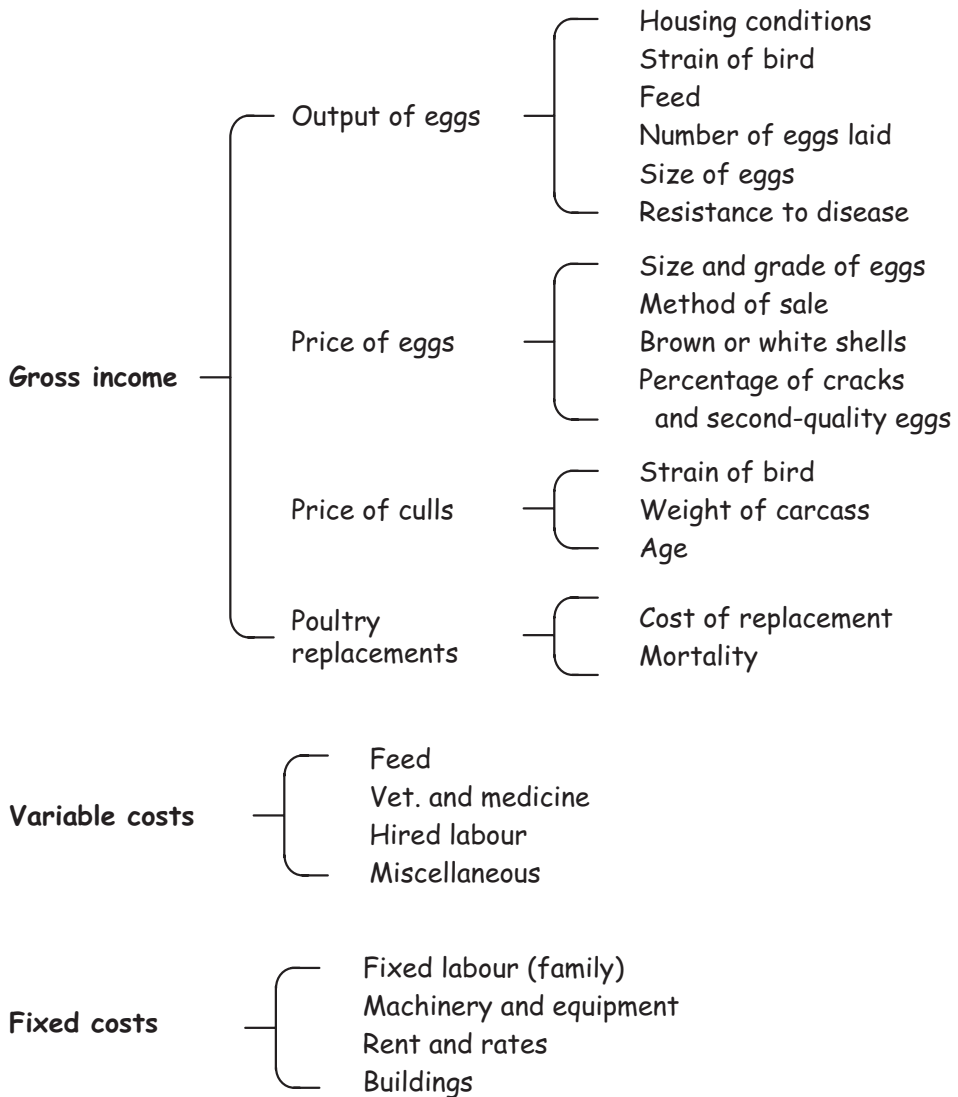
Diagrams of factors affecting gross income and profitability of a crop and livestock enterprise are indicated in Figures 3.1 and 3.2 on the next pages.

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 <i>opportunity cost</i> of labour would not be very high. We say that the cost of family labour is <i>imputed</i> (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)

<i>Gross margin, tomatoes in ha per year</i>	
Item	Value
<i>Gross income</i>	
Total production (kg)	300
Price per kg (\$)	1
Total income (\$)	300
<i>Variable costs (\$)</i>	
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

<i>Gross margin, tomatoes in ha per year</i>	
Item	Value
<i>Gross income</i>	
Total production (kg)	175
Price per kg (\$)	1
Total income (\$)	175
<i>Variable costs (\$)</i>	
Seed costs	30
Fertilizer costs	24
Pesticides	7
Irrigation costs	24
Hired labour costs	15
Other costs	25
Total variable costs (\$)	125
<i>Fixed costs (\$)</i>	
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
Lubrication costs	0.06 litres of oil per hour at \$ 2.50/litre
Maintenance costs	15% of new value

Annual costs = Depreciation + Interest + Operating costs

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

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

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

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

Operating costs

fuel: 720 x 4 litre/hr = 2 880 litres x \$0.5 = \$1 440

lubrication: 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 ...

$$\begin{array}{l} \text{initial value: } \$100 \\ \text{added value: } 9 \text{ months} \times 30 \text{ days} \times \$2 = \$540 \\ \hline \text{End value} = \$640 \end{array}$$

Calculate the interest ...

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

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)
<i>Gross income</i>		
Yield in Kg/ha	1 350.00	2 000.00
Price/kg	0.45	0.45
Total gross income	607.50	900.00
<i>Variable costs</i>		
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

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

Module 3, Unit 3.1, Session 3.1.1

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	

Module 3, Unit 3.1, Session 3.1.1

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

Module 3, Unit 3.1, Session 3.1.1

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)*

Module 3, Unit 3.1, Session 3.1.1

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**

Module 3, Unit 3.1, Session 3.1.1

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

Module 3, Unit 3.1, Session 3.1.1

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.

Module 3, Unit 3.1, Session 3.1.1

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.

Module 3, Unit 3.1, Session 3.1.1

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.

Building depreciation. Includes drainage and irrigation.

Other. Repairs, fuel and oil, utilities, insurance, land rent.

Module 3, Unit 3.1, Session 3.1.1

39 Calculating depreciation

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

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

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

Module 3, Unit 3.1, Session 3.1.1

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.

Module 3, Unit 3.1, Session 3.1.1

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.

Module 3, Unit 3.1, Session 3.1.1

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
Sub-total			278.50

*3% for 3 months

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**

Module 3, Unit 3.1, Session 3.1.1

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

Module 3, Unit 3.1, Session 3.1.1

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.

$$\text{Gross margin} = \text{Gross income} - \text{Variable costs}$$

$$\text{Whole farm income} = \text{Total gross margin} - \text{Fixed costs}$$

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.

Whole farm income measures the strength of the farm business

Notes

Training slides
for Session 3.1.2
Whole farm income

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

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.

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.

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.

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

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.

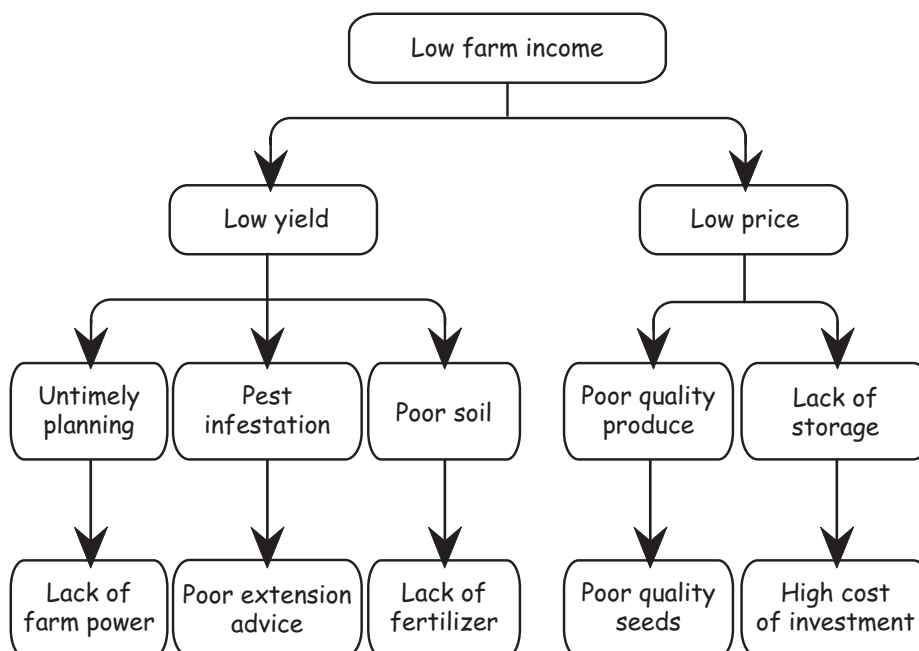
Notes

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.

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.

A constraints tree



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

... and potentials provide opportunities for change

Analysis of constraints means the identification of causes and effects

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.

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.

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

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

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 (growth with 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)

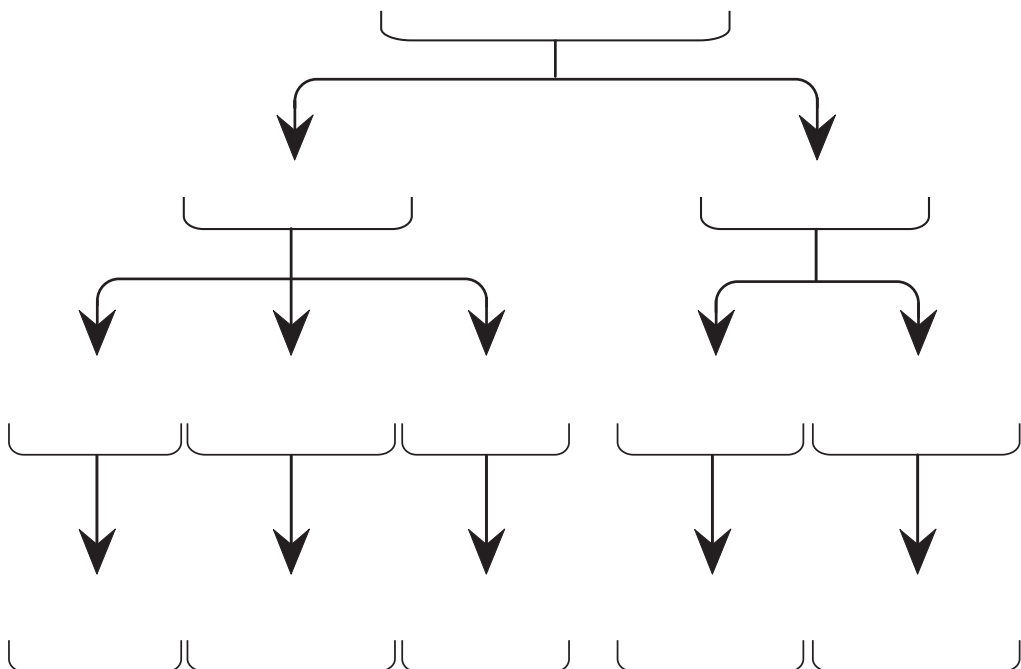
Training exercise 8 (continued)

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

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

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

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

Module 3, Unit 3.2, Session 3.2.1

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

Module 3, Unit 3.2, Session 3.2.1

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 guidelines to ensure that a field exercise contributes to the overall objectives of the programme.

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, learning 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.

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.

Benchmarking is used to compare the performance of different farms

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
<i>Variable costs (\$)</i>		
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

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*

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.

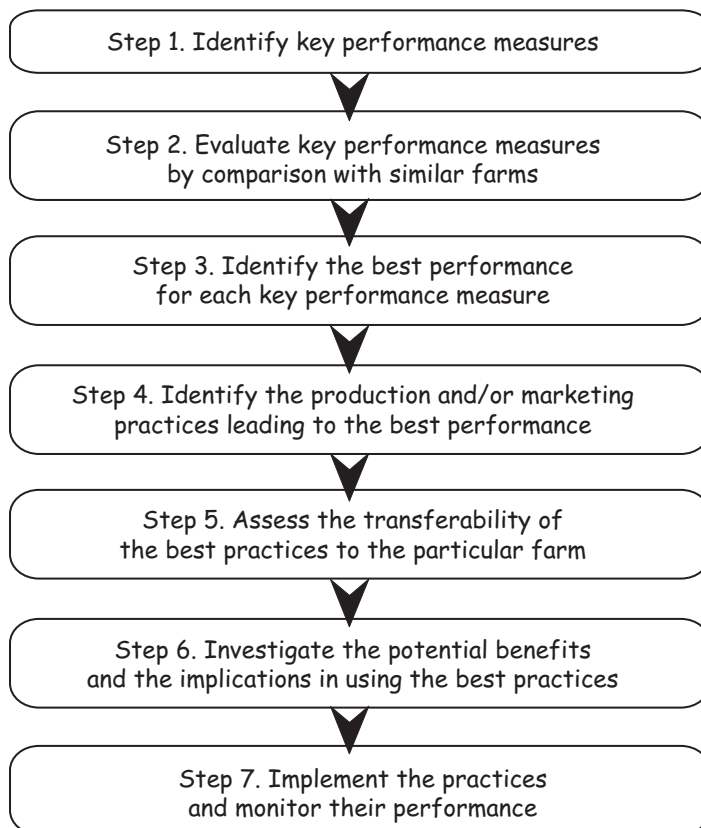
Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 3.3.2.

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



Consider using the constraints analysis to identify key performance indicators

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.

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:

- 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.

*Analysis of
performance
requires
comparative
information*

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.

Training slides
for Session 3.3.2
Farm performance analysis

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*

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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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. Alternatively 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
<i>Enterprise</i>				
Rice	2.5 ha × \$125 per ha =	2.5 ha × \$55 per ha =	3.0 ha × \$90 per ha =	2.5 ha × \$110 per ha =
Coffee	0.8 ha × \$180 per ha =	0.8 ha × \$150 per ha =	0.8 ha × \$150 per ha =	0.8 ha × \$175 per ha =
Bean	0.5 ha × \$90 per ha =	0.5 ha × \$35 per ha =	0.5 ha × \$21 per ha =	0.5 ha × \$85 per ha =
Maize	1.2 ha × \$30 per ha =	1.2 ha × \$10 per ha =	0.7 ha × \$15 per ha =	1.2 ha × \$20 per ha =
Gross margin				
Fixed costs	5.0 ha × \$70 per ha =	5.0 ha × \$70 per ha =	5.0 ha × \$70 per ha =	5.0 ha × \$90 per ha =
Profit				

(continued on the next page)

Answer key for
Training exercise 9

Farms	1 (benchmark)	2	3	4
<i>Enterprise</i>				
Rice	2.5 ha × \$125 per ha = \$312.5	2.5 ha × \$55 per ha = \$137.5	3.0 ha × \$90 per ha = \$270	2.5 ha × \$110 per ha = \$275
Coffee	0.8 ha × \$180 per ha = \$144	0.8 ha × \$150 per ha = \$120	0.8 ha × \$150 per ha = \$120	0.8 ha × \$175 per ha = \$140
Bean	0.5 ha × \$90 per ha = \$45	0.5 ha × \$35 per ha = \$17.5	0.5 ha × \$21 per ha = \$10.5	0.5 ha × \$85 per ha = \$42.5
Maize	1.2 ha × \$30 per ha = \$36	1.2 ha × \$10 per ha = \$12	0.7 ha × \$15 per ha = \$10.5	1.2 ha × \$20 per ha = \$24
Gross margin	\$537.5	\$287	\$441	\$481.5
Fixed costs	5.0 ha × \$70 per ha = \$350	5.0 ha × \$70 per ha = \$350	5.0 ha × \$70 per ha = \$350	5.0 ha × \$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 × \$220 per ha = \$550	2.5 ha × \$110 per ha = \$275	3.0 ha × \$180 per ha = \$540	2.5 ha × \$220 per ha = \$550
Coffee	0.8 ha × \$350 per ha = \$280	0.8 ha × \$300 per ha = \$240	0.8 ha × \$300 per ha = \$240	0.8 ha × \$350 per ha = \$280
Bean	0.5 ha × \$170 per ha = \$85	0.5 ha × \$70 per ha = \$35	0.5 ha × \$150 per ha = \$75	0.5 ha × \$170 per ha = \$85
Maize	1.2 ha × \$40 per ha = \$48	1.2 ha × \$20 per ha = \$24	0.7 ha × \$30 per ha = \$21	1.2 ha × \$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 × \$70 per ha = \$350	5.0 ha × \$70 per ha = \$350	5.0 ha × \$70 per ha = \$350	5.0 ha × \$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

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 possible 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 familiar 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.

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.

Farm planning and management for trainers of extension workers

TRAINING
MATERIALS FOR
AGRICULTURAL
MANAGEMENT,
MARKETING
AND FINANCE

3

ASIA



Module 4 PLANNING FOR THE MARKET



Farm planning
and management
for trainers
of extension workers

ASIA

Module 4
**PLANNING FOR
THE MARKET**

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing and Multimedia Service, Information Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy or by e-mail to copyright@fao.org

© FAO 2006

PLANNING FOR THE MARKET

Unit 4.1

Making planning decisions

Session 4.1.1 The farm planning process (30 minutes)

Unit 4.2

The process of marketing

Session 4.2.1 The why and what of marketing (30 minutes)

Session 4.2.2 Production and marketing problems
(60 minutes)

Session 4.2.3 Marketing channels, margins and costs
(150 minutes)

Session 4.2.4 Planning for the market (120 minutes)

*This volume has been designed
as a complete working package which includes all components
of the training programme needed for Module 4.*

*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.*

PLANNING FOR THE MARKET

Farmers and extension workers must learn how to plan for the market in order to increase profitability. Market-oriented farming begins by determining what buyers want, in what form and when they want it. The market dictates what to produce. Production and marketing are closely interrelated and both aspects affect the performance of the farm business. This module covers planning for the market while the next module deals with enterprise and farm budgeting and planning which also have to be considered for the planning process.

Making planning decisions

This unit looks at the process of farm planning. Farmers are concerned about the future. Some of the questions that farmers ask themselves when planning the enterprise and the farm are:

- *What crop should I produce?*
- *What area of land do I need?*
- *How much should I produce?*
- *Where should I sell the produce?*
- *When should it be produced?*
- *How much labour will I need?*
- *Do I have enough cash to buy inputs and materials?*

Farmers usually determine by themselves what farm enterprises to engage in, but there is a role for the extension worker to assist the farmer in making planning decisions. For this to occur the extension worker must understand the process of planning.

Preparing for session 4.1.1
The farm planning process

Teaching methods
Presentation, group discussion,
list steps in farm planning

Duration: 30 minutes

Learning support materials
Handout 4.1.1 (The farm planning process),
Slide 54 (Procedure for developing a farm plan)

Notes

The farm planning process

Knowledge of the farm planning process is relevant in providing direction to production and marketing activities. The intent is to place the farmers in the best possible position to make decisions about the future in such a way that efficiency and profitability are increased while meeting "buyers" needs. This session discusses farm planning as well as the steps involved in the process.

Objectives

At the end of the session participants are expected to:



- understand the stages of the planning process;
- show how farm planning summarizes the resources available and the enterprises to be carried out on a farm.

Key points

1. The farm planning process outlines or summarizes the resources available and the type and volume of production to be carried out.
2. The planning procedure involves six steps:
 - formulating goals and objectives;
 - preparing a farm resource inventory and assessment;
 - identifying opportunities and preparing an action plan;
 - preparing enterprise budgets and selecting the most profitable;
 - preparing a "whole" farm budget and action plan;
 - putting the plan into action.

Steps for instruction

1. Distribute Handout 4.1.1 (The farm planning process) before the start of the session.
2. Explain that the concept of planning is forward looking (short term or long term) and is often strategic in nature.
3. Initiate a discussion among the participants on the importance of planning for farmers and how it is usually conducted.
4. Explain the steps involved in farm planning with the aid of Slide 54 (Procedure for developing a farm plan).
5. Explain that farm planning is different from planning a regular business enterprise. This is because of the scarcity of resources in agriculture as well as the greater risks found in farming.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 4.1.1.

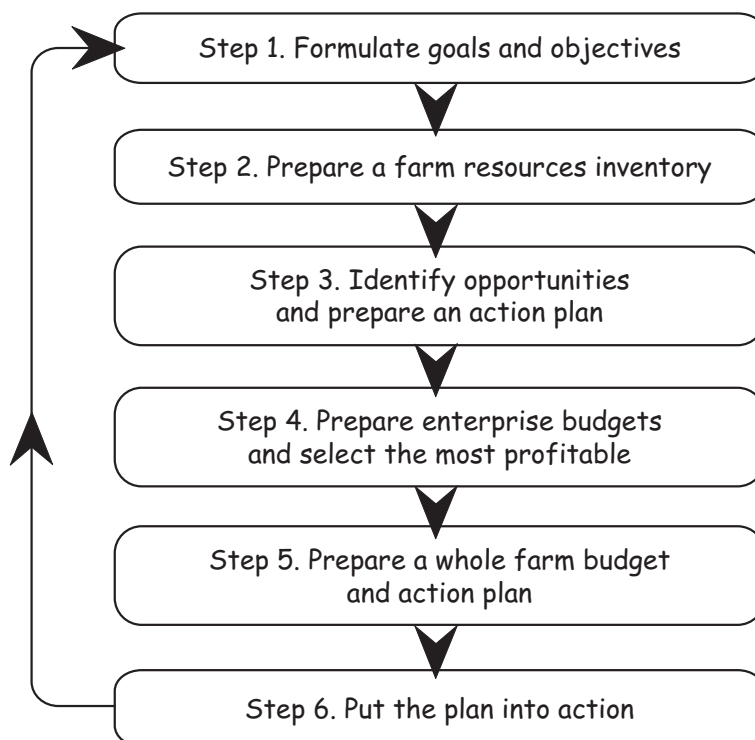
Notes

The farm planning process

Planning is one stage in the process of making decisions. Farmers often plan for their forthcoming season, or in some cases the plans may be for a number of years.

There is no single and unique strategy to guide farmers in the proper choice of enterprises to be included in the farm plan. Usually farmers determine by themselves what farm enterprises to engage in, but farmers can be influenced in their decisions by their experience, family members, neighbouring farmers and extension workers. Nevertheless, there are ways to facilitate some of the common decisions taken by farmers (i.e. whether or not to produce a particular enterprise, in what combination and at what scale). Steps in the planning process are shown below.

*Planning
means working
things out
before
they happen*



*The farm
planning
process*

Farm planning is understanding your resource base ...

Steps in the farm planning process

Step 1

Formulate goals and objectives

Begin by identifying the farm household goals and listing the priorities of the farmer. The farmer is the manager of the farm business. Farmers should decide on the objectives as well as on their capacities and interests to manage certain crops or livestock. This may simply consist of a single goal, for example, maximization of profit or competing goals such as increased profit and food security. The goals reflect the farm family preferences.

Step 2

Prepare a farm resource inventory

Draw up a list of resources available to the farm family. Any proposed plan must fit in with the available land, labour and financial capital at the disposal of the farmer. It must also consider the farmer's ability as a manager. It is no good trying to make a change that requires more resources than the farmer can acquire.

The farmer should be encouraged to produce a map of the farm that marks out the current crops and a record of the soil type and conditions. The farmer should be able to assess the physical area of land available for each plot as well as common land for grazing and forestry. Previous crop yields should give some idea of the quality of the land. The land record will also serve as a guide of which crops are suitable and in what area they may be grown, and also suggest what yields to expect. At this stage the farmer should identify problems, such as soil erosion, that refer to the land.

A list should also be drawn up of available labour. This should include an estimate of the amount of labour available to the farm family and labour that can be hired. In some situations labour sharing opportunities could be mentioned. Also note available capital (physical and financial). It will include the savings of the farm family and an estimate of money that can be borrowed if credit is available.

The inventory process may also indicate weaknesses in the management of the business, for example, because of excessive debt, high variable costs, depreciation and the use of labour. The resources available set a limit on the plans that are possible. Usually only one of these resources is a major limitation on what can be produced and the profit that can be earned. It is important to decide which resource is likely to be the major limitation.

Step 3
**Identify opportunities
and prepare an action plan**

This step starts with a careful assessment of buyer demand. Even if the resource inventory shows that certain crop and livestock enterprises are technically feasible, enterprise identification must take into account market opportunities. The market appraisal should include an assessment of the demand for the product, the marketing arrangements and probable prices that can be attained, availability, cost and quality of purchased inputs, and transportation and storage of the final product. Some ideas and suggestions for activities can come from discussions held with family members, other farmers or extension workers — all of whom could provide important sources of new information.

The range of potential opportunities identified may be broad, but could generally be reduced through a process of evaluation. The opportunities would be "short listed". Many of them might be rejected immediately because the farmer may not be

*... identifying
opportunities
and matching
them to
the market ...*

interested in them or because the farmer feels unable to manage them properly. Other opportunities may be rejected because there is insufficient land, labour or capital available to carry them out.

Step 4

Prepare enterprise budgets and select the most profitable

Assess the financial performance of the enterprises. It can be expressed through cost and income estimates for the different enterprises on a per hectare or per livestock unit basis. For many farmers the decision on what enterprises to include in a farm plan is based on personal experience and preference, together with considerations of comparative advantages of the different activities.

*... appraising
enterprise
profitability ...*

Often farmers do not change their farm plan on a regular basis, and slight adjustments and modifications are usually made to the existing enterprise combination. In this event, the planning process primarily focuses on preparing budgets of existing enterprises. However, farmers responding to market changes may decide to introduce new enterprises, and these would need to be budgeted out to assess their contribution to farm income.

Step 5

Prepare a whole farm budget and action plan

After the enterprise gross margins are calculated, budgets for the whole farm can be drawn up. Some farmers may even prepare alternative farm plans and then select the best and most appropriate. The whole farm budget checks the effect of changes in the cropping pattern and the introduction of new enterprises on the economic viability of the farm. The gross margin for each enterprise would need to match the volume of physical resources available to the farmer and decisions taken as to the most viable enterprise for each land parcel on the farm.

This would require reconciliation between physical characteristics of the resource base, market opportunities, use of other resources (labour and capital) available to the farmer and individual preferences of the farm family. This is often a process of trial and error. Once the enterprise combination has been selected, the overall gross margin and whole farm income is assessed. The latter would require the preparation of an inventory of the fixed asset requirements. The difference between the overall gross margin and the fixed costs provides an estimate of whole farm income.

Prepare an action plan taking into account physical and financial aspects of the farm plan. This should include an assessment of land suitability and enterprise selection, planned crop rotations, a calendar of operations, schedules of supplies required, an assessment of farm investments, labour profiles, cash flow projections and enterprise budgets.

For a new farm, or a large-scale change in an existing farm system, a complete budget is necessary. For smaller changes in the farm system only variable costs are affected, and a partial budget may be a sufficient guide.

Step 6 Put the plan into action

The last and most important step is to translate the plan into action. Once the farmer selects what is considered to be the best plan, it is time to put it into operation. If tree crops and livestock are included in the plan, this may take a long time, because these enterprises do not reach full production for several years. If new enterprises are introduced, the farmer may have to learn new skills and working methods to manage the enterprise effectively. Once the new plan is fully established it should run smoothly without too many management problems. The period during which the plan is put into operation is usually the most difficult and requires very careful management.

*... and
translating
the plan
into action*

Training slides
for Session 4.1.1
The farm planning process

54 Procedure for developing a farm plan

Step 1. Formulate goals and objectives

Step 2. Prepare farm resources inventory

**Step 3. Identify opportunities
and prepare an action plan**

**Step 4. Prepare enterprise budgets
and select the most profitable**

**Step 5. Prepare a whole farm budget
and action plan**

Step 6. Put the plan into action

The process of marketing

This unit explains marketing and looks at why marketing is important. It highlights some of the problems found in marketing agricultural produce in Asia. This is followed by a description of the marketing system and alternative marketing channels found in the region. The unit concludes with an explanation of how to calculate the costs of marketing at different stages in the marketing system and stresses the importance for farmers individually or as groups to plan for the market. This is an integral part of the farm planning process described in the previous unit.

Marketing is the key to a successful farm business. Farmers can improve their skills in marketing by understanding how the market functions, collecting market information, formulating marketing strategies and planning for the market. Farmers have always made decisions about what, how and when to produce and where to sell their produce. Further knowledge of the marketing process and planning for the market would greatly help farmers sell their produce and increase farm income.

Preparing for session 4.2.1
The why and what of marketing

Teaching methods
Lecture, trainer/participant interaction,
group discussion

Duration: 30 minutes

Learning support materials
Handouts 4.2.1a (The why and what of marketing),
4.2.1b (What is supply and demand?), Slide 55
(Why is marketing important?), Slide 56 (What is
marketing?), Slide 57 (Marketing services),
Slide 58 (Three important elements of
marketing), Slide 59 (Supply and demand),
Slide 60 (Supply and demand and price), Slide 61
(Farmers as "price takers" and "price makers")

Notes

The why and what of marketing

Marketing is an important part of any successful farm business. However, many small-scale farmers cannot take advantage of existing and potential market opportunities because they do not have sufficient marketing skills and access to knowledge about markets. This session looks at the "what" and "why" of marketing. Marketing is defined and its importance is placed in the context of increasing urban populations in the region. The concept of supply and demand is discussed as well as the basic principles of marketing. The session goes on to discuss the marketing services involved in moving agricultural produce from the point of production to the point of consumption.

Knowledge of marketing is important. With an effective marketing strategy, farmers often can make greater profits. The importance of marketing in a constantly changing environment cannot be overemphasized. There is a need for farmers and extension workers to recognize its importance, otherwise their efforts to increase efficiency in production and overall farm profitability will be wasted. The movement of products from the producer to the consumer is as important as production itself.

Objectives

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



- understand why a market oriented focus to farm business management is needed;
- understand the importance of marketing services and how they are part of a continuum that stretches from farm production to the buyer.

Key points:

1. Populations are continuously growing. People are rapidly moving from rural areas into towns and cities, increasing the number of people that need to be fed by the farming community. As incomes rise in towns and cities, tastes and preferences for food also change among consumers. Farmers must learn to produce for this changing market, and they need to become more competitive and profitable.
2. Marketing is an important part of this process. It connects what the buyer wants with what farmers can supply. Farm products gain value once they leave the farm and are exchanged for money.
3. Buyers can also be final consumers, buying produce for family consumption. Alternatively, buyers may also be processors or retailers purchasing to resell at a higher price.
4. Marketing is the process of exchange between the farmer who sells and the buyer who buys. The exchange mechanism of selling and buying depends on price determination. Price is the exchange value of a product measured by money.
5. Prices change as a result of changes in supply and demand.
6. Farmers are mostly "price takers" although with greater differentiation of products they could become "price makers".
7. Marketing consists of three main elements: (i) the priority of the buyer, (ii) selection of market outlets, (iii) building up a good relationship with buyers.

8. Marketing is a series of tasks and services involved in post-production that includes moving produce from the farmgate or the point of first sale to the point of last sale or purchase. The services involved consist of:

- producing
- harvesting
- assembling
- grading
- sorting
- packaging
- transporting
- distributing
- storing
- selling and buying
- processing
- retailing
- market identification
- financing

Steps for instruction



1. Distribute Handouts 4.2.1a (The why and what of marketing) and 4.2.1b (What is supply and demand?) before the start of the session.
2. Explain why marketing is important and that farm planning should start from the market. Make reference to the increasing population that is occurring in Asia and the greater need for food. Point out that the small-scale structure of Asian agriculture also requires greater efficiency and a response to market demand. The changes require farmers to have the skills to be more market oriented in their production. Within this context explain why efficiency in marketing is important. Show Slide 55 (Why is marketing important?).
3. Initiate a discussion with participants about some of the changes occurring in their local areas with respect to the supply and demand for agricultural produce. Ask them to provide reasons why marketing is so important.

4. Show Slide 56 (What is marketing?) and discuss this with the participants. Using Slide 57 (Marketing services) define the series of services involved in moving the product from the point of production (the farm) to the point of consumption. Discuss why the various services are needed and stress that their performance entails costs that are added to the price of the product.
5. Using Slide 58 (Three important elements of marketing) explain to the participants the following: (i) the priority of the buyer, (ii) the process of selection, (iii) the need for relationship building.
6. Refer to Handout 4.2.1b (What is supply and demand?). Explain the role of supply, demand and price using Slide 59 (Supply and demand) and Slide 60 (Supply and demand and price). Explain how price is determined and the supply and demand factors that influence price change. Show Slide 61 (Farmers as "price takers" and "price makers") and explain the difference between the two. Discuss these different roles and have participants draw examples from their field experiences.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 4.2.1a and 4.2.1b.

Notes

The why and what of marketing

As populations are growing rapidly in Asia, more people are moving to towns and cities in search of employment. Changes as to where people live and what they do create new opportunities for farmers. At the same time, the increased distance between the farm and the market requires products to be delivered to these markets in a regular and reliable way. This requires farmers to become more skilled in marketing and to become more market oriented.

Asian small-scale farmers have small and often fragmented pieces of land. These farmers frequently find it difficult to make enough money to support themselves and their families. But some small-scale farmers manage to produce more than the household or family needs and they have difficulty selling surplus produce. Many small-scale farmers have limited access to market information and markets. Limited access to market information means they have little knowledge of alternative products that can be produced. Through marketing, farmers can increase their options and make better use of their limited resources to earn greater incomes.

Some small-scale farmers are changing their farming systems according to the demands of the market. These farmers have managed to survive and be profitable by introducing higher value enterprises into the farming system. Some have even begun to specialize in high value enterprises. Typical examples are dairy, chicken, fruit, vegetable and flower enterprises.

Population increases result in greater demand

Farmers need to identify high income enterprises with market opportunities

Marketing is an important part of any successful farm business. It connects what the buyer wants with what producers (farmers) can produce and supply at a profit. Marketing can identify new demands and farmers, through diversification of product and services, can satisfy them. Marketing tells the farmer what to produce and how to make products and services available to buyers in the most desirable and efficient way. Through linking production with marketing, small-scale farmers can learn what adjustments they must make in their production system to better meet buyer demand.

What is marketing?

Marketing is the process of exchange between the farmer who sells and the buyer who purchases the produce. Buyers can be final consumers who buy for their own personal or family consumption or, alternatively, for further processing or reselling (processors, wholesalers and retailers). The exchange takes place because the buyer has something the farmer wants, and the farmer has something the buyer wants. The buyer has cash that the farmer values. The farmer has produce that the buyer values.

An exchange can take place when the two sides agree on an exchange rate (price) at which farm products can be exchanged for cash. Price is the exchange value of a product measured by money. Understanding how prices are determined calls for an understanding of how the free market works. Within a competitive market situation, prices are determined by supply and demand.

In the "real market", however, prices are often determined through simple bargaining between the buyer and seller. Sellers try to obtain the highest possible price while buyers aim at paying the lowest prices. Information on supply and demand often influences the price outcome of the negotiation.

Marketing connects what the buyer wants with what farmers can produce

Marketing is a complex activity for farmers. It involves finding out what buyers want and producing it at a profit. Thus, connecting what the buyer wants with what the farmer can produce and supply. In other words, marketing tells the farmer what and how much to produce and how, when and where to deliver it. Farmers then use this information to make the products and services available to the buyer in the most desirable and efficient way.

Marketing is part of a process that includes a range of tasks and services such as:

- producing
- harvesting
- assembling
- grading
- sorting
- packaging
- transporting
- distributing
- storing
- selling and buying
- processing
- retailing
- market identification
- financing

With an effective marketing strategy, farmers can ensure continuing profits. For marketing to be successful, all participants in the process must make a profit. Farmers will only grow crops and raise livestock beyond their immediate needs and provide goods for sale when they think they can earn a profit in doing so. The same is true of the traders, processors and distributors: They will provide only if they can make a profit.

Market prices are determined by supply and demand

Three important elements of marketing

1. **The priority of the buyer.** Marketing begins not with the product, but with what the buyer wants. This requires some market investigation. There is no point in producing something that buyers do not want. Farmers need to understand what buyers really want.

What most buyers really want

Quality	Attractive products
Low price	Good taste
Uniformity of produce	No pest damage
Sufficient quantity	Good packaging
Consistency	A wide selection
Freshness	Clean produce
Nutritious food	Accessible produce
Healthy food	

2. **A process of selection.** The farmer should decide to whom to sell. The product has to be geared to the buyer. The buyer could be a wholesaler, a retailer or a final consumer in the market. This element of marketing determines how and where the product is sold. A consideration is, of course, the costs involved with each option and the need to make profit.
3. **Relationship building.** Good marketing includes working with the buyers – whether they are traders or final consumers. Buyers should not be cheated. Strong relationships need to be built up with the buyer. This means that agreements will be honoured and commitments to supply products will be kept. It means delivering consistent qualities. Trust between the farmer and buyer must be built and nurtured.

What are marketing services?

Marketing includes the different services involved in moving produce from the farm to the point of consumption. The services involved consist of:

- assembling the products in small quantities from a large number of scattered producers;
- sorting the products into various sizes, degree of ripeness and other similar characteristics;
- packaging to make handling easy and prevent loss because of bruising;
- transporting the products to the place wanted by the consumers;
- storing the products after harvest for future consumption;
- selling and buying when the products are bought and sold and change ownership several times;
- processing the produce in suitable form for human consumption, such as paddy into rice, rice into noodles, milk into butter and flour into bread;
- retailing or distribution of the produce to several retailers who in turn sell to the consumers;
- other marketing services that include provision of risk taking and financing to finance market operations.

*The tasks
of marketing
are many*

Notes

What is supply and demand?

In a market-oriented system the price of a product is determined by supply and demand. The market price is the balance between the two.

Supply. Normally the higher the price of a product, the more of a product will be supplied. A high price will encourage a farmer to add this enterprise to the farm. A low price will discourage the farmer from growing a crop. If the farmer produces tomatoes, and the price increases, this would encourage him to extend the area of his land under the crop. The higher price would encourage the farmer to increase the supply of tomatoes.

Demand. The lower the price of a product the more a consumer normally demands. If the market price is high, consumers reduce their purchases. If tomatoes are very expensive, consumers may substitute by buying other vegetables. If they are cheap, consumers will buy more. The higher the price, the less tomatoes are demanded.

Changes in supply and demand

Supply and demand are, therefore, influenced by price as well as other factors. These are described below.

The common factors affecting supply are:

- seasonality of production;
- changes resulting from climate;
- attacks on farm enterprises;
- civil disruption;
- price of the product;
- change in the cost of production;
- improved techniques;
- expansion of a crop under cultivation;
- changes in profitability of competitive products.

Supply is the amount farmers are willing and able to market at a certain price

Demand is what products buyers are willing and able to buy at given market prices

Seasonality of production. At peak season there are more tomatoes supplied than at off-season times.

Changes resulting from climate. Supply also varies from year to year. Changes in production frequently occur as a result of good or bad weather, which could decrease or increase the quantity supplied. Bumper harvests usually decrease prices, poor harvests usually increase prices. In these cases, the level of production is not affected by the price of tomatoes but by climatic changes.

Attacks on farm enterprises. The incidence of pests, diseases, fire as from other events can decrease the supply.

Civil disruption. War, strikes, civil unrest, and other economic situations can reduce supply by preventing tomato production or preventing tomatoes reaching the market.

Price of the product. If the market price is high, farmers will increase their production. If the market price is low, farmers will probably decrease their production.

Change in the cost of production. A decrease in the cost of inputs or the introduction of more efficient technologies would decrease the cost of production. This makes it possible for the farmer to buy more inputs and thereby possibly increase production at the same cost of production. As a result more tomatoes could be supplied at the old price. Conversely, an increase in the cost of labour employed on the farm would have the opposite effect.

Improved techniques. Improvements in technologies, such as the introduction of high-yielding varieties, could increase the level of production (and supply) resulting in a decrease in product price.

Expansion of a crop under cultivation. Other farmers may be convinced to plant tomatoes because of the prospect of greater profits. This increase in the amount of land under tomatoes will increase the supply of tomatoes.

Changes in profitability of competitive products. Changes in the profitability of competing products can also cause a change in supply. If some farmers in a region produce spinach, a competing crop for tomatoes, which is more profitable than tomatoes, farmers will gradually shift their system towards the more profitable crop. This change would lead to a decrease in the supply of tomatoes.

There are also changes that occur that make consumers demand either more or less tomatoes at each price. In other words, the level of demand could change. For example, a farmer could join up with other farmers to promote their sales of tomatoes. They might advertise the good quality, freshness, availability at times of the year when tomatoes are not usually found in the market. This may appeal to consumers. If so, this could lead to increased demand for tomatoes.

Demand can change for the following reasons:

- price of the product;
- a change in the number of consumers;
- an increase in income;
- a change in the prices of products that are close substitutes;
- availability of competing products;
- a change in taste;
- increase in the demand for complementary products;
- expectations of future price changes or shortages.

Price of the product. If the market price is high, consumers will reduce their purchases. If the market price is low consumers will probably increase their consumption.

A change in the number of consumers. Additional people coming into the market would also increase demand, especially if tomatoes are a prominent part of the diet. Development projects, housing development and other programmes often cause people to move to the area of development. This could increase the number of consumers in that area.

An increase in income. If there is an all round increase in income, people would be able to afford more tomatoes and demand would rise.

A change in the prices of products that are close substitutes. Suppose spinach is a substitute for tomatoes. If the price of spinach decreases, consumers may prefer to purchase spinach instead of tomatoes. Even though there may have been no change in the price of tomatoes, the demand for it could decrease

Availability of competing products. If a wider range of competing products come onto the market, consumers have a wider choice. This may lead to less demand for tomatoes. This lower demand may lead to lower prices, which could cause demand to increase again.

A change in taste. A promotional campaign aimed at persuading consumers to purchase more tomatoes at the same price could also increase demand for tomatoes. Similarly changes in demand may come from changes in consumer tastes that take place gradually over time as a result of changes in diet. Alternatively, any fear that tomatoes may be contaminated would decrease it.

Increase in the demand for complementary products. The demand for tomatoes may increase as the demand increases for products that use tomato as an ingredient (for example, tomato ketchup, paste and juice).

Expectations of future price changes or shortages. The fear that the price of tomatoes may rise considerably the following week will motivate people to increase their demand and stock up on tomatoes.

Some of these changes could be immediate, such as changes in the prices of substitutes or competing products. Others are longer term, taking place gradually over an extended period. Long-term changes might be changes in population, changes in income and changes in tastes.

The relationship between supply and demand and prices of products can be quite complex. A change in the price of one product can affect the demand, and in turn the price, of an entirely different product. Supply is likely to fluctuate much more than demand. Market prices are affected more by changes in production than by changes in demand.

It is important for farmers to understand the relationship between supply and demand. This will help them decide on a price for their products in most situations. When farmers plan they need to know what prices to expect. When they sell they need to know what prices they can charge.

*Price takers
accept the
going market
price ...*

*... price makers
set the
price of
the product*

Farmers as "price takers" and "price makers"

Many farmers produce in a competitive market where there are many buyers and sellers. In farming, the number of sellers is large relative to the number of buyers, and farmers often have to accept the going market price, making them price takers. Their marketing challenge is to cope with the fluctuations in supply and demand during the year. In such an environment, successful marketing means selling as much as possible at higher prices. Because an individual farmer's production is small relative to the number of farmers growing the same crop, they cannot influence the price in the market.

In some situations, however, the farmer may not be a price taker but a price maker, setting the price of the product, because the market may not exist or may be very small. This is true for specialized products such as organics produced for "niche" markets. But the extent to which they can do this is limited. This limit is set by the farmers producing competitive or similar products.

Notes

Training slides
for Session 4.2.1
The why and what of marketing

55 Why is marketing important?

With rapid population growth
people are moving from rural to urban areas
greatly increasing the need for food in towns and cities

As incomes rise in towns and cities requests for food
(e.g. tastes and preferences) also change among consumers

Farmers must learn to produce for this changing
market and to become more competitive and profitable

*This process requires farmers
to become more skilled in the marketing of their product
and to become more market oriented*

56 What is marketing?

Marketing is the process of exchange between the farmer who produces and sells and the buyer who purchases

Buyers can be the final consumers or those who purchase for resale (i.e. rural agents, processors, wholesalers, retailers)

Marketing is a means of finding out what buyers want and what farmers can provide and supply at a profit

Marketing tells the farmer what and how much to produce and how, when and where to deliver it

Module 4, Unit 4.2, Session 4.2.1

57 Marketing services

Marketing is part of a process that includes ...

Producing
Harvesting
Assembling
Grading
Sorting
Packaging
Transporting
Storing
Processing
Distributing
Selling

Products may be bought and sold and change ownership many times during the process

For marketing to be successful all participants in the process must make a profit

Module 4, Unit 4.2, Session 4.2.1

58 Three important elements of marketing

The priority of the buyer

Farmers need to understand what buyers really want and this requires some market investigation

The process of selection

The farmer should decide at what level to sell (wholesaler, retailer or final consumer in the market)

Relationship building

Strong relationships of trust between the farmer and buyer must be built and nurtured (this will ensure that agreements are honoured and commitments are kept on both sides)

Module 4, Unit 4.2, Session 4.2.1

59 Supply and demand

Supply is the amount farmers are willing and able to market at a certain price

Supply is affected by a number of factors such as prices of products in market, inputs and costs of production, technological factors, climate and imports

Demand is what products buyers are willing and able to buy at given market prices

Demand is affected by a number factors such as prices of products, buyer preferences, buyer income, prices of similar products and range of products available

Module 4, Unit 4.2, Session 4.2.1

60 Supply and demand and price

The price of produce is set
on the balance between supply and demand

As the price of a product rises,
the quantity that will be supplied also rises
and the quantity that is demanded falls

If the price falls,
the supply will fall but demand will rise

*However short-term price changes can be affected
on specific day-to-day sales in particular markets areas*

Module 4, Unit 4.2, Session 4.2.1

61 Farmers as “price takers” and “price makers”

Price takers

Many farmers produce in a competitive market
where the number of sellers is large
relative to the number of buyers, and the farmers
often have to accept the going market price,
making them “price takers”

Price makers

In some situations the farmer may be able
to set the price of the product because
the market may not exist or it may be very small
(e.g. high-value or specialized products)
and they may become “price makers”

Module 4, Unit 4.2, Session 4.2.1

Preparing for session 4.2.2
Production and marketing problems

Teaching methods

Group discussion, trainer/participant interaction,
class training exercise, question and answer
period, further group discussion

Duration: 60 minutes

Learning support materials

Handout 4.2.2 (Production and marketing
problems), Slide 62 (Small-scale farming in Asia),
Training exercise 10 (Marketing problems
and solutions)

Notes

Production and marketing problems

It is important to recognize some of the problems and issues confronting the small-scale family farm in Asia. This session describes the physical, economic and production characteristics of small-scale farming that affect marketing there.

Objectives



At the end of this session the participants are expected to understand some of the issues facing the emerging commercial farmer and the challenges that remain in promoting commercial, market-oriented farming.

Key points

1. Market-oriented farming is affected by problems that arise from the structure of farming (e.g. small-scale production, prevalence of risk, seasonality of production).
2. Because production varies with the season, marketing situations vary. When prices are high producers have nothing to sell, and when prices are low they have more to sell.
3. In Asia there are many farmers producing different types of products, often of low quantity and scattered over a wide area. Production needs to be consolidated for more efficient marketing.
4. Farmers have limited marketing knowledge and access to market information.
5. Many Asian countries have complex marketing systems, which often result in market inefficiencies.
6. Other limiting factors are: (i) poor infrastructure facilities, (ii) the low investment capacity of farmers, (iii) the wide range of products sold, (iv) the wide range of consumer demands.

Steps for instruction

1. Distribute Handout 4.2.2 (Production and marketing problems) before the start of the session.
2. Initiate a discussion with the participants on the nature of small-scale farming and some of the common marketing problems that farmers face. The trainees should be encouraged to draw on their field experience. Show Slide 62 (Small-scale farming in Asia) and discuss the relationship between small-scale farming and marketing in Asia.
3. Distribute Training exercise 10 (Marketing problems and solutions). Instruct participants to form groups around a selected commodity (one per group) and ask them to answer the following questions: (i) Identify the main marketing problem(s) related to the selected enterprise; (ii) What could be the type of advice you, as an extension worker, would give to the farmer in order to address these problems? (iii) What information would you require? (iv) How would you collect the information? (v) What would be the source of data? Discuss the results.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 4.2.2, (iii) refer to Training exercise 10.

Notes

Production and marketing problems

Farmers in Asia experience both production and marketing problems when orienting their farming towards the market. Some of the common problems found in the region are:

- small-scale production;
- high risk of farming;
- seasonality of production;
- limited availability of labour;
- lack of marketing knowledge;
- lack of access to marketing information;
- complex marketing channels;
- poor or no infrastructure facilities;
- limited investment capacity;
- wide range of products sold.

Small-scale production. Many of the farms in Asia are small, usually less than a hectare. These are often scattered in different areas. Production is limited in volume, and individual farmers cannot sell their produce in distant markets at a profit because of the high costs of marketing. Without receiving a good return (profit) for produce sold, farmers are unlikely to be convinced to increase production and quality.

High risk of farming. Farm production deals with biological processes (i.e. plants and animals that live and die). Weather, especially drought, often determines what can be produced, when and in what volume and quality. Products produced are also often highly perishable. The very nature of these products requires better handling and management as well as ways to reduce the risks associated with farming.

*Farmers
in Asia
experience
common problems
when producing
for the market*

Seasonality of production. Because of the prevailing physical and climatic conditions, crops are planted and harvested at more or less the same time during the year, exhibiting distinct seasonal quantity and price variations. Planning of production to avoid market glut is not commonly understood by many farmers. There are risks involved in off-season planting but these could be reduced with the availability of suitable off-season varieties and improved management practices. This seasonality of production has left farmers with nothing to sell when prices are high and more to sell when prices are low.

Limited availability of labour. The availability of household or hired labour influences the farm family's ability to intensify or diversify agricultural production. Small-scale farms may have access only to household labour, some of which is devoted to subsistence production. The interaction of the family members in the production and marketing process needs to be fully understood and recognized. In developing marketing plans, one must ensure that adequate labour is available, especially if production and marketing activities are expected to increase. Seasonality of labour supply and distribution of tasks by gender are important factors affecting marketing.

Lack of marketing knowledge. Many farmers have very little exposure to competitive markets and marketing. Therefore, they are unaware of the needs and requirements of these markets and the role they play in determining price. This can be seen by the lack of appreciation of the quality, size, appearance and packaging of products, which play a major role in the market, in addition to a lack of understanding of the vulnerability of supply and demand situations, and of the costs and risks involved in marketing the produce.

Lack of access to marketing information. The availability of reliable information about market demand, desired product characteristics, alternative distribution channels and pricing is very important. Lack of information restricts the small farmer's ability to maximize income. Small farmers commonly do as their neighbours do because they have no other source of information. This behaviour frequently results in oversupply of a product and low returns to producers. Price and market information are sometimes provided by traders who come to the village to buy produce or by government market information services.

Farmers need information from the market that will allow them to make the appropriate changes in farming activities. Without proper information, farmers probably cannot adjust production or the product to make use of marketing opportunities.

Complex marketing channels. In many countries in Asia, marketing activities provide a major source of employment for a great number of people. Large numbers of people perform complex marketing functions resulting in the loss of efficiency. For example, products are procured by village traders, assembled by township traders, transported by other traders to wholesalers, sold to wholesalers in the wholesale market, then to retailers who in turn sell to the final consumers. Each participant in the distribution system incurs costs, losses and wastage, and of course each participant wants to make a profit.

Poor or no infrastructure facilities. Many farms, especially in upland areas, have limited access to markets because of a lack of road networks. Poor road systems inhibit investment in transport facilities for public use and for the marketing of produce. Farmers in marginal and remote areas of the region may be restricted by transport options and costs because of a lack of economies of scale. Transportation costs are often high, but they can be reduced with improved roads and by efficient collection and distribution systems. Lack of markets and/or processing facilities deprive the farmers of a good return for their produce.

Limited investment capacity. Many farms are limited in their capacity to generate a cash surplus that can be ploughed back into farming as an investment. When there is little cash income, the farmer's investment capacity is limited. Farmers often need credit in order to diversify production towards higher value crops and livestock products.

Wide range of products sold. The marketing of products would be simple if farmers produced one product or a limited number of products. However, there are many farmers producing different types of products, which are scattered in wide areas and produced in small volume. So the assembly of small quantities of products into bigger lots becomes necessary for efficient marketing.

When farmers in Asia are asked to identify their most pressing concerns, they usually list the following:

- low prices for produce sold;
- lack of market information;
- lack of expertise and information and also a shortage of extension officers to convey information;
- farmers produce low production volumes, often with quality problems, leading to poor returns;
- market flooding (oversupply) at specific times of the year;
- lack of local marketing outlets (e.g. roadside stalls);
- lack of technical expertise in packaging and grading;
- inconsistent supply of farm products;
- little contact between producers and buyers;
- lack of transport or the inability to pay for it;
- lack of storage facilities and pack-houses;
- low prices of equivalent imported items.

Notes

**Unit 4.2 – Training exercise 10
Marketing problems and solutions**

Task

Each group of trainees should select a commodity (one per group) and answer the following questions:

What are the main marketing problem(s) related to the selected enterprise?

What type of advice would you as an extension worker give to a farmer in order to address these problems?

(continued on the next page)

Training exercise 10 (continued)

What information would you require?

How would you collect the information?

What would be the source of data?

Training slides
for Session 4.2.2
Production and marketing problems

62 Small-scale farming in Asia

Some of the problems found in the region are ...

Small-scale production

High risk of farming

Seasonality of production

Limited availability of labour

Lack of marketing knowledge

Lack of marketing information

Complex marketing channels

Poor or no infrastructure

Limited investment capacity

Wide range of products sold

Marketing channels, margins and costs

This session provides a discussion of the marketing process and the channels and costs involved at each stage as they relate to farmers' decisions. It also explains how and why in many instances consumers pay high prices but farmers receive so little.

Understanding marketing channels, marketing margins and marketing costs enable farmers to examine how they can increase their returns from marketing.

Objectives

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



- understand the channels that farm products usually go through during the marketing process;
- understand the concepts of marketing costs and how they can be calculated to assist farmers in making more informed decisions.

Key points

1. The marketing channels describe the various stages in which the product passes from the time it leaves the farm until it reaches the buyer.
2. The price the farmer receives for a product depends on the length of the channel, the nature of the product, the distance of the farm to the market centre and the selling price of that product in the market.

3. The more complex and lengthy the marketing system, the higher the marketing costs. Simple comparisons of farmer and retail prices are a poor indicator of marketing efficiency.
4. Marketing costs may be high because many services are required. They may also be high if few services are needed, thus making the cost of each service higher.
5. The main types of costs involved in marketing are:
 - product preparation
 - packaging
 - handling
 - transport
 - produce losses
 - storage
 - processing
6. Processing of products is a common way of adding value to them.
7. There are both variable and fixed costs involved in moving products from the farm to the buyer.
8. The marketing margin is the difference between the price of the product at any two stages in the marketing process.
9. Margins may be high because of the size of the return that goes to the traders who are performing the marketing services.
10. Profits may be high if traders have low competition and can dictate the buying and selling price of produce in the market.

Steps for instruction

1. Distribute Handouts 4.2.3a (Marketing channels, margins and costs) and 4.2.3b (Options open to farmers for marketing produce) before the start of the session.
2. Promote discussion among the participants on the types of markets that they are familiar with, and ask them to discuss the differences in these markets. List some of their observations on a posterboard. Illustrate the discussion with the aid of Slide 63 (Market types) and describe briefly the different markets.
3. Show Slide 64 (Marketing system and marketing channels) and clarify the distinction between the two terms. Have the participants draw a diagram of the marketing system (from suppliers to final consumption), using a commodity of their choice. Allow time for discussion.
4. Refer to Handout 4.2.3b for a more thorough discussion of the different channels. Elaborate in greater detail the different marketing channels and discuss the channels typically found in the country or region.
5. Explain the concept and breakdown of marketing costs and illustrate with Slide 65 (Marketing costs). Encourage the participants to give their own examples of these costs.
6. Show that, generally, the more complex and lengthy the marketing system, the higher the marketing costs. Explain that there are several costs incurred by farmers and/or traders in moving agricultural produce. Point out that marketing costs consist of both fixed and variable costs.

7. Explain that a simple comparison of farmer prices with retail prices is a poor indicator of marketing efficiency because marketing costs are not taken into account.
8. Discuss processing costs and introduce the concept of value adding. Show Slide 66 (Value-adding activities). Have the participants discuss whether value-adding activities are always likely to result in better prices and higher profits.
9. Emphasize that marketing costs play an important role in determining the size of the marketing margin. Show Slide 67 (Marketing margins).
10. Conclude the session by emphasizing that the development of a marketing system that provides a broad selection of products at the right time and place is a major challenge that needs to be addressed. Point out that the extension worker has an important role to play in this.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 4.2.3a and 4.2.3b.

Notes

Marketing channels, margins and costs

Market types

Farmers often have a number of options of where to sell their produce. They can sell directly to buyers on the farm (at the farmgate), by the roadside (street hawking) or alternatively to wholesalers, processors and retailers. Farmers may take produce directly to a local village market or, alternatively, to sell in a town. These are some of the options open to farmers. Very often the choice depends on the distance of the farmer from the market, the cost of using each alternative and the ultimate profit that can be earned.

Farmers that produce higher value and more specialized produce can sell to supermarkets, hotels and catering companies. Alternatively, produce can be sold to traders who export to international markets.

But few farmers can sell their own products in large city markets unless they live close to them. Even fewer can sell their produce at a point of contact with international markets. These markets are too far away. Small-scale farmers rarely have the knowledge to contact buyers in those markets. They may not have the means to transport produce to those markets and often do not have the facilities and skills needed. The volume of production is often not large enough to justify performing post-harvest operations, and it may even be inefficient for them to do so.

Most smallholder farmers in Asia must sell their products at the farm or in the local market. Therefore, their incentive to produce commodities for sale, rather than only for their own subsistence, depends upon the prices they can get locally. These prices depend partly on the efficiency of the marketing system linking local markets to those in the city.

Choice of market depends on costs of marketing and profit earned

Marketing channels in Asia tend to be long

Marketing system and channels

The different steps involved in moving produce from the farm to the buyer is generally called the *marketing system*. All transfers of produce involve marketing activities in some form, and all these activities incur costs.

Marketing channels are the various stages through which the product passes from the time it leaves the farm to when it reaches the consumer. The distance from the farmer to the consumer determines the number of stages through which the product passes. The shortest channel is where buyers buy directly from farmers. But in farming areas where produce has to be transported to distant markets, the number of channels increase. In general, more perishable products are shipped to nearby markets and pass through fewer market channels. The length of the channel then depends on a combination of factors, such as the nature of the product as well as the distance from the farm to market.

Typically in Asia, marketing channels tend to be very long. Farmers sell their produce to rural traders. Rural traders transport the goods to a rural warehouse, where produce is often forwarded to urban warehouses. Produce is then sold to retailers who in turn sell to final consumers.

Although most farmers market their produce locally, the more entrepreneurial farmer may choose from a number of marketing channels. These are:

- market directly from the farm to the surrounding communities and traders;
- supply processing units (e.g. juice industries, bakeries and breweries);
- supply various retail outlets, construction companies, fishing companies directly;
- market through farm or market stalls;

- sell through contract markets, such as government feeding programmes, schools, hospitals, retail contracts, hotels, restaurants and tourism outlets. The extension officer is ideally situated to broker these contracts on behalf of groups of farmers who may lack the connection and knowledge to do so;
- market produce from door-to-door;
- add value to their own produce and distribute it through the various marketing channels mentioned above.

These channels are described in more detail in Handout 4.2.3b.

Marketing costs

All transactions along the marketing system entail costs. At the simplest level, the cost involved may just be the time taken by the farmers to walk to a nearby market and stay there until all of the vegetables are sold. At the most complex level, a product may be stored for long periods, transported long distances and processed several times before reaching the form in which it is finally sold.

Why, in most Asian countries, is the price of a product in a shop or retail market often so much higher than the price paid to the farmer? The costs involved in marketing are not always fully understood. We can understand that traders or processors spend money on transport or packaging, but there are many other less obvious costs.

These costs are not always visible, and those people doing the marketing are often believed to be making too much profit. People look at prices traders pay farmers and compare them with prices consumers pay for the same product and assume that the farmers and consumers are being exploited. Sometimes, of course, traders do make high profits but many times they make small profits or even losses. Clearly, unless they make an overall profit, traders will not want to continue in business. This is bad for both consumers and farmers.

*The costs
involved
in marketing
are not always
visible and
understood*

*The first
cost of
marketing
is product
preparation*

Generally, the more complex and lengthy the marketing system, the higher the marketing costs. A farmer who lives 5 km from a market will normally receive a higher share of the final price than one who lives 20 km away because of lower transport costs. A producer of a perishable crop, such as tomatoes, is likely to receive a lower share of the final price than the producer of a non-perishable crop, such as pumpkins, because some of his crop may be rotten by the time it reaches the market. In comparing farmer and final consumer prices, we need to be fully aware of all the costs involved.

The main costs involved in the marketing channel are:

- product preparation
- packaging
- handling
- transport
- produce losses
- storage
- processing

Product preparation. Preparation activities are sometimes undertaken by the farmers themselves. In some contexts these tasks are shared between farmers and traders. They include:

- cleaning, such as removing soil and foreign matter, brushing feathers on poultry and skins on cows;
- trimming to remove unwanted leaves, stems or roots;
- sorting to remove rejects and non-marketable produce;
- curing meats with onions and garlic;
- grading to separate produce into similar sizes and qualities before packaging, thus increasing the market value of the produce;
- waxing and wrapping, as with oranges for example, to preserve the produce and make it more attractive to the buyer.

Packaging. Most produce needs packaging. Packaging serves to: (i) provide a convenient way of handling and transporting produce, (ii) provide protection for the produce, (iii) make the produce more attractive to the buyer.

Clearly, the more sophisticated the packaging, the greater the cost. Fruits and vegetables may be packed and repacked several times on their way from farmer to consumer, depending on the length of the marketing chain. Different forms of packaging can be used (e.g. sacks, boxes, plastic crates). All these various types of packaging involve costs and need to be taken into account when working out the costs of marketing.

While packaging is a major cost, the costs of trying to save money on packaging often exceed it. Poor quality packaging may result in product damage. It may also make the product less attractive to buyers, reducing the price they are willing to pay.

Example Packaging cost calculations

Assume that oranges are packed 20 kg at a time in wooden boxes that can be used for 10 trips with occasional repairs. A box costs \$10, repairs and cleaning during its life cost \$2, and transporting the box back empty to the producing area costs \$1.

The packaging cost per trip is ...

$[(\text{Original cost} + \text{Repairs}) \div \text{Trips}] + \text{Transport when empty}$

$$(\$10 + \$2) \div 10 \text{ trips} + \$1 = \$2.20 \text{ per } 20 \text{ kg}$$

$$\text{and } \$2.20 \div 20 \text{ kg} = \$0.11 \text{ per kg}$$

With the use of bulk packaging, efforts are made to reuse the packages. In this situation an estimate has to be made of how many times the container is used in order to calculate the cost per journey. Allowances must also be made for repairs and for the cost of transporting the empty package back to the beginning of the marketing chain.

*Poor quality
packaging
may increase
losses
and costs*

*Handling costs
when added
together
can be
significant*

Handling. At all stages in the marketing system, produce will have to be packed and unpacked, loaded and unloaded, put into store and taken out again. Each individual handling cost will not amount to much, but the total of all such handling costs can be significant.

The following illustrates a farmer—wholesaler—retailer—consumer marketing channel with a typical example of the handling process:

- farmer or labourer loads produce onto ox-cart;
- labourer unloads produce at assembly market and the produce is weighed;
- wholesaler or an employee repackages the produce in the wholesaler's containers;
- produce is carried to and loaded on the wholesaler's truck;
- produce is unloaded at wholesale market and taken to premises occupied by the wholesaler employee and weighed;
- produce is unpacked and sorted or graded;
- produce is repacked in the retailer's containers;
- produce is carried to the retailer's transport;
- produce is unloaded at the retailer's store;
- produce is repackaged into plastic bags.

Poor handling by the farmer or trader can make the situation worse. When truckers are paid on a "per piece" basis, farmers and traders try to squeeze as much as possible into the package. This can be a false economy because the loss resulting from the damage can exceed the savings in transport costs. Produce can be damaged in transit by the constant shaking on bumpy roads, exposure to sun on top of a bus, high temperatures inside a truck or other vehicle. If a truck breaks down and has to remain at the side of the road for two or three days, the entire consignment could be lost. Delays and

bad handling at the wholesale market can make things worse. For example, sometimes produce that has been well-packed by the farmer or the trader is simply thrown on the floor of the wholesaler's premises, causing further bruising and damage.

In some situations it is possible to get an accurate assessment of the handling costs involved. For example, porters at wholesale markets usually charge a fixed rate per box or cart. In other situations fixed charges are not made and costs per container need to be calculated.

Marketing of livestock is particularly sensitive to mishandling. Stress, fatigue and bruising must be avoided because they can reduce liveweight and ultimately the market price paid to farmers. Handling must be done with caution and care.

Transport. Transport costs are incurred by farmers when they take their produce to the market and by traders as they move the produce down the marketing system to the consumer. Transport costs include produce transported by boat, truck and rail. Sometimes transport costs are simple to calculate. Farmers may pay a set price per kilogram to transporters. Other times produce is carried on a "per container" basis. Farmers or traders may hire an entire truck and transport a variety of products.

Marketing costs differ significantly if the farmer has the possibility of selling produce at the farmgate. Sometimes, however, farmers feel that their income could be increased if produce is transported to the market.

Example
Transport cost calculations

Assume that there are 40 m³ of space available in the truck to be used and that it costs \$500 to hire the truck. A container of 0.2 m³ holds 8 kg of tomatoes and a container of 0.4 m³ holds 10 kg of green peppers.

The transport cost for tomatoes per container and per kilogram is ...

$$\begin{aligned} \$500 \div (40 \text{ m}^3 \div 0.2 \text{ m}^3) &= \$2.50 \text{ per container} \\ \text{and } \$2.50 \div 8 \text{ kg} &= \$0.3125 \text{ per kilogram.} \end{aligned}$$

The transport cost for green peppers per container and per kilogram is ...

$$\begin{aligned} \$500 \div (40 \text{ m}^3 \div 0.4 \text{ m}^3) &= \$5.00 \text{ per container} \\ \text{and } \$5.00 \div 10 \text{ kg} &= \$0.50 \text{ per kilogram.} \end{aligned}$$

Transportation costs can be reduced by cramming livestock into cages and pounds. However, farmers need to be aware that overcrowding of trucks and vehicles could ultimately be more costly because livestock mortality may rise and the final product may be damaged. When livestock is transported over long distances, it requires adequate feed, water and often exercise enabling it to reach the market in the same condition as when it started. While this increases transport costs, it is likely to ensure better market prices.

Transport costs are often hidden

If livestock are being transported "on hoof" to market (i.e. walked to market), it is good to plan the trip ahead of time and ensure that necessary arrangements for feed and water are made. Cost will decrease when livestock is transported by foot, but this depends on the distance from the farm to the market and the species of livestock in question. In short, adequate care is needed when transporting live animals.

Produce losses. Losses are common with agricultural produce marketing. Even if nothing is actually thrown away, products may lose weight in storage and transit. Most crops lose weight during transit and storage as the result of moisture loss. Losses as high as 10 percent per day often occur under tropical conditions. For livestock, weight losses can be very damaging on the market price of the animals. If there are no quantity losses, there can still be quality losses and this is reflected in the price at which produce is sold. The treatment of losses in marketing cost calculations can be fairly complex. Quality losses reveal themselves when the farmer or trader sells part of a consignment at a lower price than the rest. This could be the result of poor harvesting techniques and bad handling on the farm (bruising, exposure to the sun), which do damage even before the produce is sold to the trader.

Example
Product loss calculations

The best way to treat losses is one that enables you to compare the quantity eventually sold with the quantity originally bought from the farmer. It gives the most accurate calculation and also means that the costs involved in packing, transporting, handling and storing produce that is eventually lost are included.

Assume that at 10 percent loss levels, 1 kg of tomatoes purchased by the trader from the farmer results in 900 grams (0.9 kg) available for sale to consumers. The trader buys tomatoes from the farmer at \$5 per kg. Marketing costs are \$2 per kg.

The selling price of tomatoes is \$8 per kg ...

1 kg purchased at \$5 per kg = \$5.00
1 kg packed and transported at \$2 per kg = \$2.00
Total costs = \$7.00
Income from sales = \$8 x 0.9 kg = \$7.20
Thus the margin to the trader = \$0.20

*Product losses
can occur
anywhere
along the
marketing chain*

*Storage
extends
the period
of availability
of a product*

Storage. Storage is carried out in order to extend the period of availability of a crop to consumers. In the case of staple food crops, long-term storage is of course essential. The harvest period may be just a few months, but the staple has to be consumed throughout the year.

Storage can be carried out by the farmer, the trader or the buyer. For more perishable crops, storage can be used to extend what are often very short periods of availability. However, this is only viable when the produce can be sold after storage at a price higher than the in-store price, with the difference fully covering the costs of storage, as well as offering an incentive to take the risk of loss. Storage costs fall into four categories:

- costs associated with the physical operation of the stores, that is, the actual cost per kilogram that must be paid to place the produce in the warehouse or cold store. Such costs are made up of factors, such as depreciation on the building, security costs, electricity and other utility costs, and maintenance;
- costs associated with the maintenance of the product quality while it is in store (e.g. the cost of chemicals);
- costs associated with loss of quality and quantity while the produce is in store;
- financial cost to the owner while produce is in store.

The biggest single factor affecting storage costs is capacity utilization. Where a store is used frequently to full capacity, costs per unit will be low. Where one is kept empty for much of the time, costs will be high.

Where commercial storage facilities are used, it is relatively simple to work out physical storage costs incurred by traders, because they will be charged on a fixed basis (e.g. kilogram per day, box per week, tonne per month). The cost per kilogram for the period of storage can then be worked out.

There will usually be quantity losses while produce is in store. This may be deliberate (for example, when grain is dried so that it will store better) or accidental because of bad storage. With fresh produce, some quantity loss is almost inevitable no matter how efficiently it is stored. Physical losses in storage need to be treated as costs. Quality losses are also inevitable, and for the trader these are reflected in the prices received.

Example
Storage cost calculations

Assume that a store is hired for 120 days of the year at a total cost of \$600 and that the weighted average contents are 250 bags of potatoes.

The storage cost is ...

$$\begin{aligned} \$600 \div 120 \text{ days} &= \$5.00 \text{ per day} \\ \$5 \div 250 \text{ bags} &= \$0.02 \text{ per bag per day} \end{aligned}$$

Marketing costs can be reduced by creating formal or informal marketing groups for farmers. This is often advantageous, particularly for small-scale farmers. Many farmers market their produce and pay the costs for transport, handling and storage themselves. By forming farmer groups, economies of scale are often realized and marketing costs are reduced. Farmer groups not only ensure cost reductions but they also strengthen the farmer's bargaining ability, reduce risks and ensure easier access to credit.

Processing (adding value to products). Processing products is a very common way of adding value to them. As agriculture becomes more commercial, such processing tends to be more and more in the control of commercial farms, making it very difficult for farmers to add value for themselves. However, in more traditional agriculture on-farm processing is done often.

Processing adds value to a product and potentially increases income

Adding value to products can benefit both farmers and farmer groups in a number of ways. Some of these are:

- increases the profit margin to offset transport costs from the rural areas to the lucrative markets;
- increases shelf-life of the product;
- provides family or farmer group labour;
- transport factor may be reduced completely if the improved product has a local market. For example, cassava cake might find a ready market in the community and thereby reduce the farmer's costs dramatically. Avocado or mango may be made into ice desserts.

Examples
Value-adding activities for various products

Product	Activity
Bananas	Graded, packaged, chips, dried, cooked
Coconuts	Brooms, syrup, milk, candy, jam
Eggs	Graded and packaged
Fruits	Candied, fermented dessert
Nuts	Candied, ceremonial figures
Pork	Slaughtered, sliced
Cassava	Bagged and transported to markets, crisps, snacks Fried, candy, pudding, starch, grated and wrapped, dough
Vegetables	Graded, packaged, transported to end user/market Graded, pre-packed, dried, semi-prepared, bottled, candied

Marketing margins

The marketing margin is the difference between the price of the product at two different stages in the marketing process. The price difference between the farm and wholesale levels is called the *farm-wholesale margin*, while the difference between the price received by the farmer and the price paid by the consumer is called the *farm-retail margin*. The size of the marketing margin depends on the magnitude of the marketing costs and the amount of profit that buyers or traders make.

If the margin is large, it is often because the marketing costs are high. Marketing costs may be high because more services are required. Alternatively, if only few services are rendered, the costs of the services themselves may be high. For example, people with high incomes often prefer products presented in attractive packaging and sorted into various grades. These requirements result in higher costs.

Higher costs can also be traced to poor road infrastructure. The inadequate road system results in high costs of fuel and the maintenance of vehicles, as well as higher losses as a result of damage to produce while in transit. Transport costs may also be high because of the small volume of the produce marketed. Lack of marketing training and poor management also increase marketing costs. Another source of high cost is lack of price and quality information on the part of the buyers.

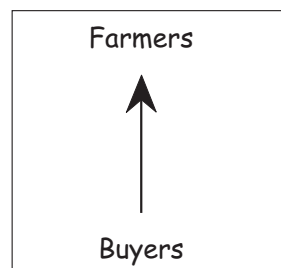
Product prices change at different stages in the marketing process

Notes

Options for marketing produce

This handout discusses some of the options that small-scale farmers have when deciding on the best marketing channel to use. It should be remembered that marketing channels in Asia are usually long, and small-scale farmers often do not possess the skills, ability and resources to select some of these channels. The advantages and disadvantages of each potential marketing channel needs to be assessed.

Farmgate marketing



*Marketing
by farmers
on farm*

As the name implies, this is marketing done by the farmer at the place where the product is produced. Buyers come to the farm to buy produce. Generally there is no limit to the type of produce that may be marketed in this manner as long as there are buyers willing to come to the farm.

The **advantages** are:

- There are no transport costs.
- Produce can be sold by the farmer, thus costs are reduced even if prices may be lower.
- It is better suited to the small-scale farmer.

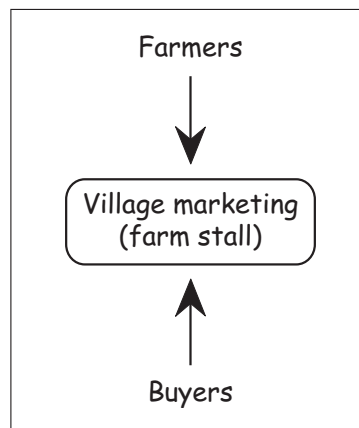
The **disadvantages** are:

- The farmer has to accept the local price for produce.
- The farmer may not be well-located to sell the product.

Farmgate marketing is common in the traditional small farming sector. However, once the local market's demand is supplied, the farmer has to look to more distant markets.

Village marketing

*Marketing
by farmers
at village
level*



This channel goes some way towards taking the product to the buyers. At its most simple level, farmers or farmer groups may operate a farm stall selling their own produce. It can also be that a single individual stallholder may sell on behalf of local farmers or farmer groups. Generally, the type of product that can be marketed on a farm stall is perishable, such as fruits and vegetables. However "processed" foods, such as pickles and jams, are also suited to this type of marketing.

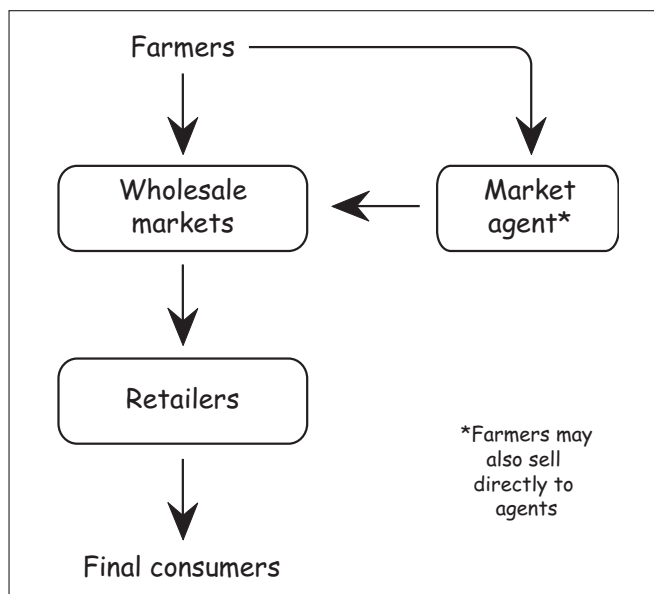
Farm stalls have the following **advantages**:

- More buyers can be reached.
- Farmers can take advantage of more favourable prices.
- Price fluctuations are generally small.

The **disadvantages** are:

- Transport of the produce may be difficult on uneven roads, if the farm is far from the village.
- The quality of the produce may have to be higher because the consumer in the market may be fussier.
- A constant supply of produce must be available to satisfy the needs of the market.

Produce or assembly markets



*Farmers
sell produce
at wholesale
markets*

These markets are set up in larger centres mainly for the sale of vegetables and fruit. They usually cater to larger producers and, in turn, supply larger urban centres through traders who buy in the assembly market and take the produce to an urban wholesale market. The quantity of supply of a particular grade of produce has a significant affect on the price obtained.

The **advantages** of this type of marketing are:

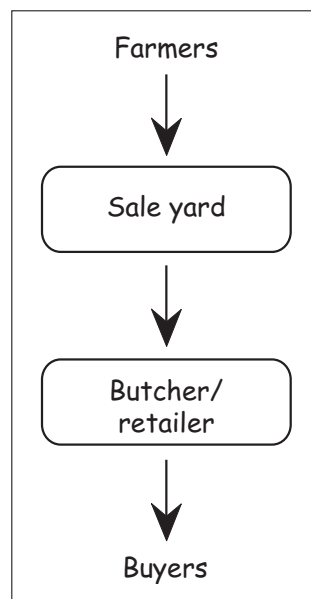
- Farmers can take advantage of higher prices in times of short supply, if they have produce available.
- The market is able to sell large quantities of farmers' produce.

The **disadvantages** are:

- Quality, packaging and presentation are very important, and produce must conform to accepted grade and packaging standards.
- Farmers need to be sure they can cover the higher marketing costs.

Auction system

*Farmers
take livestock
to auction*



The auction system is where the sellers offer animals for sale and buyers offer a price for the animals. The seller may decide whether or not to accept the price offered by the buyer.

The prices received are not fixed. To a large extent, prices reflect the supply and demand position, both locally and within the entire market. Pigs, cattle, goats and other animals are commonly marketed this way.

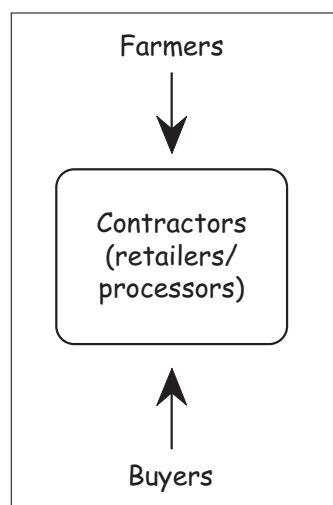
The **advantages** of the auction system of marketing are:

- Promotion is done on behalf of the farmer.
- Payment by the buyer is guaranteed.
- The market is larger than the local market.
- Small farmers have access to these sales.

The **disadvantages** are:

- Sellers may not get the price that they want.
- Prices may be lower than market price.

Contract marketing



*Farmers
produce
under
contract*

Here the farmer sells directly to a contractor at prices, quantities and qualities agreed upon in advance.

Training slides
for Session 4.2.3
Marketing channels, margins and costs

63 Market types

Farmers have a number of options to market produce

They can sell **on the farm** (farmgate)
by the road side (stalls or hawking)
or to **rural traders** who buy in rural areas

They can take their produce to a
local village market or a **town market**
or to a **large urban market**

They can sell to **processors** or **wholesalers** or **retailers**
and the farmers who produce high-value or specialized products
can sell to **supermarkets, schools, hotels** or **catering services**

64 Marketing system and marketing channels

Marketing system

Steps involved in moving produce from the farm to the buyer

Marketing channels

Stages through which the produce passes from farm to consumer

The distance from the farmer to the consumer determines the number of stages through which the product passes

Although most farmers market their produce locally, entrepreneurial farmers may choose other channels ... assembly markets, auction systems, contract marketing

Module 4, Unit 4.2, Session 4.2.3

65 Marketing costs

Product preparation

(cleaning, trimming, sorting, curing, grading, wrapping)

Packaging

(convenience, protection, marketing attractiveness)

Handling

(all movements in the farmer-to-consumer channel)

Transport

(by farmers and all trader movements in the channel)

Production losses

(poor handling, product damage, weight loss)

Storage

(operation of stores, maintenance of products in store)

Adding value by further processing (see Slide 66)

Module 4, Unit 4.2, Session 4.2.3

66 Value-adding activities

Product	Activity
Bananas	Graded, packaged, chips, dried, cooked
Coconuts	Brooms, syrup, milk, candy, jam
Eggs	Graded and packaged
Fruits	Candied, fermented dessert
Nuts	Candied, ceremonial figures
Pork	Slaughtered, sliced
Cassava	Bagged and transported to markets, crisps, snacks Fried, candy, pudding, starch, grated and wrapped, dough
Vegetables	Graded, packaged and transported to end user/ market, and graded, pre-packed, dried, semi- prepared, bottled, candied

Module 4, Unit 4.2, Session 4.2.3

67 Marketing margins

The marketing margin is the difference between the price of the product at two stages of the marketing process

The difference between farm and wholesale levels is called the **farm-wholesale margin**

The difference between the price received by the farmer and the price paid by the consumer is called the **farm-retail margin**

Large margins are often caused by high marketing costs and profits earned by traders who perform marketing services

Module 4, Unit 4.2, Session 4.2.3

Preparing for session 4.2.4
Planning for the market

Teaching methods
Lecture, group discussion, list key questions,
class training exercise, group presentation
and further discussion

Duration: 120 minutes

Learning support materials
Handout 4.2.4 (Planning for the market),
Slide 68 (Planning requires understanding the
market), Slide 69 (Questions to be addressed),
Slide 70a (Defining the market) Slide 70b (Matrix
of constraints and opportunities), Training
exercise 11 (Preparing a marketing strategy)

Notes

Planning for the market

This session explains the need to plan for the market, its advantages, formulation of a marketing strategy and data requirements. It discusses the role of extension workers to assist farmers in formulating a marketing strategy that responds to buyers' needs.

The participants should be knowledgeable of why planning for the market is necessary and understand the process of developing a market plan. This enables the farmer with the assistance of the extension worker to study the needs and preferences of consumers in advance and then to supply the produce that buyers want at a price in line with the effort and cost of production. This should ensure a successful business venture.

Objectives

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



- understand how to plan for the market;
- understand the stages in formulating a market strategy;
- recognize the important elements of a successful marketing plan;
- learn the process of developing a strategy to plan for the market.

Key points

1. Planning for the market starts with understanding the needs and preferences of final consumers or buyers and formulating a strategy for attracting them.
2. Planning should address questions such as: (i) Who is the buyer? (ii) What does the buyer want? (iii) Is this product in demand? (iv) Are other farmers providing the same product? (v) How can demand for the product be created? (vi) Can the farmer effectively compete in price and quality?

3. Planning for the market should generate information on:

- understanding the organization of the market;
- identifying what products buyers want;
- knowing when the market wants the product;
- assessing how much of the product the market wants;
- identifying market location and new or potential buyers;
- selecting the most appropriate distribution channel;
- knowing where to sell the products;
- determining the market price;
- identifying competing supplies;
- ensuring quality;
- selecting the most appropriate form of packaging;
- planning production to meet market demand.

4. Planning should answer these questions:

- What is the market?
- What products does the market want?
- Is the market aware of the supply?
- When does the market want the product?
- How much of the product does the market want?
- Where is the market?
- What is the most appropriate distribution channel?
- How does the market want the produce delivered?
- What is the market price?
- What are the terms of payment?

5. The steps in planning for the market are to:

- Assess the current market situation (demand and supply sides).
- Analyse constraints and opportunities.
- Develop the marketing strategy.

6. Constraints and opportunities analysis can assist farmers to formulate a marketing strategy. The marketing strategy consists of different ways of selling and pricing produce.
7. Planning for the market is useful for successful and profitable farming because it:
 - identifies what the buyers want;
 - lets the farmers know how much product they can sell;
 - helps the farmer to plan better for production;
 - advises the farmer what to do to make enough money to repay debts and to make a profit;
 - identifies competitors and shows farmers what they are good at through a comparison with other farmers in other areas;
 - identifies new crops to grow;
 - discovers weaknesses in the overall business plan.

Steps for instruction



1. Handout 4.2.4 (Planning for the market) should be distributed to the participants before the session.
2. Begin the session with an explanation of what is meant by planning for the market, the information that needs to be collected and its use to the farmer. This should stimulate discussion among participants.
3. Explain that the central factor in a successful marketing plan is to know the likes, dislikes and expectations of buyers. Show Slide 68 (Planning requires understanding the market). Discuss other elements that may be important for the preparation of a marketing plan.
4. Discuss a good marketing plan using Slide 69 (Questions to be addressed). Show how these questions can be addressed when preparing a marketing plan. Note that if the plan does not address solutions to these questions it should be revisited and modified.

Planning for the market

Farmers must understand the needs and preferences of buyers before they begin farming. Planning for the market involves identifying the buyers or final consumers, knowing what they want and outlining a strategy to satisfy them. Simply put, if consumers and buyers are satisfied, farmers are more likely to generate income to continue their farming operations, repay debts and ultimately make profits.

Planning for the market really means understanding the market and its opportunities. This begins with a thorough knowledge of the products to be produced and of potential buyers. Knowing who buys and why, are the first steps in understanding how best to sell. It calls for identifying the products with good market potential, identifying who are the potential buyers and competitors, what are the volumes and quality requirements, what is the schedule of delivery, what are the prices offered or set and what are the terms of payment. In some cases planning for the market may also involve drawing up a contract or agreement with purchasers.

Preparing a concrete marketing plan can be complex for an individual farmer. This is particularly true when a farmer decides to diversify production by introducing a new crop or livestock enterprise. The farmer is unlikely to succeed because economies of scale in marketing cannot be realized. Farmers would benefit by marketing as a group. A marketing plan could be very useful to them in this situation. In all events the extension worker has a necessary role to facilitate both the individual farmer and groups of farmers, and assist them in formulating strategies and planning for the market.

*Identify buyers
and ways to
attract them ...*

*... assess volume
and quality
requirements,
and schedule
of delivery ...*

*... identify
prices offered,
and determine
terms of payment*

*Understanding
the buyer is
the first step
in understanding
how best to sell*

Based on these considerations farmers should develop a marketing strategy that identifies the product to be produced, understand whether there is competition and, if so, from where it comes and identify changes in the marketplace that are likely to affect farm profitability.

What information is required?

A marketing plan for a product or a group of similar products should answer the following questions:

- Who will buy the produce?
- What does the buyer want?
- Is this product in demand?
- Are other farmers providing the same product (both locally and farther away)?
- How can demand for some products be created?
- Can the farmer effectively compete in terms of price, quality and delivery?

These are some of the questions that should be addressed through the marketing plan. A good marketing plan begins with thorough knowledge of the products to be produced and of potential buyers. Knowing who buys and why, are the first steps in understanding how best to sell.

To be successful, planning for the market must generate information on:

- understanding the organization of the market;
- identifying what products buyers want;
- knowing when the market wants the product;
- assessing how much of the product the market wants;
- identifying market location and new or potential buyers;
- selecting the most appropriate distribution channel;
- knowing where to sell the products;

- determining the market price;
- identifying competing supplies;
- ensuring quality;
- selecting the most appropriate form of packaging;
- planning production to meet market demand.

If there is already a market for selected farm products, the best opportunities for small farmers to increase their income are in these existing markets. By far the most important thing for small farmers to know is what the market wants now (i.e. what is currently being bought and sold).

The following sections examine the items outlined above that should be reviewed in order to improve marketing.

What is the market?

It is necessary to identify and understand the demand for a product in order to determine the main characteristics of the market. For example, the market for tomatoes can be the demand for this product in the local villages as a food item that complements the diet. This demand can be met by other vegetables as well.

The market for tomatoes is also the demand in the local, export and international markets. Tomatoes may be produced at off-season times where a market niche exists. There can also be a market for processed tomatoes as juice or canned or as paste. In this way the market can be seen to be a complete set of factors that form the demand.

In order to fully satisfy the demand, it is necessary to understand where and for what there is a demand. It is much different to develop and deliver products for a local fresh market than it is to produce raw materials for an industrial market, although the basic product might be the same.

Identify and understand the demand for a product

Select products that are sure to satisfy buyers

What products does the market want?

The market generally wants products that are currently being bought and sold. The requirements of buyers must be completely understood and incorporated into the daily operations of farmers who intend to compete in that market. Markets can and do change and new products can catch on, but this often takes time and implies a degree of risk.

Markets will already have well-established standards of quality, grading, packaging and prices. Farmers must be aware of these standards to be able to sell their products and maximize their profit. For example, proper grading must be strictly followed because products of inferior quality will bring a lower price. Products brought to the market by new suppliers must also respect the standards commonly accepted by consumers.

Is the market aware of the supply?

While the sale of basic commodities normally does not benefit from promotional activities, new products or products from new sources may need promotion. Information on the conditions under which they can be supplied may also be needed. This is especially true of specialized and differentiated products.

New products and products from new sources may need promoting

The buyer must be made aware of the volume and location of the produce available, standard quality of the product and seasonal changes in volume or quality. The sale terms and conditions, which may vary over time because of the financial constraints, must be made clear to both buyers and sellers. For example, the sellers may agree to let the buyers pay over a long period of time during the middle of the harvest period but require immediate cash payment at the beginning of the harvest when the farmer will need capital.

The need to promote products also may vary according to harvest/supply conditions. Marketing a well-known product from a new source will likely require some promotion. This is especially true for marketing a product of fairly standard quality. Promotional activities may have only limited success if a product or service is similar in quality and price to competing items. Within informal markets, product and price information transmitted by word-of-mouth may be the only promotion required for product sales.

When does the market want the product?

Small farmers tend to have limited choice about when to sell a given product because this is often determined by the harvest season, climatic factors beyond their control, lack of storage facilities and cash needs. Under these circumstances the market tends to respond by paying higher prices for scarce, out-of-season produce and lower prices during the harvest period. Some products have specific periods of demand during the year according to tradition and customs, while others, especially raw materials for processing, are in demand throughout the year. Cultivation practices, post-harvest treatment, stocking and storage of products (e.g. lengthen the availability of supply or adjust the harvest period) to target a specific market demand should all be analysed in terms of probable costs compared with likely benefits through higher prices.

How much of the product does the market want?

The volume of produce sold in the market reflects current demand. The market also determines the best size for units of trade (e.g. bundles or boxes) and the best method of transportation at various levels of handling. Seasonal factors affect harvest and transportation and often determine how much of a product can be delivered to the market.

*Higher prices
are paid
for scarce and
out-of-season
produce*

*The volume
of produce
sold reflects
current demand*

Access to different markets involve different costs

Where is the market?

The marketplace refers to any location where buyers and sellers come together and communicate with one another and where commercial transactions take place. It may be the local village and town market, or larger supermarkets in cities.

The market is the physical location where product, price and service information is exchanged that leads to actual purchase.

Access to different markets (i.e. from local to international) will often involve varying requirements and costs to farmers and producers. Benefits will also vary. For example, selling fruit at the farmgate to a trader eliminates the producer's costs of transportation to the marketplace. At the same time, the farmer's profit margin may be lowered when dealing with only one trader because the trader determines the price for the produce.

Access to the international markets often requires the development of the necessary linkages prior to production including further processing and other intermediate steps. Because of the accompanying related costs, normally only medium- and large-sized agribusinesses are able and willing to perform what is required to enter this market.

What is the most appropriate marketing channel?

The different channels available to farmers must be analysed and evaluated to determine the ones that best fit the client's needs while being economically viable. Different channels may be required at different times during harvest or crop period. For example, perishable fruit may be marketed and delivered directly to wholesalers and supermarkets at the beginning of the harvest when supplies are limited, and directly to agro-processing companies during the middle of the harvest when supplies are plentiful.

Select channels that are economically viable and best fit client demands

Marketing channels are not only used to identify the markets and to sell the products, but also to transfer marketing information between the producers, and the intermediate and final consumers. Each buyer has requirements for raw materials or processed goods that suppliers try to identify more accurately and satisfy better than their competitors. The successful producer learns how to meet product demand, provide quality services, meet delivery schedules and grant favourable payment arrangements so that buyers are satisfied.

The choice of marketing channel and the level of the channel to target must reflect the buyer's preference and be more efficient than the alternatives. With this information they can decide which channel or level in the supply chain will satisfy the client and still provide the grower with the best profit.

The size of the farmer's operation and its location may also determine which channel or channels are most effective. Traders and other intermediaries may provide an important service for small producers scattered over a large area by getting their products to market in a more efficient manner than the producers could do themselves. However, if the farmers harvest enough produce and deliver directly to retailers in an efficient manner, and more cheaply than through the established system, they could then sell their products directly to the consumer and thus gain the extra profit.

Some product characteristics, such as perishability, often determine which channel can reach the market most efficiently and satisfy consumer demand. Proper collection and analysis of data from the market will indicate the best channel.

The best distribution channels are those that satisfy the consumer and provide the highest income to the farmer. Most smallholders sell through many channels, including directly to consumers in local marketplaces, to trader or buyers' agents and to local associations or cooperatives. Transportation requirements of certain products will affect the choice of distribution channels.

The best distribution channels are those that satisfy the consumer and provide the highest income to the farmer

How does the market want the goods delivered?

Delivery channels are the direct or intermediate paths along which products move for processing or directly to the consumer. Larger commercial farmers often deliver directly to local consumers. But they may also deliver to local retailers and merchants and even to agro-industrial buyers. Being able to establish and maintain delivery channels may depend on the producers' ability to meet deadlines with a prearranged quantity and quality of goods. The specific market to be served, the nature and diversity of products and the skill levels of the farmers may determine favourable access to a mix of delivery channels. How the buyer wants the product to be physically delivered must be considered.

What is the market price?

The market price is the price at a specific location and time at which products and services are being traded. As previously shown, it changes in response to variations in supply and demand. Prices often incorporate premiums and discounts based on volume, type of payment and conditions of sale. Perishable foods tend to be priced lower at the end of the business day than in the morning. Lack of overnight storage facilities and the poorer quality of stock remaining may force the seller to reduce prices in the evening.

Pricing must be adjusted to buyer demand. Wholesale and retail pricing, discounts for quantities, terms of sale and credit requirements must take into account existing trade practices and prices in the market. The new supplier to the marketplace must know the price levels and policies not only to present the product in a manner acceptable to the ongoing trade but also to recognize any clear advantages that could be offered to the consumer.

Market price is the price at a specific location and at the time the product is traded

What are the terms of payment?

Payment can be made in various ways, including direct cash payment, checks or bank transfers. Finding out how payment is made or what is the common level of credit in the trade, is a critical part of the information gathering process of marketing. Conditions of payment and the credit needs of clients will determine the financing requirements for commercial operations. For instance, traders often arrange for farmers to pay them during their next visit, not immediately, and processors and supermarkets may wait up to one month before making a payment.

How should all this information be used?

Normally, small farmers do not have the information they need to evaluate the importance of individual marketing factors. As a result, they do not maximize their income. Small farmers need to increase their knowledge of marketing as a tool and build up their ability to use it. Group action is particularly effective because it is not practical to expect each individual producer to have the time, interest or ability to become knowledgeable about marketing.

Information on marketing is needed for two basic purposes, for short-term operational decisions and for long-term planning decisions. The short-term operational decisions deal mainly with issues related to coping with competition. For example, should farmers modify the quality of their products? Should different grades be supplied?

*Group
marketing
provides
potential
benefits and
economies*

Long-term planning decisions include types of crops to be planted, the amount of processing undertaken on the farm and the size of processing and marketing operations in which to become involved. All these relate to problems and opportunities in the markets. Making wise decisions requires analysing the information about market opportunities and competition and critically reviewing one's own strengths and weaknesses relative to those of other suppliers. Investment decisions are based on long-term decision-making and on information from the markets.

The next step for the development of agriculture in Asia would be for farmers to integrate their production and match what buyers or consumers in local and urban markets want to buy. This is both a challenge and an opportunity. The first question the farmers must ask themselves is not "What can I grow?", but "What do my potential buyers want to buy?" This is a radical shift in emphasis, and extension workers need to guide farmers to understand the importance of this change.

Planning for the market

The purpose of planning for the market is to define the market and identify the buyers and competitors, outline a strategy for attracting and keeping buyers, and identify and anticipate change.

Planning for the market begins with a thorough knowledge of the products to be produced and of potential buyers. Knowing who buys and why, are the first steps in understanding how best to sell. Planning for the market should:

- assess the current market situation;
- analyse constraints and opportunities analysis;
- develop the marketing strategy.

*Planning
starts
by knowing
the buyer*

The current market situation. This should define the general background on the market in which the product will be sold. It begins with a general idea of who the buyers are and what they want followed by anything else that describes the market in which the products would be sold (e.g. existing supplies and packaging preferences).

Constraints and opportunities analysis. Based on an assessment of the market opportunities, the farmer or farmer group identifies the constraints and opportunities that the farm faces and realistically evaluates the farm's internal strengths and weaknesses in dealing with its market situation.

The marketing strategy. Based on the analysis carried out above, the farmer draws up a plan to address the marketing objectives of the farm. The strategy should include a clear definition of buyers, their needs and the prices attained for produce sold.

Farmers can be assisted in analysing the possible strategies by listing constraints, solutions, opportunities and actions as shown below. This should enable the farmer, with the assistance of the extension worker, to appraise the worth of a farm enterprise by identifying constraints and possible solutions to problems in an effort to generate profits.

Matrix of constraints and opportunities	
Constraints	Opportunities
<ul style="list-style-type: none"> No local market Poor transport services 	<ul style="list-style-type: none"> Potential exists for early crop production when supplies are short
Solutions	Actions
<ul style="list-style-type: none"> Organize a local farmers' market Encourage buyers to use their own transport 	<ul style="list-style-type: none"> Encourage growing early crops and develop appropriate production techniques

The solutions to marketing problems can often be very simple and may not require major changes in production or the introduction of new technologies. The marketing-production strategy should be as simple as possible. As part of the strategy the farmer should examine the combination of factors needed to satisfy the needs of the consumers and through them increase farm profits.

The overall marketing strategy could include a number of specific methods relating to sales and pricing. These are discussed in turn below.

Selling strategy

Farmers have several options in selling their produce. One way is to sell at the farmgate. Alternatively, the farmer could sell directly in the market. The choice of strategy, however, depends on the location of the farm relative to the market, the costs involved in marketing and the volume of produce to be sold. Some of the strategies that can be pursued by the farmer include selling by the roadside, contract growing, selling crops in the field and selling to institutional buyers, processors or exporters. The advantages and disadvantages of the different selling options have already been discussed in Handout 4.2.3b.

Pricing strategy

Farmers, in their quest to maximize profits, can embark on different pricing strategies depending on the nature of the product, the marketing channel selected and the point within the marketing system at which the farmer decides to dispose of produce. Some farmers, who are in the position to produce off-season products, could set their prices a little higher than those set by competitors because supply is limited. For farmers to take advantage of such markets, a marketing strategy may

be formulated to differentiate production in order to obtain a higher price. This can be done by growing a new variety or producing a product of higher quality to be sold in specialized markets (e.g. mushrooms, improved compost, flowers, strawberries).

Regardless of whether the farm is small or large, the market-oriented farmer should put together a marketing strategy and develop a plan that responds to consumers' needs. Farmers aim at maximizing profits, while buyers aim at maximizing their satisfaction. Profits can be maximized by selling large quantities of a small number of products at the highest possible price. Buyer satisfaction can be maximized by increasing the range of products available for consumption and purchasing these products at the lowest possible price consistent with their income and the quality they require.

Examples

Questions to ask when planning for the market

A marketing plan, prepared by extension workers, could be prepared with information gathered as listed below.

Product information

The product and its benefits should be described from the consumers' perspective. Farmers should know, or at least have an idea of, what the consumer desires:

- What are the main crops grown and livestock reared including varieties/breeds?
- When are the crops harvested? What are the yields per unit, prices attained and volume produced?
- What are the advantages of these crops and/or livestock over others in terms of yield, quality, price and seasonality?
- Is the produce graded? If so, into what grades?
- Has the produce been packed? If so, what type, size and cost of packing material?

- What is the break-even price for each enterprise?
- What are the costs of growing, harvesting and transporting the crop/livestock?
- Are any new technologies or practices being tried on this crop/livestock? Have they been successful?
- What are the main production problems?
- What quantities can farmers in the area produce, and do these allow for scale economies in transport and marketing?

Input supply and financing

- Are the inputs required readily available for all farmers?
- Are they of the right quality?
- Do input suppliers provide advice to farmers? If so, how good is the advice?
- Do farmers have money to pay for these inputs?
- Do farmers have access to credit for working capital and long-term loans?
- What are the sources of credit available? What type of collateral is required and how available is the finance?
- Can farmers readily obtain equipment either to buy or hire?

Local marketing system

- How is the crop/livestock produce marketed at present?
- Who buys the produce and when?
- Who are the most important intermediaries or buyers?
- Which buyers have the best reputation?
- What prices are paid?
- Is there competition between buyers?
- Is there a wide variation between the prices received by farmers for similar produce in the same area? If so, why?
- Do buyers provide credit to farmers and on what conditions?

- Do buyers expect credit from farmers in the form of deferred payment?
- How is produce transported to the market?
- What are the main markets and where is produce sold?
- Who provides transportation?
- What is the unit price of transport to the different markets?
- How long do the journeys take? How frequently does the transport leave the area?
- How efficient are the transport links?
- What form of transport should be used to get the produce to the market?
- Should the transport of produce be pooled or sent individually?
- What is the frequency of shipment and the best day for arrival in the market?
- How much contact do farmers have with the market? What is their source of information, and how quickly do they obtain market information on prices, volumes and quality requirements?
- What complaints do farmers have about intermediaries?
- What complaints do intermediaries have about farmers?

Distribution channels

- Which distribution channels do buyers prefer? What channels are available?
- Which distribution channels are viable, given the producers' size and location?
- What labour and capital inputs are required for developing various channels?
- How do different channels affect the profit received by the producer?
- What limitations does the product itself impose on the selection of appropriate channels?
- What are the limitations/restrictions on the use of various distribution channels?

Delivery of products

- How should the product be delivered?
- What method of transportation does the consumer require?
- What methods of transportation does the producer or trader have?
- Can small farmers meet the markets' delivery requirements?
- Is the crop/livestock produce stored? If so, where and by whom? How much of the product should be stored? What storage arrangements are required?
- Are storage and stocking required to meet the buyers' delivery schedule?
- Are associations and cooperatives a necessary link in reaching the market?
- Are goods delivered directly to the buyer by producers?
- What size units does the buyer require?

Product type and form

- What products are farmers interested in producing?
- What market forms (fresh, processed)?

Competition

- How competitive is the market?
- Who are the main suppliers to that market?
- Is the marketing plan being adjusted to reflect changes in the competition?

Market potential

- What is the demand to be satisfied?
- How large is the market? How much can the market absorb?
- Which market is the farmer willing and able to satisfy?
- What percentage of produce should farmers be interested in producing?

Quality standards, packaging, prices

- What are the grades and quality standards of the produce?
- What type of packaging is required? What is the cost of packaging?

Marketing costs and margins

- What are the overall costs of marketing and what are the marketing margins?

Sales

- What factors are likely to affect sales (weather, special festivals, day of arrival in market)?
- What are the potentials and techniques for developing sales?

Pricing

- What are current price levels, price policies, conditions of sale and payment terms found in the market?
- Is the product a "price taker" or a "price maker"?
- What market prices are obtained (average, maximum, minimum, effect of different quality standards and seasonal conditions on price)?
- How can premium prices be attained?

- If the product is a "price maker", what price strategy should be followed? And what is the percentage mark-up? Does the set price leave a margin for profit?
- What are the various cost factors to be considered in determining the pricing policy?
- How does the location of the market affect prices?
- How does time of day affect prices?
- How much does the price normally fluctuate during the year?
- What credit does the buyer require and how does this affect price?

Promotion

- Is the market aware of the product?
- Does the market know the volume available and how to purchase the product?
- Does the product need promotion?
- How can producers give all possible advance notice of changes in their ability to provide the goods?

The farming community

- Who are the leaders of the farming community?
- Who is being especially successful and why?
- Do farmers think they need help in marketing and if so what type of help?

Notes

**Unit 4.2 – Training exercise 11
Preparing a marketing strategy**

Task

Groups should select one (or two) different product(s):
i) pork meat, ii) citrus, iii) vegetables, iv) bananas, v) pineapple.

List your product(s) _____

_____ and prepare a marketing strategy that provides answers to the questions below.

Where to sell and to whom?

How much to sell?

When?

At what price to sell?

(continued on the next page)

Training exercise 11 (continued)

What are the likely problems?

Justify how you arrived at the marketing plan

Upon completion
each group should discuss its strategy.

Training slides
for Session 4.2.4
Planning for the market

68 Planning requires understanding the market

**Planning for the market involves identifying buyers
and outlining a strategy for selling to them**

A marketing plan should answer the following questions ...

- **Who will buy the produce?**
- **What does the buyer want?**
- **Is this product in demand?**
- **Are other farmers providing the same product?**
- **How can demand for some products be created?**
- **Can the farmer compete in price, quality and delivery?**

69 Questions to be addressed

1. What is the market?
2. What products does the market want?
3. Is the market aware of the supply?
4. When does the market want the product?
5. How much does the market want?
6. Where is the market?
7. What is the appropriate marketing channel?
8. How does the market want the goods delivered?
9. What is the market price?
10. What are the terms of payments?

Module 4, Unit 4.2, Session 4.2.4

70a Defining the market

The current market situation

The general background on the market in which the product will be sold begins with an idea of who the buyers are and what they want.

Constraints and opportunities analysis

The farmer identifies the constraints and opportunities and evaluates the farm's strengths and weaknesses in dealing with its market situation (see Slide 70b).

The marketing strategy

Based on the analysis carried out above, the farmer draws up a plan to address the marketing objectives of the farm. The strategy should include a clear definition of consumers, customer needs and the prices attained for produce sold.

Module 4, Unit 4.2, Session 4.2.4

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 4 introduces the notion of planning for the market and describes the process of planning followed by farmers who run their farms as a business. It goes on to explain what marketing is and discusses the marketing chain and marketing margins and concludes by explaining how farmers and extension workers can better plan for the market.

Farm planning and management for trainers of extension workers

TRAINING
MATERIALS FOR
AGRICULTURAL
MANAGEMENT,
MARKETING
AND FINANCE

3

ASIA



Module 5 ENTERPRISE BUDGETING AND FARM PLANNING



Farm planning
and management
for trainers
of extension workers

ASIA

Module 5
ENTERPRISE BUDGETING
AND FARM PLANNING

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing and Multimedia Service, Information Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy or by e-mail to copyright@fao.org

© FAO 2006

ENTERPRISE BUDGETING AND FARM PLANNING

Unit 5.1

Farm enterprise and partial budgeting

- Session 5.1.1 The use of enterprise budgeting in farm planning (40 minutes)
- Session 5.1.2 Break-even budgeting (60 minutes)
- Session 5.1.3 The use of partial budgeting (50 minutes)
- Session 5.1.4 Preparing a partial budget (60 minutes)

Unit 5.2

Whole farm plan and budget

- Session 5.2.1 Whole farm planning (60 minutes)
- Session 5.2.2 Maximizing farm income using available resources (60 minutes)

Unit 5.3

Labour planning

- Session 5.3.1 Planning farm labour (120 minutes)

Unit 5.4

Cash flow

- Session 5.4.1 The concept of cash flow (30 minutes)
- Session 5.4.2 Application of cash flow (120 minutes)

*This volume has been designed
as a complete working package which includes all components
of the training programme needed for Module 5.*

*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.*

ENTERPRISE BUDGETING AND FARM PLANNING

Farmers are always looking toward the future. In order to increase profitability, extension workers need to be prepared to assist farmers plan their farm businesses. This module covers some of the tools and techniques that can be used in farm planning that can enable farmers to make better decisions.

Farm enterprise and partial budgeting

Farmers always look towards the future. Some decisions they might make when planning the enterprise and the farm as a whole are:

- *What crop should I produce and what variety or breed?*
- *What area of land do I need?*
- *How much should be produced?*

Forward-looking planning decisions are typically focused on the long term, but some decisions may also concern the immediate future.

The method of estimating the expected profitability of a farm enterprise is known as budgeting. The farmer as manager can prepare budgets to help make better decisions about which enterprises to expand, reduce or eliminate, which new enterprises to introduce and what adjustments to make in the organization.

This unit will examine the various forms of budgeting: (i) enterprise budgeting, (ii) break-even budgeting, (iii) partial budgeting.

The use of enterprise budgeting in farm planning

The concept of enterprise analysis, as discussed in Module 3, is reviewed in this session. However, the difference between enterprise analysis as a review exercise and enterprise budgeting as an aid to farm planning is explained. The strengths and weaknesses of enterprise budgeting and the steps involved in enterprise budgeting are described.

It is important for both farmers and extension workers to know how to prepare enterprise budgets and apply them to assess the relative contribution of individual enterprises to farm income.

Objectives

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



- understand why there is a need for farm planning and budgeting;
- understand the concept of enterprise budget and its use in farm planning;
- know the steps in preparing a farm plan and budget.

Key points

1. Enterprise budgeting is used to conduct an assessment of the profitability of a proposed enterprise.
2. It is set out in the same way as enterprise analysis and includes the same sections. These are: (i) gross income, (ii) variable costs, (iii) fixed costs, (iv) measures of enterprise profitability.
3. Enterprise budgets can also be created for different levels of production or types of technology so there can be more than one budget for a given enterprise.

4. A change in enterprise budget margin can result from a combination of changes in:
 - the selling price of the produce;
 - the cost of production;
 - any variation in the product mix of the farm.

5. The steps involved in preparing enterprise budgeting are to compute the following:
 - all sources of gross income from each enterprise;
 - operating or variable costs;
 - fixed costs;
 - measures of profit of the enterprise.

Steps for instruction



1. Discuss the difference between enterprise analysis and budget. Explain that the former is concerned with historical data and the latter with projected data. Explain that unlike enterprise analysis, where actual/prevaling prices and yields are used, enterprise budgeting requires projected yields and prices. Point out that the format used for computation is the same.

2. Show Slide 71 (Enterprise budgeting) and discuss how enterprise budgets can be constructed for different levels of production or types of technology and that these are called activity budgets. Note that enterprise budgets are usually conducted on a per unit basis (acres/hectares/livestock).

3. Discuss with the participants some of the difficulties associated with budgeting. These include estimating yields, product prices and input costs. Point out that the usefulness of budgeting depends on the skills of farmers and extension workers in forecasting.

4. Explain that gross margins can also be used for enterprise budgeting. Remind the trainees that this budget covers only variable costs. Review how to compute a gross margin. Emphasize that changes in gross margin can be the result of a combination of changes affecting the selling price of produce, the cost of production and variations in the product mix of the farm.
5. Provide an example of an enterprise budget with the aid of Slide 72 (A detailed enterprise budget). Explain that it is possible to assess the technical and financial strengths and weaknesses of individual farm enterprises that contribute to the overall gross margin of the farm.
6. Using Slide 73 (Steps involved in enterprise budgeting) summarize the four major steps required. Discuss some of the difficulties in preparing enterprise budgets. Point out that the allocation of fixed costs to individual crops/livestock is a problem that often needs to be addressed.
7. Explain that livestock budgets have some unique problems in terms of the following: (i) budgeting unit, (ii) time period, (iii) multiple products, (iv) feeds. Guide the participants on how to allocate costs between enterprises.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 5.1.1.

Notes

The use of enterprise budgeting in farm planning

While enterprise analysis is an evaluation of past performance, enterprise budgeting is used to make an assessment of the expected profitability of a proposed enterprise. Enterprise budgets provide the basis for planning the next season's activities. Unlike enterprise profitability analysis where actual/prevaling prices and yields are used, enterprise budgeting calls for estimates of projected yields, prices, costs and input use.

Enterprise budgeting is similar to enterprise analysis in format and presentation. Enterprise budgeting consists of four parts: (i) gross income, (ii) variable costs, (iii) fixed costs, (iv) measures of enterprise profitability. Refer to Module 3 to recap the definitions of gross income, variable and fixed costs.

Each type of crop or livestock that can be grown is an enterprise. Enterprise budgets can also be constructed for different levels of production or types of technology. These budgets are more often called "activity budgets". There can be more than one budget for a given enterprise.

An enterprise budget can be calculated on a per unit basis, such as a hectare or acre of land or head of livestock, for either one year or one production period. The base unit, however, is typically a single unit. Using common units allows for easy comparison between different enterprises.

Enterprise budgets can be used for comparing the profitability of alternative enterprises to be proposed on a farm and are useful in developing a whole farm plan. The estimated profit from a given enterprise can be compared against the estimated profit from other enterprises. It is used to select the most profitable enterprises to engage in. Once completed, an enterprise budget contains the data needed to compute average cost of production, the break-even price and the break-even yield.

Budgets are used to plan farm enterprises ...

... compare future profitability and appraise technologies

Budgeting depends on an ability to predict the future

There are often problems in estimating prices, levels of production and costs because there is much uncertainty in farming. This is particularly true when new enterprises are being considered. But there are ways to deal with these problems. This will be discussed in more detail in Unit 6.2 of Module 6 on managing risk. More crucial are the skills and judgement needed when estimating averages over a period of years. The value of budgeting depends on the skills that farmers with the support of extension workers have in forecasting and planning for the future. The more experienced the farmer and extension worker and the simpler the farm, the more precise the enterprise budget is likely to be.

As mentioned in Module 3, gross margin is the difference between gross income and total variable cost. Enterprise profit is the return after taking into account allocable fixed costs.

Example
A gross margin budget, Philippines

Farm enterprises	Gross income \$/ha	Variable costs \$/ha	Gross margin \$/ha	Area ha	Total gross margin \$
Carrots	180	83	97	0.5	48.50
Yams	120	80	40	1.0	40.00
Cabbages	210	105	105	0.3	31.50
Peppers	280	109	171	1.0	171.00
Total	790	377	413	2.8	291.00

A positive gross margin contributes towards covering the fixed costs of the farm. Maximizing the gross margin is equivalent to maximizing profit (or minimizing losses) because fixed costs for small farmers are often low and change only slightly.

Extension workers should remember that a change in gross margin can result from any combination of changes with respect to the:

- selling price of the produce;
- costs of production;
- level of production;
- level of input use;
- variations in the product mix (e.g. other enterprises).

Budgets can be divided into physical and financial parts.

Example
A detailed enterprise budget for rice (1 ha)

Item	Unit	Quantity	Price (\$)	Amount (\$)
Rice sales	Tonnes	2.5	80.00	200.00
<i>Gross income</i>				<i>200.00</i>
Variable costs				
Seed	Kg	84	0.25	21.00
Fertilizer				
Nitrogen	Kg	77	0.30	23.10
Phosphorous	Kg	35	0.10	3.50
Chemicals				19.00
Labour (hired)				2.00
Miscellaneous costs				7.00
Interest on working capital (10% for 4 months)				5.60
<i>Total variable costs</i>				<i>81.20</i>
<i>Gross margin</i>				<i>118.80</i>
Fixed costs				
Machinery depreciation				10.00
Fixed labour				13.00
Land charge (rent)				15.00
Storage costs				3.00
<i>Total fixed costs</i>				<i>41.00</i>
Total costs				122.20
Enterprise profit				77.80

*Precise planning
is essential
for enterprise
budgets ...*

*... and a detailed
breakdown
is needed for
good budgeting*

Training slides
for Session 5.1.1
**The use of enterprise budgeting
in farm planning**

71 Enterprise budgeting

Enterprise budgeting contains four parts ...

- gross income
- variable costs
- fixed costs
- measures of enterprise profitability

Enterprise budgeting can be used to ...

- assess the expected profitability of an enterprise
- compare the profitability of alternative enterprises
- develop a whole farm plan

72 A detailed enterprise budget

Item	Unit	Quantity	Price (\$)	Amount (\$)
Rice sales	Tonnes	2.5	80.00	200.00
<i>Gross income</i>				<i>200.00</i>
Variable costs				
Seed	Kg	84	0.25	21.00
Fertilizer				
Nitrogen	Kg	77	0.30	23.10
Phosphorous	Kg	35	0.10	3.50
Chemicals				19.00
Labour (hired)				2.00
Miscellaneous costs				7.00
Interest on working capital (10% for 4 months)				5.60
<i>Total variable costs</i>				<i>81.20</i>
<i>Gross margin</i>				<i>118.80</i>
Fixed costs				
Machinery depreciation				10.00
Fixed labour				13.00
Land charge (rent)				15.00
Storage costs				3.00
<i>Total fixed costs</i>				<i>41.00</i>
<i>Total costs</i>				122.20
Enterprise profit				77.80

Module 5, Unit 5.1, Session 5.1.1

73 Steps involved in enterprise budgeting

- Step 1. Compute all sources of gross income from each enterprise**
(main product and by-products)
- Step 2. Compute operating or variable costs**
- Step 3. Compute fixed costs**
(machinery and equipment depreciation, interest on fixed capital investment and land charge)
- Step 4. Compute the measures of profit of the enterprise**

Module 5, Unit 5.1, Session 5.1.1

Break-even budgeting

The changes in gross margin and enterprise profit have previously assumed average values. However, averages can be deceiving. They represent the common mid-point between two extremes and often portray a picture that does not reflect the actual situation. In this session, we shall investigate what happens when we move away from the average case. The trainee is introduced to the concept of break-even budgeting as a tool for enterprise budgeting and farm planning. Extension workers are taught how to calculate the break-even yield and price and to interpret the results by way of simple examples.

In break-even budgeting, the farmer can determine the minimum yield and output price needed to recover the variable costs or total cost incurred in using a given technology or improved farm practice.

Objectives

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



- understand the concept of break-even budgeting and know its uses;
- know how to calculate the break-even yield and break-even price.

Key points

1. Break-even analysis studies the relationship between costs and income at different levels of production. This is useful because the data included in enterprise budgets are averages and there is a risk that these averages will not be realized.
2. The data contained in enterprise analysis can be used to perform the break-even analysis for prices and yields.
3. A break-even budget estimates the maximum acceptable level of a cost item or the minimum acceptable level of a income, given an estimated level of cost.

4. Break-even yield refers to the yield required to recover the costs incurred in production at given prices of products and inputs.
5. Break-even price refers to the product price needed to recover all the costs incurred in production at a given level of output and price of input.
6. Break-even prices and yields can be calculated from both total costs and variable costs.
7. Break-even yields and prices should be compared with the actual values. If the actual values are higher than the computed break-even values, it is profitable to proceed with the enterprise. Otherwise losses are likely to be incurred.

Steps for instruction



1. Distribute Handout 5.1.2 (Break-even budgeting) to the participants before the session begins.
2. Show Slide 74 (What is break-even budgeting?) and explain the concept. Point out that farmers and extension workers can calculate the minimum yield and product price needed to recover the variable costs. Explain that break-even prices and yields can be calculated from either total costs or variable costs. Stimulate a discussion on the subject.
3. Explain how break-even calculations are carried out with the aid of Slide 75a (A simple break-even budget), Slide 75b (Diagram of a break-even point), Slide 76 (Calculating break-even yield), Slide 77 (Calculating break-even price).

4. Conclude the session by discussing other uses of break-even budgets. Encourage discussion by asking questions such as:
 (i) How can it be used for setting prices? (ii) Why aren't fixed costs included? Some of the points that might be raised by the participants in the discussion are that:

- Break-even budgeting is a very useful tool for pricing farm produce. By using the break-even analysis in competitive pricing, a farmer can determine how to lower prices, sell more without losing and, thus, compete with other suppliers.
- Only variable costs need to be considered in the break-even analysis because fixed costs are always present whether or not a farmer produces. It is more important for farmers to recover the variable costs from the product price set.

These points should be raised in the discussion.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 5.1.2.

Notes

Break-even budgeting

Break-even budgeting is a technique for studying the relationship between costs and income at different levels of production. A break-even budget estimates the maximum acceptable level of a cost item or alternatively, the minimum acceptable level of income given an estimated level of cost. In other words, it looks at the scale of the enterprise when income equals cost. At this point, profits or gross margins are zero.

The results obtained from actual farm conditions are often very different from the values included in the enterprise budget. Yields and output prices often vary considerably in reality because of changes in many factors. It is, therefore, useful to determine the minimum yield and product price required that enables the farmer to recover the variable and total costs incurred in farm enterprise production. The information included in enterprise analyses can be used to perform break-even analysis for product prices and yields. The break-even values can be calculated from both variable and total costs.

In preparing a break-even budget the values of all the variables except a selected variable are known. For example, a farmer might be interested in substituting one variety of tomato for another, although the production potential of the new variety is unknown. In this situation, the break-even budget is constructed to estimate the minimum yield that would have to be achieved to make the change worthwhile. Alternatively, if the expected yield is known but the price is unknown, the budget could indicate the minimum price that must be obtained to make the change economically feasible.

Break-even budgeting examines cost and income at different levels of production or price

It determines the minimum yield and price needed to cover costs

Farmers should be aware of the point at which they start making a profit. This requires that the farm's fixed costs have to be taken into account and covered by the income generated from farm enterprises. The higher the fixed costs, the longer it will take for the business to break even and make a profit. It is, therefore, vital to keep fixed costs down to a minimum.

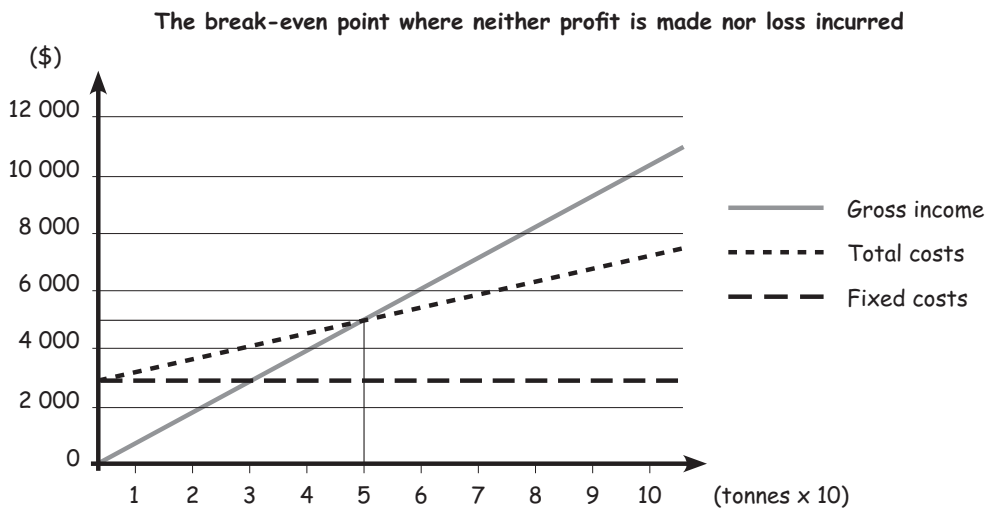
Example

A simple break-even budget

A farmer intends to sell fruit at \$100 per tonne. The variable costs are \$40 per tonne, and fixed costs are estimated at \$3 000. The farmer carries out a market investigation that suggests that 100 tonnes of fruit could be sold at this price. The farmer wants to calculate the break-even point for sales and estimate how much profit can be earned.

This can be calculated and shown as a graph. The graph opposite shows that the farmer would need to sell 50 tonnes of produce at a value of \$5 000 in order to cover the variable and fixed costs (total costs) of production. This would be the break-even point before beginning to generate a profit. If the farmer increases sales to 100 tonnes, then a profit of \$3 000 will be earned.

Units sold (tonnes)	Sale price (\$)	Gross income (\$)	Variable costs (\$)	Fixed costs (\$)	Total costs (\$)	Enterprise profit (\$)
0	100	0	0	3 000	3 000	- 3 000
10	100	1 000	400	3 000	3 400	- 2 400
20	100	2 000	800	3 000	3 800	- 1 800
30	100	3 000	1 200	3 000	4 200	- 1 200
40	100	4 000	1 600	3 000	4 600	- 600
50	100	5 000	2 000	3 000	5 000	0
60	100	6 000	2 400	3 000	5 400	600
70	100	7 000	2 800	3 000	5 800	1 200
80	100	8 000	3 200	3 000	6 200	1 800
90	100	9 000	3 600	3 000	6 600	2 400
100	100	10 000	4 000	3 000	7 000	3 000



The break-even point at which neither profit is made nor loss incurred is plotted above. The total costs of the farm enterprise would be the same as gross income.

Break-even yield

The break-even yield provides information on the yield required to make the enterprise profitable. This is the yield necessary to cover all costs at a given product price.

$$\text{Break-even yield} = \frac{\text{Total costs}}{\text{Product price}}$$

If total costs (fixed + variable) are \$157.50 per hectare and the product price is given to be \$80/tonne ...

$$1.97 \text{ tonne per ha} = \frac{\$ 157.50 \text{ per ha}}{\$ 80 \text{ per tonne}}$$

Information on the break-even yield is needed to make the enterprise profitable

Because the product price is only an estimate, it is often useful to compute the break-even yield for a range of possible prices. This provides some insight into the sensitivity of the break-even yield to changes in the output price as shown below.

Product price (\$ per tonne)	Break-even yield (tonnes per ha)
40	3.94
50	3.15
60	2.63
80	1.97
90	1.75

Interpretation of break-even yield. If the actual yield is higher than 1.9 tonnes per ha (the break-even yield), it will be profitable for the farmers to grow the crop. Conversely, if actual yield is lower than its break-even yield, farmers will incur a loss if the crop is grown.

Break-even price

The break-even price is the product price needed to just cover all costs at a given production level.

$$\text{Break-even price} = \frac{\text{Total costs}}{\text{Expected yield}}$$

Using an expected yield of 2.5 tonnes with the same total costs (\$157.50) as before ...

$$\text{\$63 per tonne} = \frac{\text{\$157.50}}{2.5 \text{ tonnes}}$$

Provides information on the price needed to make the enterprise profitable

Notice that the break-even price is the same as the total cost of production. These are only two different ways of looking at the same value.

The break-even price can also be computed for a range of possible yields as in the following table. Different yields cause different break-even prices (and cost of production), and these prices can vary widely depending on the yield level.

Expected yield (tonnes)	Break-even price (\$)
1.0	157.50
1.5	105.00
2.0	78.75
2.5	63.00
3.0	52.50
3.5	45.00

Interpretation of break-even price. If the price of the product is above the break-even price, it will be profitable to grow the crop. Conversely, if the price of the product is below \$63 per tonne, farmers will incur a loss if they decide to cultivate the crop.

Since costs, yields and output prices in an enterprise budget are estimated values rather than actual values, the calculation of the break-even points, yields and prices can assist farmers in making better decisions. By studying the various combinations of the break-even point, yields and prices, farmers can form their own expectations about the chance of obtaining a price and a yield that would just cover total costs. Break-even prices and yields can also be calculated from total variable costs rather than total costs of production.

Notes

Training slides
for Session 5.1.2
Break-even budgeting

74 What is break-even budgeting?

**Break-even budgeting is a technique
for studying the relationship between costs and income
at different levels of production**

**A break-even budget estimates
the maximum acceptable level of a cost item
or alternatively, the minimum acceptable level of income
given an estimated level of cost**

*Thus, it looks at the scale of the enterprise
where income equals cost
at which point profits or gross margins are zero*

75a A simple break-even budget

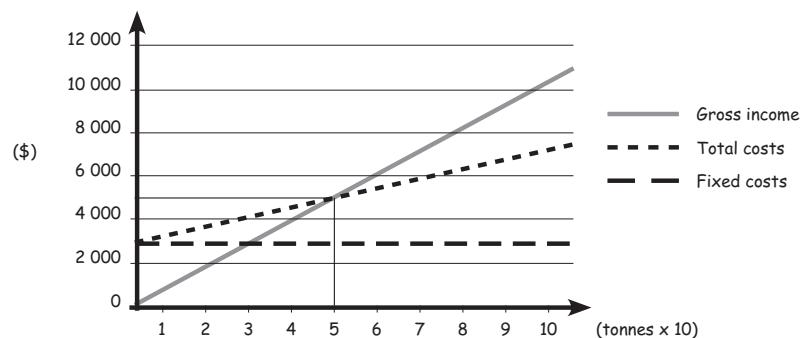
Units sold (tonnes)	Sale price (\$)	Gross income (\$)	Variable costs (\$)	Fixed costs (\$)	Total costs (\$)	Enterprise profit (\$)
0	100	0	0	3 000	3 000	- 3 000
10	100	1 000	400	3 000	3 400	- 2 400
20	100	2 000	800	3 000	3 800	- 1 800
30	100	3 000	1 200	3 000	4 200	- 1 200
40	100	4 000	1 600	3 000	4 600	- 600
50	100	5 000	2 000	3 000	5 000	0
60	100	6 000	2 400	3 000	5 400	600
70	100	7 000	2 800	3 000	5 800	1 200
80	100	8 000	3 200	3 000	6 200	1 800
90	100	9 000	3 600	3 000	6 600	2 400
100	100	10 000	4 000	3 000	7 000	3 000

(the break-even point is diagrammed in Slide 75b)

Module 5, Unit 5.1, Session 5.1.2

75b Diagram of a break-even point

The break-even point at which neither profit is made nor loss incurred



All enterprises must remain profitable, so the break-even point should be closely watched

Module 5, Unit 5.1, Session 5.1.2

76 Calculating break-even yield

Break-even yield provides information on the yield required to make an enterprise profitable

$$\text{Break-even yield} = \frac{\text{Total costs}}{\text{Product price}}$$

So, if **total costs** (fixed + variable) are **\$157.50 per hectare** and the **product price** is given to be **\$80 per tonne** ...
... then the **break-even yield** is **1.97 tonnes per hectare**

Since the **product price** is an estimate, it is useful to compute the break-even yield for a range of possible prices* as shown in the chart

Product price (\$ per tonne)	Break-even yield (tonnes per ha)
40	3.94
50	3.15
60	2.63
80	1.97
90	1.75

*at the same total cost of \$157.50

Module 5, Unit 5.1, Session 5.1.2

77 Calculating break-even price

Break-even price is the product price needed to just cover all costs at a given production level

$$\text{Break-even price} = \frac{\text{Total costs}}{\text{Expected yield}}$$

So, if **total costs** (as before) are **\$157.50 per hectare** and the **expected yield** is given to be **2.5 tonnes** ...
... then the **break-even price** is **\$63 per tonne**

Since the **expected yield** is an unknown it is useful to compute the break-even price for a range of possible yields* as shown in the chart

Expected yield (tonnes)	Break-even price (\$)
1.0	157.50
1.5	105.00
2.0	78.75
2.5	63.00
3.0	52.50
3.5	45.00

*at the same total cost of \$157.50

Module 5, Unit 5.1, Session 5.1.2

Preparing for session 5.1.3
 The use of partial budgeting

Teaching methods

Lecture, formal class discussion,
 draw conclusions

Duration: 50 minutes

Learning support materials

Handout 5.1.3 (Use of partial budgeting in enterprise and farm planning), Slide 78 (What is partial budgeting?), Slide 79 (When to use partial budgets), Slides 80a, b and c (Compare two different systems of farming), Slides 81a, b and c (Determine profitability of varying inputs), Slide 82 (Choose the plan which gives better results), Slide 83 (Format for a partial budget), Slide 84 (Example of partial budgeting)

Notes

The use of partial budgeting

This session explains the concept of partial budgeting and its importance. It also introduces a simple format that can be used when preparing a partial budget. Partial budgeting is an important planning tool used by farmers to estimate the effect of relatively minor adjustments on the farm and its effect on overall farm profit.

Objectives

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



- understand the concept of partial budgeting;
- use the partial budget as a tool to assess the effects of marginal changes involving several enterprises within the farm.

Key points

1. Partial budgeting looks only at those income and expense items that are affected by the proposed change. It is different from a total budget.
2. It evaluates whether or not the proposed change would be more profitable than the current situation. It shows the net farm income from proposed changes.
3. Partial budgeting is "testing it out on paper" before committing resources to a plan or to a change in an existing plan.

4. Partial budgeting can be used to:

- compare two different systems of farming;
- help determine the profitability of varying input applications;
- enable the farmer to choose the plan that gives better results;
- help determine the best age to market crops, poultry and livestock.

5. The following information is needed in partial budgeting:

- the prices of both inputs and outputs;
- the costs and returns of the old practice/resource/plan;
- the costs and returns of the new practice/resource/plan.

From this information the added costs, as well as the reduced costs and returns of both the old and new practice/resource/plan, can be calculated.

Steps for instruction



1. Distribute Handout 5.1.3 (The use of partial budgeting in enterprise and farm planning) before the start of the session.
2. Define partial budgeting with the aid of Slide 78 (What is partial budgeting?).
3. Explain when partial budgeting should be used with the aid of Slide 79 (When to use partial budgets). Point out that it is used to compare two different cultural practices or systems of farming, determine the profitability of varying input applications, choose which practice or plan gives better results, and to determine the best age to market crops, poultry and livestock. Give examples to promote understanding. Elaborate the situations mentioned above with the aid of Slides 80 a, b, and c; Slides 81 a, b and c; Slide 82.

- 4. Discuss the information needed to conduct a partial budget.
Mention that this includes the prices of inputs and outputs, costs and returns of the old practice/resource/plan and costs and returns of both the old and new practice/resource/plan. Show Slide 83 (Format for a partial budget) to illustrate a partial budget in preparation.

- 5. Conclude the session by showing Slide 84 (Example of partial budgeting) and draw conclusions.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 5.1.3.

Notes

The use of partial budgeting

Partial budgeting is a planning tool used by farmers to estimate the effect on farm profit of a particular change to an enterprise or activity within the farm. It looks only at those income and expense items that are affected by a proposed change. This differs from a total budget that includes the income and expenses for the entire farm. The partial budget looks at the economic and non-economic benefits and costs of proposed changes. Many of the day-to-day decisions made by farmers are really an adjustment of an existing farm plan.

Partial budgeting can be useful when there are proposed changes to a farm such as expansion, introducing a new enterprise, purchasing machinery or equipment, or even down-sizing the farm. These adjustment decisions often affect income and expenses. Thus, partial budgeting is a valuable instrument that shows the effect of marginal changes on overall profitability and, in particular, choosing between technologies and enterprises. It is a form of marginal analysis designed to show the net increase or decrease in net farm income resulting from the changes rather than to show the profit or loss for the farm as a whole.

Four basic items to be considered in partial budgeting

Cost (-)	Income (+)
(a) additional costs	(c) additional income
(b) income lost	(d) costs saved

The partial budget evaluates whether or not the proposed change would be more profitable than the current situation. The difference between (a + b) and (c + d) will indicate whether the change is profitable. If (c + d) exceeds (a + b), the change increases farm income, provided that it is technically feasible.

Partial budgeting shows the affect of small changes on farm profit

*Small changes
to the farm
business are
often all
that is needed*

When to use partial budgets

Many small reorganization problems involve partial budgeting. These are undertaken when the basic farm plan is not changed, and the farmer is concerned with the marginal costs and returns resulting from a small change. In many cases where the farm is already planned, partial budgeting for small adjustments may be all that is required. In practice it is not always easy, or even feasible, to collect information on all the inputs and outputs for an enterprise or technology. Partial budgeting does not require this to be done. The tool only requires information about those outputs and inputs (i.e. both expressed in monetary or value terms) that will actually change as a result of small adjustments to the farm business.

Many changes that do not require a complete reorganization of the farm can frequently be identified. Farmers can employ their resources in more than a single way in response to changes in prices, market demand and the cropping pattern. Partial budgets are useful to evaluate changes such as:

- expanding an enterprise;
- selecting alternative enterprises;
- selecting different production practices;
- deciding whether to purchase or hire equipment;
- making a capital improvement;
- buying new equipment to replace hand labour or maintaining the older equipment.

Partial budgeting is based on the principle that a small change in the organization of a farm will have one or more of the following effects:

- eliminate or reduce some costs;
- eliminate or reduce some gross income;
- cause additional costs to be incurred;
- cause additional gross income to be received.

Partial budgeting gives an idea whether the proposed change is better or worse in terms of profitability compared with the actual situation. However, it cannot by itself indicate whether both the "before" and "after" situations are profitable. Gross margins are used to do this.

Examples The use of partial budgets

To compare two different systems of farming such as:

- direct seeding vs transplanting;
- hand weeding vs herbicide application;
- pesticide application vs integrated pest management (IPM);
- manual threshing vs machine threshing;
- winnowing by wind vs winnowing by fan;
- sun drying vs use of mechanical dryer.

To help determine profitability by varying inputs:

- working 10 vs 15 labour days on the farm;
- applying 3 bags vs 4 bags of fertilizer;
- applying 2 pints vs 3 pints of weedicide;
- sowing 2 cavans vs 3 cavans of seeds per hectare;
- transplanting vs direct seeding in planting;
- use of animal vs hand tractor in land preparation;
- sun drying vs use of mechanical dryer;
- applying 1 bottle vs 2 bottles of insecticide;
- using Azolla vs chemical fertilizer.

To choose the plan which gives better results:

- buying vs renting a farm machine;
- feeding poultry with home-made vs commercial feeds;
- using pump vs gravity as source of power in irrigation;
- early planting to take advantage of high prices vs seasonal planting.

To help determine the best age to market crops, poultry and livestock:

- marketing 5-week-old vs 6-week-old broilers;
- marketing 3-month-old vs 4-month-old hogs;
- marketing young vs old coconuts;
- marketing young coconuts vs "tuba" gathering;
- marketing fresh maize vs dried kernels;
- pick-up vs delivered in marketing farm products
- selling fresh vs processed products.

Information needed in partial budgeting:

- prices of both inputs and outputs;
- costs and returns of the old practice/resource/plan;
- costs and returns of the new practice/resource/plan.

From this information, the added as well as the reduced costs and income of both the old and new practice/resource/plan can be calculated.

Preparing for partial budgeting

The items to be considered when preparing a partial budget are shown below. It is important to note that the categories on the right side of the form are the two that increase profit (additional income and saved costs). On the left side are the two that reduce profit (decreases in income and increases in costs). Entries on the two sides can be summed up and compared to find the net change in income.

Additional costs (-)	Additional income (+)
Things you will have to buy because of the change or new activity.	New or extra things that you will be able to sell or eat if you make this change.
Only include a share of the total cost of capital items that will last longer than the period of the budget.	Costs saved (+)
Income lost (-)	Things you will stop buying as a result of the change.
Things you will no longer have to sell or eat if you make this change.	You will only save a share of the cost of equipment that lasts longer than the period of the budget.

Example

Problem: whether to introduce hybrid ducks or continue raising local Malaysian ducks

The shift from local ducks to hybrid ducks brings both advantages and disadvantages such as (i) *Additional costs*: bigger shelter, extra labour, water and feed; (ii) *Income lost*: results from decreased sales of meat; (iii) *Additional income*: results from the increased weight of birds; (iv) *Costs saved*: less cost for veterinarian and health care. This example continues on the following page.

The overall additional gross income together with the reduced costs is \$140.5. In contrast, the total additional costs and reduced gross income is \$172.0. This results in a net change in profit of -\$31.5. This negative difference shows that the introduction of hybrid ducks would actually decrease profit. A complete breakdown of the figures indicated above is given in the partial budget format shown below.

Partial budgeting – hybrid vs Malaysian

Additional costs (-)	(\$)	Additional income (+)	(\$)
<i>Fixed costs</i>		Added weight 60 kg (1 kg x \$1.25)	75.0
Bigger shelter	50.0		
<i>Variable costs</i>		Manure 30% weight (1 kg x \$0.05)	9.0
Extra labour	10.0		
Extra water	5.0	Feathers 5% weight (1 kg x \$0.50)	1.5
Extra feed	50.0		
<i>Subtotal</i>	<i>115.0</i>	<i>Subtotal</i>	<i>85.5</i>
Income lost (-)		Costs saved (+)	
Malaysian duck (40 kg x \$1.25)	50.0	Vet and health	20.0
Manure 15% weight (1 kg x \$0.05)	3.0	Mortality	5.0
Feathers 2% weight (1 kg x \$0.50)	4.0	Feed efficiency	30.0
<i>Subtotal</i>	<i>57.0</i>	<i>Subtotal</i>	<i>55.0</i>
(a) Total additional costs and reduced gross income	172.0	(b) Total additional gross income and reduced costs	140.5
			172.0
		Net change in profit (b - a)	-31.5

Training slides
for Session 5.1.3
The use of partial budgeting

78 What is partial budgeting?

**A planning tool to estimate the effect on net profit
of a particular change to an enterprise activity
within the farm**

**It evaluates whether or not
a proposed change to the farm
would be more profitable than the current situation**

Cost (-)	Income (+)
(a) additional costs	(c) additional income
(b) income lost	(d) costs saved

*The difference between $(a + b)$ and $(c + d)$ will indicate
whether the change is profitable. If $(c + d)$ exceeds $(a + b)$,
the change increases farm income, provided that it is technically feasible.*

79 When to use partial budgets

Farmers can employ their resources in more than a single way in response to changes in product prices, market demand and the cropping pattern. Partial budgets are useful to evaluate changes such as ...

- expanding an enterprise
- selecting alternative enterprises
- selecting different production practices
- deciding whether to purchase or hire equipment
- making a capital improvement
- buying new equipment to replace hand labour or maintaining the older equipment

Module 5, Unit 5.1, Session 5.1.3

80a Compare two different systems of farming

RICE



Direct seeding vs transplanting

Module 5, Unit 5.1, Session 5.1.3

80b Compare two different systems of farming



Manual threshing vs machine threshing

Module 5, Unit 5.1, Session 5.1.3

80c Compare two different systems of farming



Winnowing by wind vs winnowing by fan

Module 5, Unit 5.1, Session 5.1.3

81a Determine profitability by varying inputs

Applying fertilizer



3 bags vs 4 bags



Module 5, Unit 5.1, Session 5.1.3

81b Determine profitability by varying inputs

Applying weedicide



2 litres vs 3 litres



Module 5, Unit 5.1, Session 5.1.3

81c Determine profitability by varying inputs



Use of animal vs tractor in land preparation

Module 5, Unit 5.1, Session 5.1.3

82 Choose the plan which gives better results



Early planting to take advantage of high prices vs planting in season

Module 5, Unit 5.1, Session 5.1.3

83 Format for a partial budget

Categories on the left side increase profit while categories on the right side decrease profit

Additional costs (-)

Things you will have to buy because of the change or new activity.

Only include a share of the total cost of capital items that will last longer than the period of the budget.

Income lost (-)

Things you will no longer have to sell or eat if you make this change.

Additional income (+)

New or extra things that you will be able to sell or eat if you make this change.

Costs saved (+)

Things that you will be able to stop buying as a result of the change.

You will only save a share of the cost of equipment that lasts longer than the period of the budget.

Module 5, Unit 5.1, Session 5.1.3

84 Example of partial budgeting

Additional costs (-)	(\$)	Additional income (+)	(\$)
<i>Fixed costs</i>		<i>Added weight 60 kg</i>	
Bigger shelter	50.0	(1 kg x \$1.25)	75.0
<i>Variable costs</i>		<i>Manure 30% weight</i>	
Extra labour	10.0	(1 kg x \$0.05)	9.0
Extra water	5.0	<i>Feathers 5% weight</i>	
Extra feed	50.0	(1 kg x \$0.50)	1.5
<i>Subtotal</i>	<i>115.0</i>	<i>Subtotal</i>	<i>85.5</i>
Income lost (-)		Costs saved (+)	
Malaysian duck		Vet and health	20.0
(40 kg x \$1.25)	50.0	Mortality	5.0
Manure 15% weight		Feed efficiency	30.0
(1 kg x \$0.05)	3.0		
Feathers 2% weight			
(1 kg x \$0.50)	4.0		
<i>Subtotal</i>	<i>57.0</i>	<i>Subtotal</i>	<i>55.0</i>
(a) Total additional costs and reduced gross income	172.0	(b) Total additional gross income and reduced costs	140.5
			172.0
		Net change in profit (b - a)	-31.5

Module 5, Unit 5.1, Session 5.1.3

Preparing for session 5.1.4

Preparing a partial budget

Teaching methodsPresentation, class training exercise,
summarize solution**Duration:** 60 minutes**Learning support materials**Handout 5.1.4 (Preparing a partial budget),
Slide 85 (Steps in preparing a partial budget),
Training exercise 12 (Partial budgeting)

Notes

Preparing a partial budget

The step-by-step procedure presented in this session should simplify the preparation of a partial budget. This would be useful for both extension workers and farmers.

Objectives



At the end of the session, the participants should be able to prepare a partial budget for a given proposed change in the farm.

Key points

There are seven steps to be followed in preparing a partial budget:

1. State the proposed change.
2. List the added annual gross income from the proposed change by considering the costs and income of both the old and new plan. Use the prescribed partial budgeting form.
3. List the reduced costs from the proposed change.
4. List the added costs.
5. List the reduced annual gross income.
6. Estimate the change in net profit by subtracting the total additional costs and reduced income from the total additional income and reduced costs. If the difference is positive, it is profitable to proceed with the change, otherwise losses will be incurred.
7. Consider the non-economic factors of the proposed change, such as the safety issue of the machinery, the ease of use, or any social aspects of having more/less family workers working on the farm.

Steps for instruction

1. Distribute Handout 5.1.4 (Preparing a partial budget) to the participants before the start of the session.
2. Discuss the process in preparing a partial budget, such as stating the proposed change, listing the added income, listing the reduced costs, listing the added costs, listing the reduced income, estimating the net change in profit and looking at the non-economic considerations of the change. Explain the procedures with the aid of Slide 85 (Steps in preparing a partial budget).
3. Explain the use of partial budgeting using the example in Handout 5.14 (5-week vs 6-week-old broilers). Explain how to arrive at the entries for each component of the budget.
4. Point out that after computing the change in net profit and before implementing the planned change, there is a need to examine the non-economic considerations involved in the change. These are: (i) availability of inputs or outputs, (ii) labour and capital requirements, (iii) effect of management, (iv) personal preferences/culture, (v) effect on the environment. Cite examples.
5. Distribute Training exercise 12 (Partial budgeting). Have each participant to do the exercise individually. Once the exercise is completed start a discussion on the problem.

Evaluation: (i) review objectives and key points, (ii) refer to Handout 5.1.4, (iii) refer to Training exercise 12.

Notes

Preparing a partial budget

The seven steps in preparing a partial budget are illustrated using the example below.

Example

Poultry farmers would like to determine the best time to market their broilers (How would they assess whether it is profitable?)

Step 1

State the proposed change
(marketing of 5-week-old vs 6-week-old broilers)

Step 2

List the added annual gross income from the proposed change

Consider the costs and income between marketing 5- or 6-week-old broilers and enter all computations in the partial budget format (see Step 7). Expenses and returns can be computed using the following technical assumptions based on ten broilers.

- **Feeds** consumption is 0.59 kg per bird for the 5th week and 0.64 kg per bird at the 6th week or an increase of 0.05 kg per bird per week \times 10 birds = 0.5 kg \times \$4.1 per kg = **\$2.05**.
- **Labour** cost per 10 broilers calculated at **\$0.25 per week**. (The value of the farmer's labour is based on the prevailing market wage as if all labour were hired.)
- **Water** cost is calculated at **\$0.16 per week**.
- **Gain in weight** between the 5th and 6th weeks is 0.23 kg per bird \times 10 broilers = 2.3 kg \times \$4.1 per kg = **\$9.43**.
- **Manure** sold is estimated at 31 percent of body weight and valued at \$0.06 (0.31×0.23 kg = 0.71 kg \times \$0.06 = **\$0.04**).

Based on these assumptions the additional income will be **\$9.47** per production cycle for 10 broilers.

Step 3**List the reduced costs from the proposed change**

In this example, raising broilers for one more week will not result in any reduction in cost.

Step 4**List the added costs**

The added costs considered are feeds, labour and water. Note that as birds grow older, feed consumption increases and therefore feed cost also increases. This rise in feed cost decreases the added net income as birds grow older. Vaccination of birds is done during the 2nd and 5th weeks. That is why the cost of vaccine is not considered as an added cost. Light is also not used from the 5th to the 6th week so that no expense in electricity is incurred. Other costs, such interest on capital and depreciation, are fixed costs common to both and should not be considered under added costs.

Step 5**List the reduced annual gross income**

In this example, there are no reduced returns. However, if raising broilers for another week will result in the death of some birds, then it would result in reduced sales.

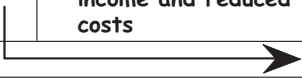
Step 6**Estimate the net change in profit**

Summarize the net effect on profit. In this example, the net farm income would increase by \$7.01 because of the additional one week of raising broilers (e.g. from 5 weeks to 6 weeks).

**Step 7
Non-economic considerations**

Look at the non-economic factors of the change, such as the safety issue of the machinery, the ease of use or any social aspects of having more or fewer family members working on the farm.

Partial budget of marketing 5-week-old vs 6-week-old broilers
(based on 10 birds)

Additional costs (-)	(\$)	Additional income (+)	(\$)
Feeds	2.05	Gain in weight	9.43
Labour	0.25	Manure sold	0.04
Water	0.16		
<i>Subtotal</i>	<i>2.46</i>	<i>Subtotal</i>	<i>9.47</i>
Income lost (-)		Costs saved (+)	
None		None	
(a) Total additional costs and reduced income	2.46	(b) Total additional income and reduced costs	9.47
			2.46
Net change in profit (b - a)			7.01

In this example, in deciding whether to raise the broiler from 5 weeks to 6 weeks, the farmer would look at the fact that net farm income increased by \$7.01 per production cycle per 10 birds. However, the farmer also needs to consider non-economic aspects before making the decision to raise the broiler for another week. These include the presence of a ready market for broilers as well as other factors.

Notes

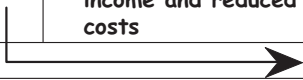
Unit 5.1 – Training exercise 12 Partial budgeting

Task

Suppose a vegetable farmer is considering growing carrots instead of peas. The information available to the farmer is as follows:

Item	\$
Extra income (carrots)	640
Costs saved (peas)	532
Extra costs (carrots)	538
Income not received (peas)	564

Construct a partial budget using the following form

Additional costs (-)	\$	Additional income (+)	\$
Extra costs (carrots)		Extra income (carrots)	
<i>Subtotal</i>		<i>Subtotal</i>	
Income lost (-)	\$	Costs saved (+)	\$
Income not received (peas)		Costs saved (peas)	
<i>Subtotal</i>		<i>Subtotal</i>	
(a) Total additional costs and reduced income		(b) Total additional income and reduced costs	
			
Net change in profit (b - a)			

(Answer key on the opposite page)

Answer key for
Training exercise 12

Additional costs (-)	\$	Additional income (+)	\$
Extra costs (carrots)	538	Extra income (carrots)	640
<i>Subtotal</i>		<i>Subtotal</i>	
Income lost (-)	\$	Costs saved (+)	\$
Income not received (peas)	564	Costs saved (peas)	532
<i>Subtotal</i>		<i>Subtotal</i>	
(a) Total additional costs and reduced income	1102	(b) Total additional income and reduced costs	1172
		→	1102
		Net change in profit (b - a)	+70

Training slides
for Session 5.1.4
Preparing a partial budget

85 Steps in preparing a partial budget

- Step 1. State the proposed change
- Step 2. List the added gross income
from the proposed change
- Step 3. List the reduced costs
from the proposed change
- Step 4. List the added costs
- Step 5. List the reduced annual gross income
- Step 6. Estimate the net change in profit
- Step 7. Consider the non-economic factors

Whole farm plan and budget

This unit defines the whole farm plan and budget, distinguishing it from partial budgeting. It also explains the procedures that can be applied to maximize farm income within the resource constraints of the farmer.

Whole farm planning and budgeting is needed when a major change to the existing farm is being considered – one that will affect most of the cost and income items on the farm. A "partial" change, as we saw in Unit 5.1, can also have significant side effects on the whole farm economy. Changes in the profitability of a single enterprise have ramifications on the profitability of the other farm enterprises. Since most farms are diversified, it is important to know the contribution of particular enterprises to the overall income of the farm. This information and knowledge should ensure better farm management.

Preparing for session 5.2.1**Whole farm planning****Teaching methods**

Presentation, trainer/participant interaction,
draw farm plan, list steps

Duration: 60 minutes

Learning support materials

Handout 5.2.1 (Whole farm planning), Slide 86
(What is a farm plan?), Slide 87 (Preparing a
whole farm plan and budget), Slide 88 (The
planning format)

Notes

Whole farm planning

This session describes the whole farm plan and budget and provides a format that can be used in its preparation. This should provide extension workers and farmers with a greater understanding of how combinations of farm enterprises affect the overall profitability of the farm. The trainees will also be provided with an understanding of the data requirements needed to prepare farm plans.

Objectives

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



- understand how to prepare a farm plan;
- understand the changes in the farm (before and after) and implications on resource allocation;
- understand the enterprise combinations and implications that lead to increases in farm income or profit.

Key points

1. A farm plan is an outline of the resources available and the type and volume of production to be carried out.
2. The farm plan requires the following basic data:
 - inventory of resources;
 - potential crops and livestock enterprises;
 - resource requirements per unit of each enterprise;
 - gross margins for planning the enterprise.

3. The farm plan involves five steps:
 - assessment of the plan in physical terms;
 - preparation of enterprise budgets;
 - selection of enterprises;
 - calculation of net farm income;
 - test sensitivity of the plan.
4. The format of a complete farm plan and budget depends on the number and kinds of enterprises involved and the details desired by the planner.
5. A complete farm plan and budget usually contains the following elements:
 - farm inventory;
 - calendar of operations;
 - schedule of expected production and income;
 - schedule of labour requirements;
 - cash flow schedule;
 - summary budget.



Steps for instruction

1. Distribute Handout 5.2.1 (Whole farm planning) to participants before the start of the session.
2. Explain what is meant by a whole farm plan. Initiate a discussion among participants on the use of whole farm planning in practice and the different ways farmers plan their farm. Explain that farm planning aims at combining resources available to the farmer in a way that best achieves the objectives that the farmer sets. Point out that it is usually carried out on an annual basis. Show Slide 86 (What is a farm plan?)

3. Explain how a whole farm plan and budget is prepared using Slide 87 (Preparing a whole farm plan and budget) as an aid. Each of the steps should be elaborated in detail.
4. Discuss the different elements of a complete farm plan. Point out that they usually include (i) a farm inventory, (ii) calendar of operations, (iii) schedule of expected production and income, (iv) schedule of labour requirements, (v) cash flow schedule, (vi) summary budget. Show Slide 88 (The planning format) to illustrate the point.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 5.2.1

Notes

Whole farm planning

A farm plan is an outline of the resources available, the enterprise possibilities and the objectives and goals of the farm family. It should give an assessment of the overall income that can be earned from the selected combination of enterprises.

The plan includes a list of possible enterprises and corresponding levels of production, expected costs and income. This data is brought together into detailed enterprise projections. Consideration is given to market outlets, sources of inputs and materials. The farm plan can also be presented spatially indicating the fields and plots where crops can be grown on the farm and possible cropping rotations to be followed.

When preparing the plan farmers need to take into account the objectives, the possible enterprises that can be grown and the resources that are at their disposal. The plan preparation should include new enterprises that have market potential.

The farm plan requires the following basic data:

- inventory of resources;
- potential crops and livestock enterprises;
- resource requirements per unit of each enterprise;
- list of gross margins for planning the enterprise.

Once a list of potential enterprises and available resources is prepared, it would be possible to select the combination of enterprises that generates a maximum total income for the farm. This would also have to be technically and financially feasible.

*A farm plan
helps to
achieve the
goals of
farm business*

Preparing a farm plan

Step 1

Assess resources available

The plan should first be expressed in physical terms. An assessment will be needed of the resources available to the farmer and the area of each crop and number of each type of livestock available. This also involves identifying the potential crops that can be grown from the farmer's resource base.

Step 2

Prepare budgets for the different farm enterprises

The enterprise budgets or gross margins are brought to a per unit basis for comparisons to be made. The range of farm enterprises should include new enterprises identified through the market plan. The farmer should also take into account the decision as to whether to specialize in a few enterprises, or alternatively, to diversify production and spread risks. Supplementary enterprises, such as small-scale livestock, can also be included especially if they are held around the homestead and do not compete for scarce resources. These enterprises will add to the overall farm profit or income.

Step 3

Use the enterprise budgets to determine which of the alternative crops and livestock enterprises would yield the highest gross margin

This is done while considering the constraints of the limited supplies of labour and sometimes capital. While farmers have a number of resources under their management control, there may be one or two resources that are really in short supply and prevent the farmer from expanding income on the farm. These are called the "most limiting resource", on production. Ways are used to identify which resource it is. Once the limiting

resource is found, the problem facing the farmer is to know how much of an enterprise to produce and with what resources in order to increase profits. Farm enterprises would then be selected in order from that generating the highest gross margin per unit of limiting resource to the lowest. A selected enterprise would be expanded until the limiting resource is all used up.

A problem often encountered is to find which resource it is that is the most limiting. The farmers' judgement is needed to assess this. Farmers are the most likely persons to know. Most often land is treated as the limiting resource and planning is conducted on the basis of gross margin per hectare but this may not always be suitable, especially among small farms in Asia where family labour is often in scarce supply. The limiting resource often depends on local circumstances.

Step 4

Estimate the total net income for the farm

The farm plan is initially constructed on the basis of gross margin data expressed as a unit of land or head of livestock. In order to estimate the net farm income, the total gross margin generated from the farm plan must take into account the fixed costs. This shows the profitability of the farm as a whole. In economic terms it is defined as the reward for all the resources contributed by the farm family during the year. Whole farm income is necessary to cover the family living expenses.

Note: The whole farm income is not the same as the cash the farm family earns. To know precisely the amount of cash available, the costs related to family labour, depreciation and interest must be deducted from the farm income.

Step 5

Test the sensitivity of the plan for key variables

This can be done in relation to the goals of the farm family (e.g. food, profit, leisure) and the availability of cash, labour supply, and food requirements. A sensitivity analysis is required that repeats some of the enterprise budget calculations for different values of the key variables. This indicates the risks involved to the farmer.

The planning format

The format of a complete plan and budget is more flexible than partial budgets and depends on the number and kind of enterprises involved and the details desired by the planner. A complete plan and budget, however, usually contains the following elements:

- farm inventory;
- calendar of operations;
- schedule of expected production and income;
- schedule of labour requirements;
- cash flow schedule;
- summary budget.

Notes

Training slides
for Session 5.2.1
Whole farm planning

86 What is a farm plan?

An outline of resources available, enterprise possibilities, objectives and goals of the farm family

It includes a list of possible enterprises and levels of production, expected costs and income brought together in detailed enterprise projections

Consideration should be given to market outlets, sources of inputs and materials

The farm plan can also be presented spatially showing fields and plots of enterprises and their rotation

87 Preparing a whole farm plan and budget

- Step 1. Assess resources available, the area of each crop and numbers of available livestock. Identify also the potential crops that can be grown on farm from the farm resource base**
- Step 2. Prepare budgets for the different enterprises that can be produced**
- Step 3. Determine which crops and livestock enterprises would yield the highest gross margin**
- Step 4. Estimate the total net income for the farm**
- Step 5. Test sensitivity of the plan for key variables**

Module 5, Unit 5.2, Session 5.2.1

88 The planning format

A complete plan and budget usually contains the following elements ...

**Farm inventory
Calendar of operations
Schedule of expected production and income
Schedule of labour requirements
Cash flow schedule
Summary budget**

The format of a complete plan and budget is more flexible than partial budgets and depends on the number and kind of enterprises involved and the details desired by the planner

Module 5, Unit 5.2, Session 5.2.1

Preparing for session 5.2.2
Maximizing farm income using available resources

Teaching methods
Lecture, class training exercise, group work,
summarize solution

Duration: 60 minutes

Learning support materials
Handout 5.2.2 (Maximizing farm income from the
efficient use of resources), Slide 89a (Farm plan),
Slide 89b (Budgeted gross margin by enterprise),
Slide 89c (Budgeted gross margin by resource
requirements), Training exercise 13 (Whole farm
budget)

Notes

Maximizing farm income using available resources

This session presents an example of how farm income can be maximized with the use of available resources, by way of preparing a farm plan and budget. The step-by-step procedure described in the previous session is applied to solve an example problem.

Because the concept is something new to both the farmer and the extension worker, the use of this illustrative example should greatly facilitate understanding of the farm planning process.

Objectives



At the end of the session, the participants are expected to know how to prepare a whole farm plan and budget.

Key points

1. The basic objective of a farmer is to maximize farm income given the available resources. This is done by choosing the most profitable combination of enterprises suitable for the farm along with the most appropriate resource allocation.
2. A simplified programming technique can be applied to a farm with few enterprises and limited resources.

3. The steps involved are listed as follows:

- Determine the resources available and required for each activity. These could be: (i) land; (ii) capital, such as cash on hand; (iii) family and hired labour.
- Select the activity with the highest gross margin and consider its resource requirements.
- Select the activity with the second highest gross margin and allocate the remaining resources in line with the activity requirements.
- Work through the same process for the next activity until all the resources are fully utilized.
- Calculate the gross margin for each activity or enterprise to find the total income for the whole farm.

4. Whole farm budget analysis does not follow strict rules, but it can become complicated when additional resource constraints and activities are included.

Note: Computer packages, such as linear programming, are available for optimization of income or minimization of cost of resources given the resource constraints.

Steps for instruction



1. Distribute Handout 5.2.2 (Maximizing farm income using available resources) to participants before the start of the session.
2. Explain that the farmer should choose the most profitable combination of enterprises for the farm along with the most appropriate resource allocation. Show Slide 89a (Farm plan), Slide 89b (Budgeted gross margin by enterprise), Slide 89c (Budgeted gross margin by resource requirements).

3. Explain clearly the method used for farm planning, using enterprise budgets and matching the input–output data with the farm resource base. Refer to the handout for a summary of the methodology. Explain to the participants that for more complex and highly diversified farming systems programming techniques are sometimes used.
4. Distribute Training exercise 13 (Whole farm budget). Have the participants work in groups. Once the exercise has been completed discuss the solution with the entire class.

Evaluation: (i) review objective in relation to key points, (ii) refer to Handout 5.2.2, (iii) refer to Training exercise 13.

Notes

Maximizing farm income using available resources

An important objective of farmers is to optimize farm income given the available resources. For this, the farmer should choose the most profitable combination of enterprises suitable for the farm along with the most appropriate resource allocation. The budgeted gross margin below involves few enterprises and limited resources, which as such can be resolved using a simple farm planning technique as shown.

Budgeted gross margin by enterprise
(applying a simple farm technique)

Enterprise	Example				
	Yield (mt/ha)	Gross income (\$)	Cash variable costs (\$)	Total variable costs (\$)	Gross margin (\$)
Rice	2.8	4 500	1 273	2 173	2 327
Cauliflower	15.0	12 000	2 974	4 454	7 546
Cabbage	25.0	10 000	2 982	4 482	5 518

Gathering basic information for a farm plan

Step 1

Determine the resource availability and requirement

- **Land availability.** The average landholding in Asia is assumed to be 0.76 hectare, so in our example a model farmer operates 0.76 hectare of lowland irrigated area.
- **Capital.** The farmer has cash in hand amounting to \$1 600 for crops grown in the summer season.
- **Labour.** The farmer has two full-time adult family members. The farmer hires labour on a daily basis at \$12 per day.

Budgeted gross margin by resource requirement

Resource	Available	Per hectare resource requirement for each crop		
		Rice	Cauliflower	Cabbage
(1)	(2)	(3)	(4)	(5)
Rice land	0.76 ha	1		
Cauliflower land	0.40 ha		1	
Cabbage land	0.40 ha			1
Labour availability requirements in September	30 days	28	50	50
Cash available/requirements (\$)	1 600	1 273	2 974	2 982
Gross margin per ha (\$)		2 327	7 546	5 518

Land available for rice is 0.76 ha. The available land for cauliflower and cabbage is 0.40 ha.

The labour requirements for each crop is estimated and given in the table above. The total available family labour is 30 days in September. The cash requirements available to the farmer are also shown above.

With this information on the requirements and availability of resources such as land, labour and capital resources, the question is "How can the resources be allocated in a way that profit can be maximized?"

Step 2
Obtain the crops with the highest gross margin

As can be seen, cauliflower has the highest gross margin. The area allocated for cauliflower is 0.40 ha. out of a possible 0.76 ha. To determine the family labour needed to cultivate cauliflower, the labour requirement of 50 person-days is multiplied by the area of land allocated to that crop (0.40 ha). Why is this so? Simply, that resource requirements are estimated on a per hectare basis. Thus, the family labour required for 0.40 ha is 20 days of the 30 days available. This leaves a remaining 10 days.

We now consider the crop with the second highest gross margin. In this case it is cabbage. Because all the 0.40 ha. suitable for vegetable cultivation has already been allocated to cauliflower, it is not possible for cabbage to be grown. There is insufficient land available. The remaining 0.36 ha. of land therefore, can only be planted with rice. The remaining 10 days of family labour, which is the required labour for 0.36 ha rice, can be fully utilized.

In order to calculate the capital needed to grow cauliflower, the 0.4 hectares is multiplied by a cash requirement of \$2 974. The sum (\$1 189) is deducted from the cash available to the farmer (\$1 600) leaving \$411. We cannot grow cabbage because of the limits of cash. Because we have only \$411 left, this can be allocated to rice but the area of land under the crop will need to be cut back to 0.32 ha ($\$411 \div 1\,273$). The combination of cauliflower and rice generates the highest income compared to alternatives, or \$3 018 ($7\,546 \times 0.40$) from cauliflower and \$744 ($\$2\,327 \times 0.32$) from rice. This generates a total farm income of \$3 764.

From this example, it is clear that budget analysis does not follow strict rules. It is quite simple but could be a little tedious if more resource constraints and activities exist.

Unit 5.2 – Training exercise 13 Whole farm budget

A farmer has 1.0 hectare of land that could all be planted with rice. The land could also be used to grow tomatoes on 0.40 hectares and eggplant on 0.60 hectares. Cash available here is \$3 000 and there are 40 person-days of labour for disposal. The resource requirements by the different enterprises and the gross margin per hectare are also indicated.

Resource	Available	Resource requirement		
		Rice	Tomatoes	Eggplant
Rice land (ha)	1.00	1.00		
Tomatoes land (ha)	0.40		1.00	
Eggplant land (ha)	0.60			1.00
Labour (person-days)	40	25	50	40
<i>Cash on hand</i>	<i>\$3 000</i>	1 500	4 000	3 000
Gross margin per ha		\$1 000	\$7 500	\$5 500

Task

Given the data above, fill out the form below showing the allocation of resources to maximize net farm income.

Enterprise	Land (ha)	Labour (person-days)	Capital (\$)	Gross margin (\$)
Tomatoes				
Eggplant				

Total

(Answer key on the opposite page)

Answer key for
Training exercise 13

Enterprise	Land (ha)	Labour (person-days)	Capital (\$)	Gross margin (\$)
Tomatoes	0.40	20	1 600	3 000
Eggplant	0.47	19	1 400	2 585
			Total	5 585

Training slides
for Session 5.2.2
Maximizing farm income using available resources

89a Farm plan

The basic objective of the farmer
is to optimize farm income
given available resources

The farmer needs to choose
the most profitable combination of enterprises,
along with the most appropriate resource allocation
for preparing the farm plan

Slides 89b and 89c show examples

89b Budgeted gross margin by enterprise

This example involves selected enterprises and limited resources

Enterprise	Yield	Gross income	Cash variable costs	Total variable costs	Gross margin
	(mt/ha)	(\$)	(\$)	(\$)	(\$)
Rice	2.8	4 500	1 273	2 173	2 327
Cauliflower	15.0	12 000	2 974	4 454	7 546
Cabbage	25.0	10 000	2 982	4 482	5 518

(continue to Slide 89c)

Module 5, Unit 5.2, Session 5.2.2

89c Budgeted gross margin by resource requirements

This example shows resource availability for selected enterprises

Resource	Available	Per hectare resource requirement for each crop		
		Rice	Cauliflower	Cabbage
(1)	(2)	(3)	(4)	(5)
Rice land	0.76 ha	1		
Cauliflower land	0.40 ha		1	
Cabbage land	0.40 ha			1
Labour availability requirements in September	30 days	28	50	50
Cash available/requirements (\$)	1 600	1 273	2 974	2 982
Gross margin per ha (\$)		2 327	7 546	5 518

Module 5, Unit 5.2, Session 5.2.2

Labour planning

This unit looks at the importance of labour planning in farm planning. There is often insufficient full-time labour available on a farm to cover all necessary work. If there is full-time labour available, it often includes periods of excess labour, depending on the specific labour needs of the farming system. Farming by nature implies that labour is irregular. There can be periods of excess labour supply and periods of shortage of labour.

Labour can be a major cost contributor to farm production and output, hence labour has to be planned carefully. In planning for labour it is necessary to consider the peaks and troughs of seasonal labour availability in relation to farm labour requirements. This understanding and knowledge should ensure better management and more profitable farming.

Preparing for session 5.3.1
 Planning farm labour

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

Duration: 120 minutes

Learning support materials
 Handout 5.3.1 (Planning farm labour), Slide 90
 (Planning farm labour), Slide 91a (Preparing and
 using a labour profile), Slide 91b (Diagram of a
 labour profile), Training exercise 14 (Preparing a
 labour profile)

Notes

Planning farm labour

The use of labour planning in farm planning serves as a tool to allocate labour on the farm and make best use of its full potential.

The availability of labour on the farm is irregular and there are times when there is an excess of supply and other times when there are shortages. More often than not, farms in a particular area follow the same calendar of operations and, therefore, have the same high and low demands for labour. Labour planning helps farmers anticipate incoming labour supply problems and enables them to lessen the effects of shortfalls in supply.

Objectives

At the end of this unit, the participants should be able to:



- understand the importance of labour planning for the farm;
- prepare a labour profile for the farm;
- use labour planning as a tool to assess the effects of changes involving several enterprises within the farm.

Key points

1. Any change in farm activities will require the farmer to check the labour resources and demands.
2. Many farms do not have sufficient family labour to cover all the demands throughout the year.
3. It is necessary to consider the highs and lows of seasonal labour availability in relation to the farm labour requirements.

4. A labour profile shows the seasonal labour requirements of each farm enterprise and the total demand of all enterprises for each month of the year.
5. The procedure for preparing and using a labour profile is as follows:
 - Calculate the person-days required for each enterprise.
 - Calculate the monthly requirements in person-days for each enterprise.
 - Construct a labour profile for all farm enterprises together.
 - Assess the person-days available to the farmer from the family labour supply.
 - Examine the labour supply and demand profiles and formulate a strategy for dealing with labour shortfalls and surpluses.
6. The labour profile should be evaluated and conclusions drawn as to how best to improve labour efficiency.

Steps for instruction



1. Distribute Handout 5.3.1 (Planning farm labour) to the participants before the start of the session.
2. Explain the purpose of labour planning. Mention that any change in the farm activities will require an assessment of labour demand and supply. Show Slide 90 (Planning farm labour).
3. Open a discussion with the participants on the usefulness and relevance of labour planning. The participants should be encouraged to talk about their field experiences.

4. Explain the concept of a labour profile and explain that it shows the seasonal labour requirements of each enterprise and the total demand of all enterprises on the farm for each month of the year. Show Slide 91a (Preparing and using a labour profile). Explain how the high and low periods of labour demand can be interpreted and used in assessing the labour requirements of farm enterprises and the farm as a whole.

5. Elaborate the step-by-step process by constructing a labour profile. This should be done with the aid of Slide 91b (Diagram of a labour profile).

6. Distribute Training exercise 14 (Preparing a labour profile). Have the participants to work in groups. When they have completed the exercise have each group discuss different ways of dealing with peak labour requirements and share their findings with the class.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 5.3.1, (iii) refer to Training exercise 14.

Notes

Planning farm labour

Labour costs are often a high percentage of the total production costs. It is essential therefore to plan carefully the use of family and hired labour. More efficient use of labour can be planned at two levels: (i) the individual enterprise; (ii) the whole farm. At the individual enterprise level, labour planning is used to improve the performance of the different operations associated with the enterprise. Here the problems are essentially practical and deal with the way operations are conducted.

At the whole farm level, the best use of labour throughout the year is assessed. These two levels, however, are closely linked. Any change in the type of farm enterprises selected and farm operations requires farmers to examine the labour resources and requirements. Labour requirements in peak periods (e.g. transplanting, weeding, harvesting) could be met partially through the employment of part-time or casual labour.

There is often insufficient full-time labour to cover all the labour demands on the farm throughout the year. If it does, it is likely to have excess labour at other times. It is necessary to consider the peaks and troughs of seasonal labour availability in relation to the farm labour requirements. To do so, it is necessary to calculate the labour requirements for the different crops and livestock within the farm.

In planning the use of labour on the farm over a season, labour profiles are drawn up. The labour profile shows graphically the seasonal labour requirements of each enterprise and the total demand of all enterprises for each month of the year. Many farm operations are carried out by women, thus labour profiles could be disaggregated and broken down by gender.

Labour forms a large part of farm costs and should be planned carefully

Preparing and using a labour profile

- Calculate the person-days required for each enterprise (see diagram opposite).
- Calculate the monthly requirements in person-days for each enterprise (see diagram opposite).
- Construct a labour profile for all farm enterprises together, as shown in the diagram opposite.
- Assess the person-days available to the farmer from the family labour supply.
- Examine the labour supply and demand profiles and formulate a strategy for dealing with labour shortfalls and surpluses.

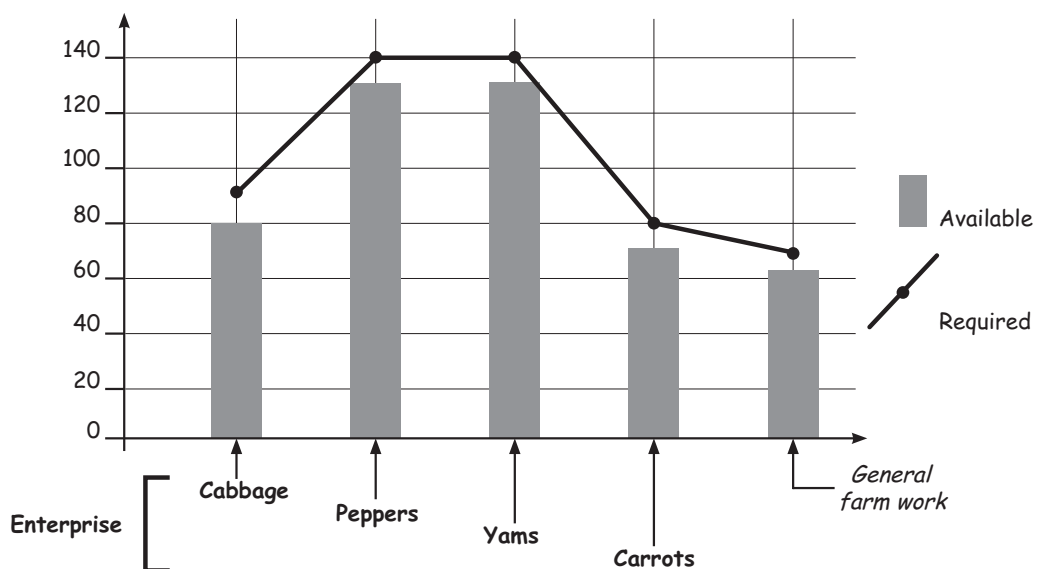
It is necessary to consider the peaks and troughs of seasonal labour availability in relation to the farm labour requirements. By modifying the cropping pattern and making changes to the enterprise operations it is possible to achieve a better allocation of labour and ensure its more efficient use. Periods of low supply may be used for conducting more general farm maintenance operations. And, as noted above, labour requirements during high periods of demand (e.g. transplanting, weeding or harvesting period) could be met through the employment of either part-time or casual labour or alternatively through the introduction of more efficient use of labour or the introduction of mechanization.

Enterprise	Available person-days	Required person-days
Cabbage	80	90
Peppers	130	140
Yams	130	140
Carrots	70	80
General farm work	62	68
Total	472	518

Person-day requirements for some agricultural enterprises by small farmers in Asia

Enterprise	Labour availability (person-days per ha or head)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Cabbage	80	0	0	3	5	0	0	0	18	24	25	4	0
Pineapple	120	0	0	4	8	0	0	28	37	24	13	7	0
Peppers	130	0	0	4	9	0	0	30	40	33	8	7	0
Yams	130	0	0	40	0	4	0	0	32	33	5	12	5
Carrots	70	0	0	19	2	2	0	0	26	9	3	6	3
Chili	240	0	0	74	0	0	0	0	72	54	10	21	10
Sweet potato	120	0	0	11	22	3	6	6	1	12	45	14	2
Ginger	120	0	0	6	0	90	18	3	3	0	0	0	0
Sugar cane	120	11	11	11	10	9	9	9	9	9	10	11	11
Dairy cows	60	5	5	5	5	5	5	5	5	5	5	5	5
Beef cattle	45	4	4	4	4	3	3	3	4	4	4	4	4
Total		20	20	181	65	116	41	84	247	207	128	91	40
<i>Gen. farm work (approx. 15%)</i>		3	3	27	10	17	6	13	37	31	19	14	6
General total		23	23	208	75	133	47	97	284	238	147	105	46

Diagram of a labour profile



Unit 5.3 – Training exercise 14 Preparing a labour profile

Background

	Labour requirements (person/day/hectare)				Total month	Availability month (*)	Surplus (+) Deficit (-)
	Vegetables	Yams	Cabbages	Hot pepper			
Jan	2	25	10	0	37	50	13
Feb	5	20	10	15	50	45	-5
Mar	5	30	5	30	70	45	-25
Apr	5	10	5	30	50	45	-5
May	3	5	10	35	53	45	-8
Jun	3	15	0	30	48	45	-3
Jul	0	15	0	30	45	45	0
Aug	0	0	0	35	35	45	10
Sept	0	25	0	25	50	45	-5
Oct	0	5	0	30	35	50	15
Nov	5	5	0	0	10	50	40
Dec	5	5	0	0	10	50	40
Total	33	160	40	260	493	560	

(*) Labour availability = 2 adults (one works full time and the other only 50%)

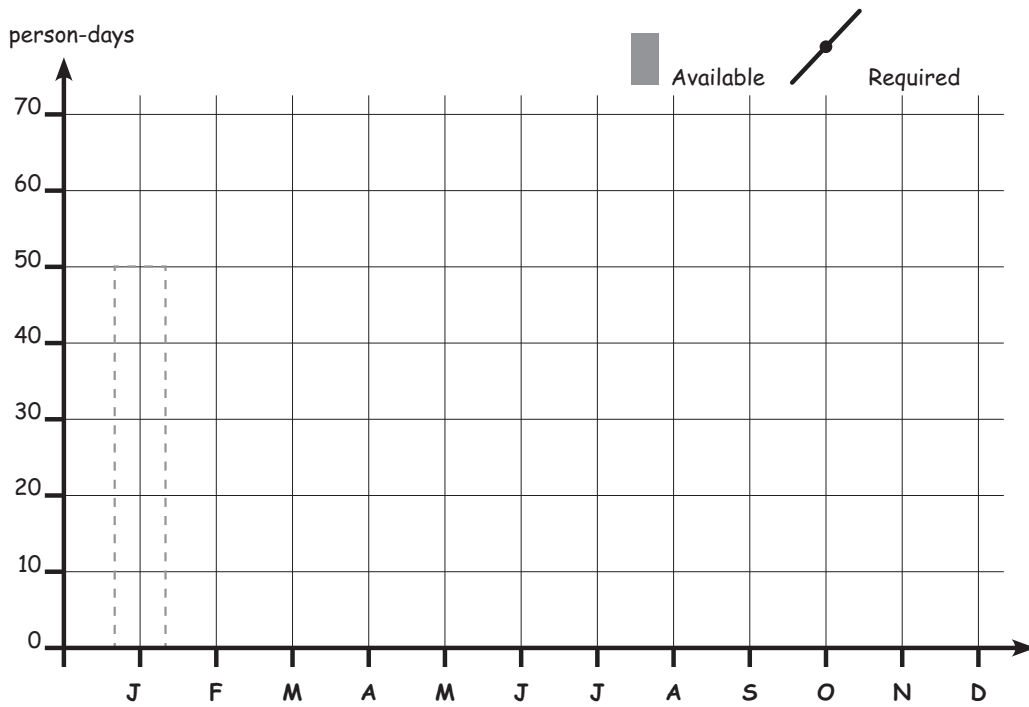
Task

Given the monthly labour requirements and labour availability set out in the table above, prepare a labour profile for an Asian farm. The farm consists of 5 ha with 0.5 ha of vegetables, 2.0 ha of yams, 0.5 ha of cabbages and 2.0 ha of hot pepper.

(continued on the next page)

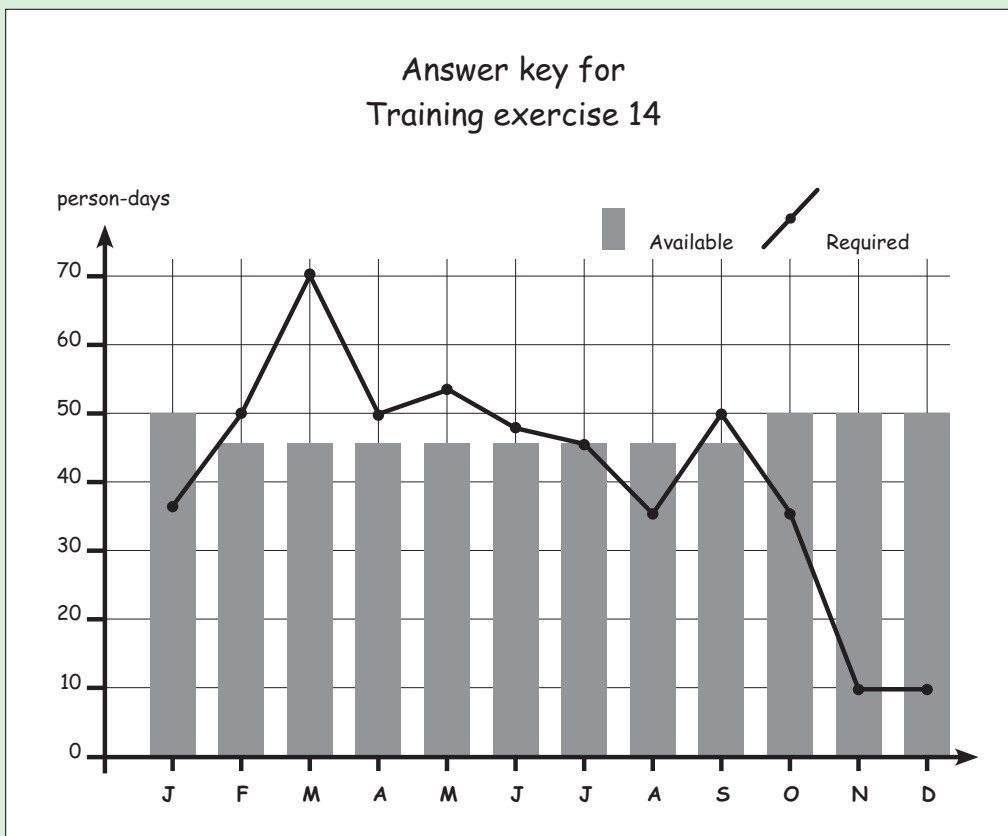
Training exercise 14 (continued)

Illustrate graphically a labour profile



Comment on how you will cope with any peak labour requirements

(Answer key on the following page)



Training slides
for Session 5.3.1
Planning farm labour

90 Planning farm labour

**Labour costs are often a high percentage
of total production costs**

**Efficient use of labour can be planned on two levels ...
enterprise and whole farm**

**Farms rarely carry sufficient full time labour
to cover all demands throughout the year ...
if so, they are likely to have excess labour at other times**

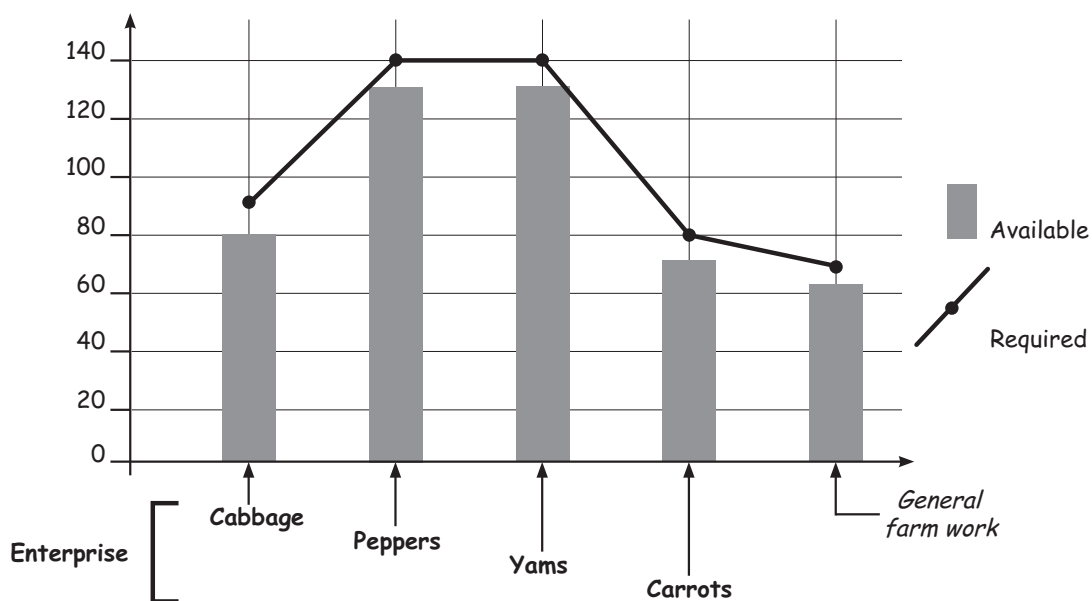
**It is necessary to consider peaks and troughs in seasonal
labour availability in relation to farm labour requirements**

91a Preparing and using a labour profile

1. Calculate the person-days required for each enterprise.
2. Calculate the monthly requirements in person-days for each enterprise.
3. Construct a labour profile for all farm enterprises together (see Slide 91b).
4. Assess the person-days available to the farmer from the family labour supply.
5. Examine the labour supply and demand profiles, formulate a strategy for dealing with labour shortfalls and surpluses.

Module 5, Unit 5.3, Session 5.3.1

91b Diagram of a labour profile



Module 5, Unit 5.3, Session 5.3.1

Cash flow

This unit introduces the use of cash flow for farm planning and analysis. One of the most important factors that affect the farm business is the availability of money to run day to day farm operations. Farmers often experience difficulty in financing their activities by themselves and sometimes have to use loans. Cash flow is used to assess whether the farmer has enough money to carry out the farm plan in part or in its entirety and the financial requirements that are needed.

The concept of cash flow

This session discusses the concept of cash flow and liquidity. Cash inflow and outflow are discussed as well as ways to improve cash flow performance.

Farm management decisions are determined largely by the cash position of the farm household. Cash flow analysis examines the ability of the farm household to meet its financial obligations through its enterprises and other sources of income, and it provides solutions to generate sufficient cash. This determines its liquidity status. It also shows the period in the year when the farm household has adequate cash to cover costs and the months when the farm household has a cash deficit.

Understanding the concept of cash flow will enable both the farmer and the extension worker to realize when enterprise profitability is insufficient and to assess whether a change in farm activities is required. Cash flow is a tool to determine whether adequate funds are available within the farm business or will have to be acquired from outside sources.

Objectives

At the end of this session, the participants will:



- understand the concepts of cash flow and liquidity;
- understand the importance of cash flow in planning and analysis of the farm;
- understand the purpose of the tool.

Key points

1. Cash flow is the flow of money into the farm from sales and the flow of money out of the farm from purchases.
2. For a farm to continue to operate in the medium to long term, it must generate a positive cash flow.
3. Cash flow is a tool with applications for both ongoing analysis and forward planning of a farm.
4. Cash flow can be used:
 - to monitor liquidity;
 - for farm planning and management;
 - to provide solutions to cash shortfalls.
5. An important management task is to control the cash flow in and out of the farm.
6. Liquidity is the ability of the farmer to generate enough cash to meet financial obligations without disrupting the normal operation of the farm.
7. The following factors affect the liquidity of the farm:
 - length of the production cycle;
 - timing and schedule of crop sales throughout the year;
 - ability of buyers to pay farmers in time for produce sold.

8. Cash inflows may come from:

- sales of crop, livestock and livestock products;
- other sources of farm income;
- sales of capital assets;
- borrowed money.

9. Cash outflows may be in the form of:

- production costs;
- capital expenditures;
- loan payments;
- family living expenditures.

10. The availability of cash is often more important than generating profits.

Steps for instruction



1. Distribute Handout 5.4.1 (The concept of cash flow) before the start of the session.

2. Show Slide 92 (Cash flow) and explain its value.

Show Slide 93 (Calculating cash flow) and define it as the flow of money into the farm from sales and the flow of money out of the farm from purchases. Explain that net cash flow is the difference between the inflow and outflow of cash.

3. Explain the use of cash flow with the aid of Slide 94 (Cash flow analysis), pointing out that for a farm to continue to operate in the medium to long term it must generate a positive cash flow.

The concept of cash flow

Gross margins and enterprise budgets show the profitability of a farm enterprise. This indicates the contribution that new, profitable enterprises can make to the overall farm income. But when a new farm enterprise is introduced into the farming system a cash flow should also be prepared to check if the farm enterprise generates enough income to cover its expenses. The cash flow is also needed to look at the overall effect of these changes on the financial situation of the farm and farm household as a whole.

Cash flow is of particular interest to farmers. It guides them in assessing whether they have enough money to carry out the plan or are likely to be short of money in any month. It enables the farmer to see when, during the year, additional financial resources may be required.

The cash flow is simply the flow of money into the farm from sales and the flow of money out of the farm in the form of purchases. The difference between the inflows and outflows is known as net cash flow.

$$\text{Net cash flow} = \text{Cash inflows} - \text{Cash outflows}$$

Farmers should try to generate a positive cash flow by ensuring that more cash flows into the farm than out of the farm.

Cash flow analysis

Cash flow budgets are important in:

- planning the farm;
- choosing between alternative farm enterprises;
- comparing actual and budgeted results and enabling corrective action to be taken on time;
- arranging for loans.

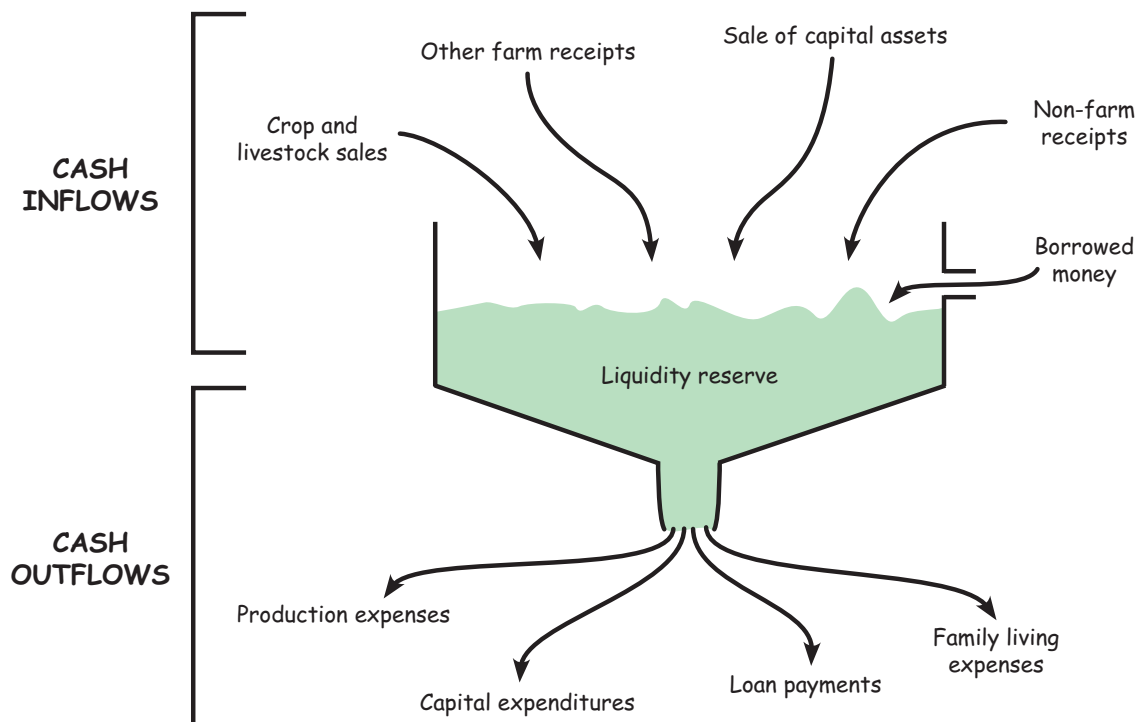
Cash flow is used to check if the farm has enough cash to cover expenses

Cash transactions frequently occur. An important task of the farmer as manager is to control this flow of cash in and out of the farm. Cash flow is used to examine whether the financing is available within the farm household, or whether there is a need to take out a loan. If a farmer decides to take a loan, the cash flow will also indicate whether the farmer is able to repay the interest and debt.

Liquidity

Liquidity is the ability of the farmer to generate enough cash to meet financial obligations as they come due without disrupting the normal operation of the farm. This concept is illustrated below.

The flow of cash into and out of the liquidity reserve



As the diagram shows, cash flows into the farm from various sources such as the sales of crops and livestock, the sales of capital assets, mobilization of loans and non-farm income sources. Farmers use this money to cover their farm and family expenses. These include such items as production costs, capital expenditures, loan repayments and family living expenses. A reserve of cash or liquidity needs to be kept to prevent cash shortages from disrupting the normal farm operations. Several factors can affect the liquidity position of the farm:

- The farm production cycle for most enterprises lasts at least a year. This means that farmers often have to make payments for inputs and materials used for up to a year before any produce is sold.
- Farmers often find that it may be better not to sell produce directly following harvest, but alternatively to store the crop for some time in the search for higher prices. This, however, has an effect on the cash reserve by delaying cash inflows from product sales.
- Very often traders involved in purchasing farm produce do not pay for it immediately.

For many farmers the availability of cash over the short term may even be more important than generating additional profits. For example, farmers may sell some of their productive assets, such as livestock, in order to pay for seeds and fertilizers. For these reasons farmers need access to working capital and short-term credit. Flexible lending facilities are often required to advance cash as is needed during the production cycle and can be repaid when produce is sold.

Cash inflows

Sales of crop and livestock products are the primary sources of cash for the farm and are critical to maintain the farm's liquidity reserve. Some enterprises, such as dairy cows, generate a relatively even flow of cash over the production year. Other enterprises, such as fruit and livestock (meat production), result in irregular cash inflows over the production period.

Other farm income sources sometimes constitute a substantial cash inflow to the farm. A typical item includes income generated from work performed for other farmers.

Non-farm income sources include income from off-farm employment, cash inflows from savings, interest earned on investments and financial gifts.

Sales of capital assets are irregular inflows of cash from the sale of land, buildings, machinery, livestock and other capital items.

Borrowed money is also a source of cash. It enters the cash reserve from the side rather than the top because it is often considered a source of cash used to maintain liquidity when cash outflows exceed inflows. Borrowed money takes the form of short-term loans to cover operating costs and longer-term loans for the purchase of assets such as machinery, livestock and buildings.

Cash outflows

Production costs constitute a relatively large draw on the liquidity reserve. These costs include seed, fertilizer, pesticides, feed, hired labour and repairs. If a farmer fails to maintain a liquidity reserve to meet these costs, farm production could immediately drop, and the farmer could end up paying a high level of interest on borrowed money.

Training slides
for Session 5.4.1
The concept of cash flow

92 Cash flow

When a new enterprise is introduced into the farming system a cash flow should be prepared to assess whether the enterprise generates enough income to cover expenditures

It is also necessary to assess the overall effect of the change in the farm enterprise on the finances of the farm household as a whole

Cash flow is of particular interest to farmers for it allows them to see when, during the year, additional financial resources may be required

93 Calculating cash flow

Cash flow is simply the flow of money into the farm from sales and the flow of money out in the form of purchases.

The difference between the inflows and outflows is known as net cash flow ...

Net cash flow = Cash inflows - Cash outflows

Farmers should try to generate a positive cash flow by ensuring that more cash flows into the farm than out of the farm

Module 5, Unit 5.4, Session 5.4.1

94 Cash flow analysis

Cash flow budgets are important and are used in ...

Planning the farm

Choosing between alternative farm enterprises

Comparing actual and budgeted results and enabling corrective action to be taken on time

Arranging for loans

An important task of the farmer as a manager is to control the flow of cash in and out of the farm

Module 5, Unit 5.4, Session 5.4.1

Application of cash flow

This session examines the use of cash flow in farm planning and as a tool for evaluating the financial performance of the farm as a whole. The cash flow guides decision-makers in assessing whether the farm is able to generate a cash surplus or incur a cash deficit and the time of the year when additional financial resources may be required. Ways for improving cash flow performance are discussed.

Knowing the possible applications of cash flow is useful for farmers and extension workers to better manage the financial situation of the farm and make more informed financial decisions. Knowledge of possible solutions to liquidity problems are sure to improve the performance of the farm business.

Objectives



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

- understand the many uses and advantages of analysing the farm's cash flow;
- know the cash flow problems usually encountered on a farm and know how to go about addressing them.

Key points

1. The projected cash flow is completed at the beginning of the accounting period. Estimates are made of the expected cash inflows and outflows. The cash flow is used to estimate the liquidity reserve or cash balance for each month.
2. The farmer needs to find answers to the following: (i) How much money are the farm enterprises likely to generate, and how much will they cost? (ii) When will money be received, and when will money be needed? (iii) If the amount of money expected to be received over the year does not cover the amount needed, how can the farmer make up the difference? (iv) Can it be made up by savings? (v) Does the farmer have the reserves? (vi) Does the farmer have access to loans?

3. The steps involved in preparing the cash flow are:

- list the sales and expenditure items when they occur in the year;
- prepare a cash flow table;
- calculate the net cash flow;
- calculate the cumulative net cash flow;
- analyse the net cash flow.

4. The cash flow is used:

- to monitor liquidity;
- for farm planning and management;
- to provide solutions to cash shortfalls.

Steps for instruction



1. Distribute Handout 5.4.2 (Application of cash flow) to the participants before the start of the session.
2. Ask the participants to suggest uses of cash flow and list them on a posterboard. Make sure the points raised include: (i) How much money is likely to be generated from the farm enterprises and at what cost? (ii) When will the money be received, and when will it be needed? (iii) If the money received does not cover the expenses, how can the difference be made up?
3. Explain with the aid of examples the different uses of the cash flow. These might include to monitor liquidity, for farm planning and management, and to provide solutions to cash shortfalls. Brainstorm with the participants on some of the typical cash flow problems and solutions that they have experienced. Discuss the issues and draw up a list of possible solutions. Refer to Handout 5.4.2 as a source of reference.

- 4. Show Slide 96 (Steps in preparing a cash flow) and discuss each step.
- 5. Distribute Training exercise 15 (Cash flow). Ask the participants to work in groups. Once the exercise has been completed, start a discussion on the problems that they may have experienced.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 5.4.2, (iii) refer to Training exercise 15.

Notes

Application of cash flow

The main feature of a cash flow is that it focuses specifically on cash. The non-cash items included in gross margin analysis are taken out. Items such as depreciation, the value of family labour and food consumed at home are omitted. The cash flow is prepared to include all income and expenditures for the farm household in the months in which they occur. It could include loans that the farm household receives from moneylenders, friends and lending institutions as cash inflows, and also the repayment of these loans (principal and interest) as cash outflows.

Constructing a cash flow. A cash flow can be constructed on what the farmer is currently doing. It can also be drawn up on the basis of what the farmer intends to do over the next year. Farm management extension workers and farmers often find it useful to calculate cash flows on a monthly or quarterly basis although annual cash flows are also common for long-term investments. In this session cash flow is calculated on a monthly basis for a farm year.

Example

A farm household earns some income from selling rice and maize and keeping dairy cows. Three farm children attend school. The farmer wishes to introduce French beans and knows that this enterprise is profitable.

The question facing the farmer is whether there are enough funds to finance the enterprise. Answers are needed to the following questions: (i) How much money are the farm enterprises likely to generate and how much will they cost? (ii) When will money be received and when will it be needed? (iii) If the amount of money expected to be received over the year does not cover the amount needed, how can the farmer make up the difference? (iv) Will it be made up by savings? (v) Does the farmer have reserves? (vi) Does the farmer have access to loans?

Using this example, the steps involved in preparing the cash flow are shown on the following pages.

Step 1

List sales and expenditure items when they occur
(a list of cash inflow and outflow figures are provided below)

Cash inflow		
Description	Month	Income (\$)
Sales of rice	Sep	300
	Jan	250
Sales of maize	Aug	120
Sales of milk	Mar-Sep	420
Sales of chicken	Jan	130
Planned sale of French beans	July	450
	Dec	400

Cash outflow		
Description	Month	Expenditure (\$)
Money spent on farm inputs	Mar	350
	Sep	410
Money spent on farm inputs	Apr	250
Money spent on farm inputs	Jan-Dec	1 960
Brooding cost and feeding	Sep	60
Money to cover living expenses	Jan-Dec	720
Money spent on inputs	Apr	250
	Jul	90
	Oct	210
	Dec	70
Money to cover school expenses	Feb	240
	Apr	140
	Sep	100
Money to cover health expenses	Jan-Dec	240

Step 2

Prepare a cash flow budget

From this list we can work out the monthly balance. This can be done by entering all of the information in a cash flow budget form as shown on the opposite page.

Table 5.1 — Cash flow budget

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Cash reserves	25											
<i>Money coming in</i>												
Sales of farm products												
Rice	250		300	100	100	50			300	100	100	
Maize				220				120				
Milk	60	60	60	60	60	60	60	60	60	60	60	60
Chicken	130								60			
Planned sale of beans							450					400
Total cash inflow	465	60	360	380	160	110	510	180	420	160	160	460
<i>Money going out</i>												
Purchase of inputs												
Rice			300						300			
Maize					320							
Farm inputs livestock	30	50	50	50	50	50	50	50	50	30	30	30
Chicken feeding expenses									60			
French beans				200			40			180		40
<i>Household expenses</i>												
School fees		240		140					100			
Hospital expenses	20	20	20	20	20	20	20	20	20	20	20	20
Total cash out-flow	50	310	370	410	390	70	110	70	530	230	50	90
Monthly net cash flow	415	-250	-10	-30	-230	40	400	110	-110	-70	110	370
Cumulative balance	415	165	155	125	-105	-65	335	445	335	265	375	745

Step 3**Calculate the net cash flow**

This is simply done by subtracting the expenses from the income for each month. It will be positive if income is greater than expenses and negative if income is less than expenses.

Step 4**Calculate the cumulative net cash flow**

In order to assess whether the family has enough cash over the year to cover the introduction of beans, a cumulative cash flow needs to be prepared.

Step 5**Analyse the net cash flow**

This example shows that the family has a shortfall of cash in May. This means that even though beans is a profitable enterprise the family does not have the money available to cover the expenditures expected to occur in that month. What can the family do?

- The farmer could decide not to introduce French beans.
- Or the farmer could try to save some money in order to cover the financial "deficit".
- The farmer might decide to cut back on some of the inputs used for growing beans.
- The farmer might decide to reduce some of the area under maize and rice in order to reduce costs.
- The farmer might sell some of the livestock to cover the financial gap.
- The farmer might decide to take a loan to cover the shortfall.

Uses of cash flow

Farmers should be aware of the cash flow situation of the farm. This is necessary to ensure that cash is available to cover expenses when needed. Ways in which cash flow can be used are discussed below.

To monitor liquidity. The cash flow records the timing and size of the cash inflows and outflows that occur over a given period, normally a year. The year is broken down into shorter periods of months or quarters. Actual cash flows could be compared with projected cash flow as a way of monitoring the plan, devising solutions to problems and taking advantage of opportunities that occur.

For farm planning and management. The actual cash flow is compared with the projected cash flow to improve the performance of the farm. The actual cash flow from one year can be used to project the cash flow for the next year. In this way farmers will know that they have cash reserves available and will not be surprised by cash shortfalls.

Projecting a cash flow is sometimes difficult. Crop and livestock budgets are useful in providing necessary information for projecting future cash flows. The farmer should also anticipate the changes in farm operations that are expected to take place the coming year, such as the introduction of crop rotations, new livestock enterprises or sales and purchases of capital assets.

To provide solutions to cash shortfalls. An important function of the cash flow is to identify cash shortfalls and ways of addressing the problem. This might be done by borrowing additional funds, using savings or selling assets.

Table 5.2 on the next page illustrates situations where cash problems occur and provides possible solutions or suggestions for improvement.

Table 5.2 — Identifying problems and possible solutions using a cash flow

Problems	Possible solution
Low profitability	Cash flow problems may be a symptom of low profitability. The first step would be to analyse the profit and profitability of each single farm enterprise. Increasing profit and profitability is often the best way to remedy cash flow problems.
Unexpected cash problems	One way to prevent cash flow problems is to identify them before they occur. Cash flow would give the farmers time to alter their plans and remedy the problems by timing cash inflows and cash outflows.
Need to maintain profitability and increase cash flow at the same time	This means a careful look at the combination of enterprises on the farm. Perhaps another crop rotation or livestock enterprise would increase cash flow and allow the farmer to maintain profitability at the same time.
High production costs	An effective way to improve cash flow is through cost control. Is the farmer using the best seeds and seeding rates? Is fertilization at the right level? Can the use of commercial fertilizer be reduced through the use of manure? Can integrated pest management be implemented?
Need to increase selling flexibility	The best approach to this problem is by improving marketing plans. For non-perishable products, the farmer has some flexibility in timing sales. Improving farm profitability should be the main goal in formulating a marketing plan.
Need to reduce cash outflow	<i>Leasing or renting instead of owning.</i> The down payments and loan payments associated with the purchase of land, buildings and machinery sometimes put a heavy burden on cash flow.
Increase cash availability	<i>Taking an off-farm job.</i> Adult farm members could seek part-time or full-time employment off the farm. Any additional expenses related to off-farm employment, such as transportation and clothing, need to be considered carefully.
Increase cash availability	<i>Refinancing.</i> Cash flow problems are sometimes caused by a poor balance of short- and long-term debts on the farm. Some farmers use short-term loans to finance current and fixed assets. Operating loans should be used only to purchase variable inputs.
Increase cash availability	<i>Liquidating assets.</i> Selling assets is usually a drastic measure for dealing with cash flow problems, but it may be justified. However, try to sell unprofitable assets first (e.g. personal assets, timber, replacement stock, unused machinery and unproductive land).

Unit 5.4 – Training exercise 15

Cash flow

Background information

Vegetable sales	\$1 800	Family expenses	\$680
Purchase of seedlings	\$80	Loan repayment	\$1 500
Fertilizer purchase	\$150	New loan	\$1 500
Labour costs (permanent)	\$600	Vegetables in store (beginning of year)	\$1 700
Interest charges	\$260	Vegetables in store (end of year)	\$1 500
Depreciation	\$200		

Task

Based on the background information above trainees should complete the two forms in this exercise.

Form 1 – Calculate profitability of vegetables and total profit of farm

Item	(\$)
<i>Income</i>	
Total output	
<i>Costs</i>	
Total variable costs	
Total fixed costs	
Total farm profit	

(continued on the next page)

Training exercise 15 (continued)

Can the farmer afford to take out a loan of \$1 500 to purchase additional farm implements?

Form 2 — Prepare a cash flow on a quarterly basis

Item	Quarters (\$)				Total (\$)
	first	second	third	fourth	
<i>Output</i>					
Vegetable sales					
<i>Expenses</i>					
Seedlings					
Fertilizers					
Labour					
Interest charges					
Total expenses (\$)					
Cash flow (\$)					
New loan/Loan repayment					
Family expenses					
Net cash flow (\$)					
Total farm profit (\$)					

What is the most appropriate quarter to make the purchase?

(Answer key on the opposite page)

Answer key for Training exercise 15

Form 1 – Profitability of vegetables and total profit of farm

Item	(\$)
<i>Income</i>	
Vegetable sales	1 800
Vegetables in store (end of year)	+1 500
Vegetables in store (beginning of year)	-1 700
Total output	1 600
<i>Costs</i>	
Purchase of seedlings	80
Fertilizer purchase	150
Total variable costs	230
Interest charges	260
Labour costs	600
Depreciation	200
Total fixed costs	1 060
Total farm profit	310

Form 2 – Prepare a cash flow on a quarterly basis

Item	Quarters (\$)				Total (\$)
	first	second	third	fourth	
<i>Output</i>					
Vegetable sales	450	450	450	450	1 800
<i>Expenses</i>					
Seedlings	80	0	0	0	80
Fertilizers	150	0	0	0	150
Labour	150	150	150	150	600
Interest charges	65	65	65	65	260
Total expenses (\$)	445	215	215	215	1 090
Cash flow (\$)	5	235	235	235	710
New loan/Loan repayment	1 500	0	0	-1 500	0
Family expenses	170	170	170	170	680
Net cash flow (\$)	1 335	65	65	-1 435	30
Total farm profit (\$)	1 335	1 400	1 465	30	

Training slides
for Session 5.4.2
Application of cash flow

96 Steps in preparing a cash flow

- Step 1. List sales and expenditure items when they occur**
- Step 2. Prepare a cash flow budget**
- Step 3. Calculate the net cash flow**
(subtract expenses from income for each month)
- Step 4. Calculate the cumulative net cash flow**
(to assess whether the family has enough cash)
- Step 5. Analyse the net cash flow**

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 5 introduces farm enterprise budgeting and goes on to explain some of the tools that could be used by farmers to make better business decisions. The budgeting tools covered include enterprise budgets, break-even budgets, partial budgets, and labour, cash flow and farm planning.

Farm planning and management for trainers of extension workers

3

ASIA



Module 6 FARM INVESTMENT AND RISK



Farm planning
and management
for trainers
of extension workers

ASIA

Module 6
FARM INVESTMENT
AND RISK

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing and Multimedia Service, Information Division, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy or by e-mail to copyright@fao.org

© FAO 2006

FARM INVESTMENT AND RISK

Unit 6.1

Investment appraisal

Session 6.1.1 Investment decisions (50 minutes)

Session 6.1.2 Simple methods of investment appraisal
(100 minutes)

Session 6.1.3 Discounted methods of investment appraisal
(120 minutes)

Session 6.1.4 Loan appraisal (45 minutes)

Unit 6.2

Managing risk

Session 6.2.1 Risk and risk management (45 minutes)

Session 6.2.2 Sources of risk (45 minutes)

Session 6.2.3 Risk management strategies (60 minutes)

Session 6.2.4 Dealing with risk (90 minutes)

*This volume has been designed
as a complete working package which includes all components
of the training programme needed for Module 6.*

*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 INVESTMENT AND RISK

A thorough knowledge of techniques used in assessing alternative capital investments will enable extension workers and farmers to appraise the profitability of farm investments and decide between alternative investment opportunities. Investment appraisal is also useful for farmers who wish to prepare business plans in order to access term loans from financial institutions. There are different methods that can be used to appraise on-farm capital investments. These are usually divided into simple measures of investment appraisal and discounted measures. The simple measures covered include (i) payback period and (ii) simple rate of return. The discounted measures include (i) net present value (NPV) and (ii) internal rate of return (IRR).

In this module the element of risk is also discussed. Farmers make decisions in a risky and ever-changing environment. They can never be sure of the outcome of any decision. This is because of the constantly changing environment within which farms are managed. Even though it is impossible to prevent changes from happening, it is useful for farmers to know the source of their risks and the management strategies they can follow to ease them.

Investment appraisal

This unit examines the importance of investment decisions and looks at the types of investments farmers can make. Because investments often involve large sums of money, it is important that farmers become familiar with certain appraisal methods, such as "payback period" and "simple rate of return". They should also understand the strengths and weaknesses of discounted methods of appraisal. The unit goes on to examine the capacity of farmers to repay loans should they decide to borrow money to make farm investments.

Investment decisions

This session discusses the different types of investment decisions often faced by farmers.

It is useful for farmers and extension workers alike to understand what is meant by a capital investment and the type of farm investments that most farmers make. This knowledge has a direct bearing on the way farmers should plan their farming activities. It is particularly important as capital for on-farm investment is scarce and expensive. Farm investment decisions need to be given serious consideration.

Objectives

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



- understand what capital investments are in farming;
- realize that these investments take different forms depending on the timing of expenses and the income received.

Key points

1. Investment decisions are a matter of choice between alternative investment opportunities.
2. Capital investment decisions tie up money. The use of these investments typically lasts for several production cycles or years.
3. Investing in capital assets often means that a large expense occurs in one time period with income generated from the investment distributed over a number of future periods.
4. Farmers invest because they believe that the long-term returns above the cost of the investment are greater than any immediate returns.

Steps for instruction

1. Distribute Handout 6.1.1 (Investment decisions) to the participants before the start of the session.
2. Initiate a discussion among participants on the definition, nature and importance of capital investments for farmers. Following the discussion explain what capital investments are and show Slide 97 (Capital investments).
3. Have the participants differentiate between two types of capital: (i) working capital, (ii) investments. Discuss the difference between the two and provide concrete examples. List examples on the classroom board.
4. Brainstorm among the participants on different uses of capital and the type of investments that farmers make. Discuss why farmers make these investments and show Slide 98 (Why do farmers invest?)
5. Encourage the participants to think about the methods farmers use to appraise investments in practice. Point out some of the drawbacks of these methods.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 6.1.1.

Notes

Investment decisions

Investment is a matter of choice. The choice of investment opportunities on farms are many — as are the returns that these investments offer. Farmers are often required to make choices between alternative investment opportunities: (i) whether to purchase farm machinery or continue to lease or rent, (ii) whether to install an irrigation system, (iii) whether or not to plant tree crops. The best policy to follow depends on the importance of the asset, the need for it and the capital available for investment.

Capital investments

Capital investment decisions are particularly important. They tie up much money and determine the farm's future profitability for many years ahead. Profits arise from correct investment decisions made in the past.

Investment can take place in different ways. The first way in which a farmer invests is by saving some produce. Crops that are stored are an addition to the stock of capital and are, therefore, investments. This is referred to as "working capital". The second method of investment involves assets generated by the effort made by farmers. When a farmer plants trees or constructs a store, an investment is made. The third form of investment is through purchasing capital assets such as tools, machinery and equipment.

*Investments
can occur by
saving produce
as working
capital ...*

*... generating
assets from
farm work ...*

*... purchasing
assets*

Training slides
for Session 6.1.1
Investment decisions

97 Capital investments

Investments can take place in a number of ways ...

Saving some of the produce

(stored crops are an addition to the stock of capital;
this is referred to as "*working capital*")

Assets generated by efforts made by farmers

(e.g. income from the planting of tree crops)

Purchase of capital assets

(e.g. tools, machinery, equipment)

Good profits arise from correct investment decisions

Simple methods of investment appraisal

This session deals with simple methods of making investment decisions. These are (i) the payback period and (ii) the simple rate of return.

Investments often involve tying up sums of money. It is crucial for farmers that investments are thoroughly appraised before any final decision is made. Knowing how to apply simple investment appraisal methods and their advantages and disadvantages should assist both extension workers and farmers in deciding on the choice of the most appropriate method of investment appraisal to use.

Objectives

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



- understand the simple methods of appraising investments;
- know the differences between the two methods;
- understand the advantages and disadvantages of each method.

Key points

1. Simple measures of farm investment appraisal are easy to compute but are imprecise because they fail to take into consideration the time value of money.
2. The payback period method calculates the number of years it would take for an investment to cover its original cost through the annual cash benefits generated. An investment with a short payback period is more attractive than one with a longer payback period.
3. The simple rate of return expresses the average annual net income as a percentage of the investment. However, it fails to consider the size and timing of annual earnings.

Steps for instruction



1. Distribute Handout 6.1.2 (Simple methods of investment appraisal) before the session.
2. Initiate a discussion of the data needed for the simple methods of investment appraisal. Ask trainees to suggest what items are needed (initial cost of the investment, annual costs, annual benefits) and list them. Refer to cash flow in Module 5, but point out that here investments extend beyond a one-year period.
3. Explain the two main ways to measure the benefits and costs of farm investments. They can be classified as simple and discounted methods. The simple methods are popular and easy to compute. These are (i) the payback period and (ii) the simple rate of return; both are discussed in this session. Discounted methods, covered in Session 6.1.3, consider the time value of money. However, the trainer may wish to introduce the time value concept here.
4. Introduce the simple methods using: Slide 99 (Investment appraisal – payback period), Slide 100 (Using the payback period), Slide 101 (Investment appraisal – simple rate of return), Slide 102 (Calculating the simple rate of return).
5. Explain how the payback period is computed and mention advantages and disadvantages. Discuss what decision criteria should be used in order to select the most attractive investment. Show how the simple rate of return is computed for an example investment. It is important to explain how average annual net income is derived. Interpret, rank and differentiate the result from that obtained using the payback period method. Explain also the strengths and weaknesses of this method.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 6.1.2.

Notes

Simple methods of investment appraisal

The farmer can use different methods to appraise investments that have different timings of costs and benefits. Investing in capital items typically means that a large expense (the initial purchase) occurs in one time period while the benefits are distributed over a number of future time periods.

Investment appraisal requires a set of background information that includes estimates of (i) the annual net income from the investment, (ii) the initial cost of the investment, (iii) the salvage value, (iv) the interest or discount rate to be used. The following methods can be used for assessing the profitability of an investment:

- payback period
- simple rate of return

Each of these methods has advantages and disadvantages and will be discussed in the course of this session. Since investment decisions can be quite complicated, it is assumed that extension workers will need to assist farmers in selecting the appropriate method and in making the correct decisions.

Payback period

The payback period method calculates the number of years it would take for an investment to return its original cost through the generation of income. This method assesses the time that is required until the cumulative income from the investment equals its initial cost. The method is useful to highlight those investments that are not viable (e.g. ones that never achieve payback). It can also be used to select the most appropriate source of finance. For instance, those investments having a short payback period would only require short-term finance.

Investment appraisal is a way to determine investment profitability

To calculate the payback period the extension worker together with the farmer needs to assess the annual net cash flow that is expected after making the investment. This is the difference between the cash inflows and cash outflows for each year in the future. In comparing any two investments, the one having a shorter payback period would be more attractive than one with a long payback period.

Example
Annual net cash flow for two investments

Two investments are outlined below. Each needs an initial capital outlay of \$10 000 but result in different patterns of cash flows. For simplicity, the salvage values are assumed to be zero*. It is convention to treat the initial cost of the investment as if it occurs in year 0.

Year	Investment A	Investment B
0	\$(10 000)	\$(10 000)
1	3 000	1 000
2	3 000	2 000
3	3 000	3 000
4	3 000	4 000
5	3 000	6 000
Total	15 000	16 000
Payback period (yrs)	3.3	4.0
Avg. annual net cash flow (5 yrs)	3 000	3 200
Less annual depreciation	-2 000	-2 000
Average annual net income	\$1 000	\$1 200

When the annual net cash flow is the same for each year of the investment, the payback period is calculated by dividing the amount of the investment by the expected annual net cash flow.

*Whenever salvage values exist, they should be added to the income flow because they represent an additional cash receipt.

Investment A

The payback period is 3.3 years. The cost of the investment (\$10 000) is divided by the annual net cash flow (\$3 000). When the cash flows are irregular and unequal they are accumulated and the payback period is assessed by taking the year where the net cash flow is equal to the cost of the investment.

Investment B

The payback period is 4 years. The cumulative net cash flow covers the cost of the investment (\$10 000) in year 4.

Therefore, investment A is preferred over investment B because it has the shorter payback period.

The payback method is attractive because it is easy to calculate and is a simple way of comparing alternative investments. It is also easily understood by farmers. If the farm is short of cash, it is essential that income is generated as soon as possible.

However, the payback method also has deficiencies. It ignores the cash flows arising after the payback has occurred as well as the timing of the income flows. Money received earlier in the life of the investment is more valuable than money received later. For example, by selecting investment A, the method ignores the higher net cash flows from investment B in year 4 and year 5.

The payback period does not measure profitability, but is more a measure of how quickly the investment will contribute to the farm's liquidity.

Simple rate of return

The simple rate of return recognizes that it is not only income that is important to the farm but also the amount of capital used to produce it. Income is regarded not by itself but as a return on the capital used. More precisely, the rate of return expresses the average annual net income or profit as a percentage of the investment. The term of net income is used and is calculated by subtracting the average annual depreciation of the investment from the average annual net cash flow, as shown in the previous example (Annual cash flow for two investments). The return on capital is calculated as follows:

$$\text{Simple rate of return} = \frac{\text{Average annual net income}}{\text{Cost of investment}} \times 100$$

The return on capital is used to compare alternative investments.

Investment A

$$\frac{\$1\,000}{\$10\,000} \times 100 = 10\%$$

Investment B

$$\frac{\$1\,200}{\$10\,000} \times 100 = 12\%$$

This method ranks investment B higher than investment A.

Training slides
for Session 6.1.2
Simple methods of investment appraisal

99 Investment appraisal — payback period

The **payback period** method calculates the number of years it would take for an investment to return its original cost through the generation of income as follows ...

$$\text{Payback period} = \frac{\text{Cost of the investment}}{\text{Annual net cash flow}}$$

*When net cash revenues are not equal,
they should be summed up year by year to find the year
where the total is equal to the amount of the investment*

Advantages: (i) easily understood by farmers, (ii) easy to calculate, (iii) alternative investments are ranked according to attractiveness.
Disadvantages: (i) ignores cash flow arising from after the payback period and timing of receipts, (ii) it is more a measure of how quickly the investments will contribute to the liquidity of a business.

100 Using the payback period

This example shows net cash benefits from two investments of \$10 000

Year	Investment	
	A	B
0	\$(10 000)	\$(10 000)
1	3 000	1 000
2	3 000	2 000
3	3 000	3 000
4	3 000	4 000
5	3 000	6 000
Total	15 000	16 000
Payback period (yrs)	3.3	4.0
Avg. annual net cash flow (5 yrs)	3 000	3 200
Less annual depreciation	-2 000	-2 000
Average annual net income	\$1 000	\$1 200

Module 6, Unit 6.1, Session 6.1.2

101 Investment appraisal – simple rate of return

The **simple rate of return** recognizes that it is not only income that is important, but also the amount of capital used to produce it

Income is regarded not by itself but as a return on the capital used

More precisely, the rate of return expresses the average annual net income as a percentage of the investment

Advantage: using the simple rate of return is better than using the payback period because it considers earnings over the entire life of an investment.

Disadvantage: is based on average annual earnings, thus failing to consider the size and timing of annual earnings causing possible error in selecting investments.

Module 6, Unit 6.1, Session 6.1.2

Discounted methods of investment appraisal

This session deals with ways of appraising investments by using discounted methods such as the: net present value (NPV) and the internal rate of return (IRR).

Investments often involve tying up sums of money over periods of time. It is crucial to understand the advantages and disadvantages of discounted methods and how these can be of help to farmers in making investment decisions. It is also important to understand the comparative advantages and disadvantages of simple and discounted methods for investment appraisal.

Objectives

At the end of the session, the participants should understand:



- the concept of time value of money;
- discounted methods;
- how to discount an investment;
- how farmers take investment decisions;
- the advantages and disadvantages of undiscounted and discounted methods of investment appraisal.

Key points

1. Time value of money means that money today has a higher value than money in the future.
2. Compounding is computing by how much the principal grows based on the amount of the accumulated interest.
3. Discounting is calculating what a known future amount is worth today.
4. NPV of an investment is the sum of the present values for each year's net cash flow less the initial cost of investment.

5. Farmers should accept investments with a positive NPV, reject those with negative NPV and be indifferent to a zero value.
6. The IRR is the interest rate at which the NPV of an investment is equal to zero.
7. The acceptability of the IRR depends on the opportunity cost of capital used in the investment.
8. Opportunity cost can be computed as the weighted average of the interest rates charged by the sources if there are two or more different sources of capital.
9. The NPV is used to compare different investments. However IRR may be easier to understand.

Steps for instruction



1. Distribute Handout 6.1.3 (Discounted methods of investment appraisal) to the participants before the start of the session.
2. Explain that the cash flow streams presented previously can be set up in another way, closer to the concept of cash flow given in Module 5.
3. Clarify the conventions used in setting up a cash flow, the phasing of income and cost flows. Mention that investments are made at the end of year 1, but operating costs and income begin from year 2. The time scale of a cash flow should also be discussed, explaining that the appraisal should extend up to the end of the life of the investment.
4. Show Slide 103 (Time value of money in investment appraisal), and discuss the importance of this concept in discounted measures.

5. Define compounding and explain the formula for compounding. Point out that discounting is the reciprocal process of compounding. Demonstrate how a table of prepared discount rates (see Table 6.1) can be used and illustrate with an example computation.
6. Ensure that the participants have a clear understanding of the concept of the time value of money. The use of an example would greatly enhance understanding of the concept. Try to borrow some money from the trainees. It can be any amount and for any period, but suggest at least 3 months. Encourage the trainees to "play the game". Ask them all to write down what rate of interest they would charge you (the trainer). Convert the rates to a per annum basis and discuss the reasons behind the different rates suggested. Use this example to explain time preference.
7. Encourage discussion among the participants about the type of data needed to conduct a discounted investment appraisal. Ask trainees to suggest what is needed. Some items include: (i) initial cost of the investment, (ii) annual costs, (iii) annual benefits, (iv) salvage value. Write their suggestions on the classroom board.
8. Refer again to the session on cash flow in Module 5, pointing out the difference that here we are concerned with investment beyond a 1-year period. Explain that investment appraisal is concerned with incremental investments; the cost stream should only include cash items (depreciation is omitted); and that there is a need to carefully assess the phasing of investment costs and benefits.
9. Using Slide 104 (Discounted investment appraisal — net present value [NPV]), discuss this method of appraisal and point out its advantages and disadvantages. With Slide 105 (Calculating the net present value), explain how to arrive at the values required.
10. Show slide 106 (Discounted investment appraisal — internal rate of return [IRR]), discuss this method of appraisal and point out its advantages and disadvantages.

11. Explain that the IRR is the interest rate (discount rate) at which the NPV of an investment is equal to zero and can be found using the NPV method by trial and error. The use of trial and error method implies that the initial choice of interest rate to use is arbitrary. However, the choice of the second rate can be done by increments of 5 percent, in the process changing the choice of the higher and lower discount rates until a negative NPV is reached. The higher discount rate is where NPV is negative and the lower discount rate is where NPV is positive.
12. Show Slide 107 (Calculating the internal rate of return). Point out that because there are two discount rates used in the computation of NPV, there is now a necessity for interpolation in order to arrive at a single discount rate that sets the NPV equal to zero. Explain the process of interpolation.
13. After calculating the IRR, explain how it is used; mention that a decision whether or not to invest depends on the opportunity cost of capital. Show Slide 108 (Selection of discount rate) and Slide 109 (Weighted average cost of capital [WACC]). Explain that the opportunity cost of capital is calculated as the weighted average interest rate of different sources of capital (if two or more sources are used). Provide an example from the handout for explanation.
14. Divide participants into pairs and distribute Training exercise 16. On completion of the exercise discuss the solutions presented.
15. Initiate a discussion among participants on the advantages and disadvantages of the different types of appraisal methods discussed. In particular, compare the use of the IRR and the NPV.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 6.1.3, (iii) refer to Training exercise 16.

Notes

Discounted methods of investment appraisal

Some simple methods of investment appraisal were considered in Session 6.1.2. This session explores discounted methods for assessing the profitability of an investment. These include:

- net present value (NPV)
- internal rate of return (IRR)

Both methods have advantages and disadvantages, which will be discussed in the course of this session. Since investment decisions can be quite complicated, extension workers will likely need to assist farmers in selecting the appropriate method and making the correct decisions. But before looking at these methods it is important to understand the time value of money and take it into account when discounting.

The time value of money in investment appraisal

Time value of money means that a dollar today does not have the same value a year from now. Understanding the time value of money is important in appraising and making farm investment decisions.

If you were offered \$1 000 today or \$1 000 a year from now, which would you choose? There are many reasons for choosing cash now instead of later. One might place the \$1 000 in a savings account and earn 5 percent interest. This would generate \$50 in extra income, an advantage that would be missed by receiving the \$1 000 one year later.

*Money
not invested
loses value
over time*

Other uses could earn the farmer even more money. For example, why wait a year for new farm machinery when it can be purchased and used now? Alternatively, one may worry about the uncertainties of life. Either the giver or the receiver of the \$1 000 might not be alive in a year to fulfil their part of the transaction. These different reasons demonstrate the importance of the time value of money.

Realizing that money is worth more to a person in the present rather than in the future may appear obvious but quantifying the effect is more complex. Interest rates are used to compare present and future claims on investments. Different interest rates imply different time values.

Lenders of capital receive interest, and borrowers pay interest because of the perceived benefits of time. For example, a lender who provides \$100 today at 8 percent interest per year is paid back \$108 in 1 year. The \$8 compensates the lender for alternative investments not made, personal consumption foregone or for the risk that the money might not be repaid.

The borrower and lender agree that \$100 today is worth \$108 a year from now. The borrower agrees to receive \$100 now and pay back \$108 in 1 year; the lender gives \$100 now to receive \$108 in 1 year. However, the lender is not convinced that \$8 (8 percent) is enough. It might be that 9 percent interest would be necessary to convince the lender. In this case, the time value of money over the 1-year period would be \$9.

Compounding and discounting. The time dimension of money is taken into account through the use of discounting. It is simply a technique by which future benefits and costs can be reduced to a present value. This can be better understood by explaining the notion of compounding.

Example Compounding

Consider a case where a farmer lends \$1 000 to a neighbour at an interest rate of 5 percent annually. The following year the neighbour will owe \$1 050, consisting of the \$1 000 principal and \$50 in interest ($\$1000 \times 0.05$). Suppose the neighbour wants to keep the money for two years. Then 5 percent must be paid for the use of the money for the first year and an additional 5 percent for the second year. The neighbour must also pay interest on the amount due to have been paid the lender at the end of the first year. In other words, the farmer must be paid compound interest.

Compounding is the process of finding the future value of a present amount

Example Discounting

Now suppose we ask a different question. If a borrower promises to pay the farmer \$1 200 at the end of five years at an interest rate of 8 percent, how much is that promise worth to the farmer today? Put another way, what is the present worth of \$1 200 five years in the future if the interest is assumed to be 8 percent? To answer the question the farmer would have to divide the amount due by 1.08 for each project year as shown below:

Discounting is the process of finding the present value of a future amount

Year	Amount at end of year (\$)	One plus interest rate	Amount at beginning of year (\$)
1	1 200	1.08	1 111
2	1 111	1.08	1 029
3	1 029	1.08	953
4	953	1.08	882
5	882	1.08	817

The present value of \$1 200, 5 years in the future, is \$817.

This process of finding the present worth of a future value is called "discounting". Discounting looks backward from the future to the present. The interest rate assumed for discounting is the "discount rate" (see Table 6.1 at the end of this handout). Using this table the discount factor for 8 percent and 5 years is given as 0.681. To find the present value of \$1 200 received 5 years in the future, the amount due in the future is multiplied by the discount factor for the fifth year. This gives \$817 ($1\ 200 \times 0.681 = 817$).

Example

Find the present value of \$6 438 received 9 years in the future if the discount rate is 15 percent.

The relevant factor in the discounting tables shows that at a 15 percent rate and for a period of 9 years, the coefficient is 0.284. The future amount is multiplied by the discount factor to obtain a present value of \$1 828 ($\$6\ 438 \times 0.284 = \$1\ 828$).

Net present value (NPV)

The NPV of an investment is the sum of the present values for each year's net cash flow less the initial cost of the investment. It is also called the discounted cash flow method because it uses the discounting method of analysis. This method considers the time value of money and the stream of cash flows over the entire life of the investment.

A general rule regarding the number of years to include in the cash flow analysis is to choose a period of time that is comparable to the life of the major investment item. In the case of farm machinery and equipment, this is often taken as between 5 and 7 years and for buildings 30 to 40 years.

With this method, the farmer would accept an investment with a positive NPV, reject those with a negative NPV and be indifferent to a zero value. The rationale behind accepting investments with a positive NPV can be explained in two ways.

First, it means the rate of return on the investment is greater than the discount rate used in the calculations. A second explanation is that the farmer can afford to pay more for the investment and still achieve a rate of return equal to the discount rate used in calculating the NPV.

Example
Calculating net present value

This example assumes that the investment has no salvage value at the end of its life. If this assumption is relaxed, an entry would need to be made of the salvage value of the investment as part of the cash inflow and entered in the respective year incurred.

(8% discount rate and no salvage values)

Year	Investment A			Investment B		
	Net cash flow (\$)	Discount rate	Present value (\$)	Net cash flow (\$)	Discount rate	Present value (\$)
1	3 000	0.926	2 778	1 000	0.926	926
2	3 000	0.857	2 571	2 000	0.857	1 714
3	3 000	0.794	2 382	3 000	0.794	2 382
4	3 000	0.735	2 205	4 000	0.735	2 940
5	3 000	0.681	2 043	6 000	0.681	4 086
		Total	11 979			12 048
	Less investment cost		10 000			10 000
	Net present value		1 979			2 048

The farmer could pay up to \$11 979 (\$10 000 + \$1 979) for investment A and \$12 048 (\$10 000 + \$2 048) for investment B and still receive an 8 percent return or more on invested capital. Both investments show a positive NPV using an 8 percent discount rate.

The selection of the discount rate consequently affects the result of the appraisal. When a higher discount rate is used, the NPV decreases and vice versa. At some higher discount rates the NPV values would be zero, and at an even higher rate it could become negative.

Internal rate of return (IRR)

The IRR is the interest rate at which the NPV of an investment is equal to zero. This is the maximum rate of interest that the farmer can afford to pay for the resources used, in order to recover the original investment and its operating costs and still break even.

Example Calculating the internal rate of return

Since there is no formula for finding the IRR, a procedure of trial and error is needed in an attempt to equate the net present value of the cash flow with the zero break-even point.

Estimation IRR for Investment A

Year	Net cash flow (\$)	14%		16%	
		Present value factor	Present value (\$)	Present value factor	Present value (\$)
1	3 000	0.877	2 631	0.862	2 586
2	3 000	0.769	2 307	0.743	2 229
3	3 000	0.675	2 025	0.641	1 923
4	3 000	0.592	1 776	0.552	1 656
5	3 000	0.519	1 557	0.476	1 428
		Total	10 296	Total	9 822
	Less investment cost		-10 000	Less cost	-10 000
		NPV	296		-178

The relatively high NPV of the investment with an 8 percent discount rate suggests that the actual rate of return on the investment may be considerably higher than this rate. An interest rate of 14 percent was arbitrarily chosen as a first estimate of the IRR. The calculation shows a positive NPV of \$296, indicating that the IRR is still high and in excess of zero, the break-even point. An even higher discount rate is used next (16 percent) assuming that this will result in a lower NPV. The result shows that there is a negative IRR of -\$178. The actual IRR lies somewhere between 14 and 16 percent.

The most difficult aspect of this trial and error process is making an initial estimate. If the estimate is too far from the final result, then several trials will have to be made to find two rates that are sufficiently close enough to allow the break-even point to be calculated. This is done by interpolation (i.e. finding a desired value between two other values).

The rule for interpolating the value of the IRR between two discount rates (with a negative and positive NPV) is as follows:

$$\text{Low discount rate} + \frac{\text{High NPV}}{\text{High NPV} - \text{Low NPV}} \times (\text{High discount rate} - \text{Low discount rate})\%$$

This procedure is applied to the above example. The lower discount rate is 14 percent. The difference between the two rates is 2 percent. The present worth of the lower discount rate cash flow is \$296 and the present worth of the higher rate is -\$178. The sum of the present worth of the cash flows at the two discount rates, ignoring the signs, is \$474.

Through interpolation the IRR is calculated as follows:

$$14\% + \frac{296}{296 - (-178)} \times (16 - 14)\% = 15.2\%$$

At a discount rate of 15.2 percent the investment just breaks even. From another angle the IRR can be understood as the earning capacity of the investment.

The formal selection decision for the IRR is to accept all investments with a return equal to or greater than the discount rate. If the IRR of the investment as a whole is lower than the discount rate, the investment is not profitable. If the IRR exceeds the interest rate, the farmer may try to borrow as much as possible to increase the return on the investment.

Finally, it should be pointed out that an IRR can only be calculated when at least one value in the net cash flow is negative. If all the values are positive, no discount rate can make the NPV of the cash flow equal to zero. In this event the IRR would be infinite.

Selection of discount rate

An appropriate discount rate has to be selected in order to use discounted measures of investment appraisal. The discount rate used is usually the cost of capital to the farmer for whom the appraisal is being done. But how should the cost of capital be measured? This is often assumed to be the rate of interest at which the farmer is able to borrow money. However, if the capital that the farmer uses to finance the investment is a mixture of equity and borrowed capital, the discount rate should also be weighted to take account of the return necessary to attract equity capital on the one hand and the borrowing rate on the other.

A weighted average cost of capital (WACC) calculation is needed, estimating the rate of return for both forms of capital tied up in the investment: debt and equity. This reflects the cost of all forms of financing that the farmer may use.

The WACC can be calculated as follows:

$$WACC = \frac{\text{Equity capital} \times \text{Return needed to attract equity capital}}{\text{Total capital}} + \frac{\text{Borrowed capital} \times \text{Borrowing rate}}{\text{Total capital}}$$

This requires information on the:

- cost of capital funds from each source employed by the farmer;
- weights to be given each source of capital in computing a weighted average cost.

The proper set of weights to use is the relative proportion of each type of capital in the farmer's desired financing of the investment. The assumption is that the farmer will, in fact, fund the capital investment in the proportions assumed in the weighting system. If bank loans represent 67 percent of a farmer's funds, it should be assigned a weight of 0.67. If equity capital represents 33 percent of the investment, it would be given a weight of 0.33.

While the interest rate charged on long-term bank loans is used as the cost of capital from lending, placing a meaningful cost on equity capital is much more difficult. This is so because equity has no clear cost. There is no interest paid. However, there is an opportunity cost. If farmers put their money into an investment they are denied the use of these funds for other purposes. If by investing in their own farms, the farmers forgo making investments that will earn 10 percent, they should view equity capital as costing the alternative 10 percent.

The opportunity cost of farmers' equity differs between farmers because individuals differ in their abilities to find alternative investment possibilities for their capital and in their management capacity and attitude to risk. With this in mind farmers must use their judgement in assessing their cost of equity. The important point is for the farmer to recognize that equity capital is not "costless" and, in fact, should be regarded as a more expensive source of capital than bank loans.

Example Calculating weighted average cost of capital

In this example, the WACC is 8 percent. Investments

Source	Amount	Weighted average cost of capital
Loan (7% IR)	5 000 (67%)	7% of 67% = 4.7%
Equity capital (10% IR)	2 500 (33%)	10% of 33% = 3.3%
Total	\$7 500 (100%)	Total 8.0%

promising a return of less than 8 percent (i.e. investments with a negative NPV using 8 percent as the discount factor or investments with an IRR of less than 10 percent) would appear undesirable. On the other hand, investments promising a rate of return of something over 8 percent would be acceptable.

Comparison of measures

The two discounting measures give the same answer to the simple question of whether the investment pays. Many extension workers might prefer the NPV criterion for its simplicity, unambiguous quality and straightforward way of selecting among mutually exclusive investments. Some, however, may prefer the IRR criterion because it is understood easily by those unfamiliar with the discounted measures. The IRR can be explained easily as the maximum rate of interest that a farmer could pay if all resources used in the investment were borrowed.

But if the investment alternatives considered by the farmer are mutually exclusive, the IRR is not a useful measure and the NPV would be more appropriate. The NPV better serves this purpose because it measures the absolute surplus of the benefits over the costs, discounted. Furthermore, it escapes the problem of having to estimate the opportunity cost of capital to the farmer.

Notes

Table 6.1 — Discount rates
(present value of a single sum of 1\$ received or paid at the end of the period)

		Rate of Interest (%)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	0.990	0.980	0.971	0.962	0.952	0.943	0.935	0.926	0.917	0.909	0.901	0.893	0.885	0.877	0.870	0.862	0.855	0.847	0.840	0.833	
2	0.980	0.961	0.943	0.925	0.907	0.890	0.873	0.857	0.842	0.826	0.812	0.797	0.783	0.769	0.756	0.743	0.731	0.718	0.706	0.694	
3	0.971	0.942	0.915	0.889	0.864	0.840	0.816	0.794	0.772	0.751	0.731	0.712	0.693	0.675	0.658	0.641	0.624	0.609	0.593	0.579	
4	0.961	0.924	0.888	0.855	0.823	0.792	0.763	0.735	0.708	0.683	0.659	0.636	0.613	0.592	0.572	0.552	0.534	0.516	0.499	0.482	
5	0.951	0.906	0.863	0.822	0.784	0.747	0.713	0.681	0.650	0.621	0.593	0.567	0.543	0.519	0.497	0.476	0.456	0.437	0.419	0.402	
6	0.942	0.888	0.837	0.790	0.746	0.705	0.666	0.630	0.596	0.564	0.535	0.507	0.480	0.456	0.432	0.410	0.390	0.370	0.352	0.335	
7	0.933	0.871	0.813	0.760	0.711	0.665	0.623	0.583	0.547	0.513	0.482	0.452	0.425	0.400	0.376	0.354	0.333	0.314	0.296	0.279	
8	0.923	0.853	0.789	0.731	0.677	0.627	0.582	0.540	0.502	0.467	0.434	0.404	0.376	0.351	0.327	0.305	0.285	0.266	0.249	0.233	
9	0.914	0.837	0.766	0.703	0.645	0.592	0.544	0.500	0.460	0.424	0.391	0.361	0.333	0.308	0.284	0.263	0.243	0.225	0.209	0.194	
10	0.905	0.820	0.744	0.676	0.614	0.558	0.508	0.463	0.422	0.386	0.352	0.322	0.295	0.270	0.247	0.227	0.208	0.191	0.176	0.162	
11	0.896	0.804	0.722	0.650	0.585	0.527	0.475	0.429	0.388	0.350	0.317	0.287	0.261	0.237	0.215	0.195	0.178	0.162	0.148	0.135	
12	0.887	0.788	0.701	0.625	0.557	0.497	0.444	0.397	0.356	0.319	0.286	0.257	0.231	0.208	0.187	0.168	0.152	0.137	0.124	0.112	
13	0.879	0.773	0.681	0.601	0.530	0.469	0.415	0.368	0.326	0.290	0.258	0.229	0.204	0.182	0.163	0.145	0.130	0.116	0.104	0.093	
14	0.870	0.758	0.661	0.577	0.505	0.442	0.388	0.340	0.299	0.263	0.232	0.205	0.181	0.160	0.141	0.125	0.111	0.099	0.088	0.078	
15	0.861	0.743	0.642	0.555	0.481	0.417	0.362	0.315	0.275	0.239	0.209	0.183	0.160	0.140	0.123	0.108	0.095	0.084	0.074	0.065	
16	0.853	0.728	0.623	0.534	0.458	0.394	0.339	0.292	0.252	0.218	0.188	0.163	0.141	0.123	0.107	0.093	0.081	0.071	0.062	0.054	
17	0.844	0.714	0.605	0.513	0.436	0.371	0.317	0.270	0.231	0.198	0.170	0.146	0.125	0.108	0.093	0.080	0.069	0.060	0.052	0.045	
18	0.836	0.700	0.587	0.494	0.416	0.350	0.296	0.250	0.212	0.180	0.153	0.130	0.111	0.095	0.081	0.069	0.059	0.051	0.044	0.038	
19	0.828	0.686	0.570	0.475	0.396	0.331	0.277	0.232	0.194	0.164	0.138	0.116	0.098	0.083	0.070	0.060	0.051	0.043	0.037	0.031	
20	0.820	0.673	0.554	0.456	0.377	0.312	0.258	0.215	0.178	0.149	0.124	0.104	0.087	0.073	0.061	0.051	0.043	0.037	0.031	0.026	
21	0.811	0.660	0.538	0.439	0.359	0.294	0.242	0.199	0.164	0.135	0.112	0.093	0.077	0.064	0.053	0.044	0.037	0.031	0.026	0.022	
22	0.803	0.647	0.522	0.422	0.342	0.278	0.226	0.184	0.150	0.123	0.101	0.083	0.068	0.056	0.046	0.038	0.032	0.026	0.022	0.018	
23	0.795	0.634	0.507	0.406	0.326	0.262	0.211	0.170	0.138	0.112	0.091	0.074	0.060	0.049	0.040	0.033	0.027	0.022	0.018	0.015	
24	0.788	0.622	0.492	0.390	0.310	0.247	0.197	0.158	0.126	0.102	0.082	0.066	0.053	0.043	0.035	0.028	0.023	0.019	0.015	0.013	
25	0.780	0.610	0.478	0.375	0.295	0.233	0.184	0.146	0.116	0.092	0.074	0.059	0.047	0.038	0.030	0.024	0.020	0.016	0.013	0.010	
26	0.772	0.598	0.464	0.361	0.281	0.220	0.172	0.135	0.106	0.084	0.066	0.053	0.042	0.033	0.026	0.021	0.017	0.014	0.011	0.009	
27	0.764	0.586	0.450	0.347	0.268	0.207	0.161	0.125	0.098	0.076	0.060	0.047	0.037	0.029	0.023	0.018	0.014	0.011	0.009	0.007	
28	0.757	0.574	0.437	0.333	0.255	0.196	0.150	0.116	0.090	0.069	0.054	0.042	0.033	0.026	0.020	0.016	0.012	0.010	0.008	0.006	
29	0.749	0.563	0.424	0.321	0.243	0.185	0.141	0.107	0.082	0.063	0.048	0.037	0.029	0.022	0.017	0.014	0.011	0.008	0.006	0.005	

Years

1) To find present value (PV) of future amount: $PV = \text{Factor} \times \text{Amount}$
 2) To find future amount representing the present value: $\text{Amount} = PV \div \text{Factor}$

Unit 6.1 — Training exercise 16

Net present value and internal rate of return

Background information

A farmer decides to buy a tractor at a cost of \$1 125 and estimates that the annual net benefits (cash inflows minus cash outflows) generated as a result of the investment are:

*Year 1: \$500 Year 3: \$300
Year 2: \$400 Year 4: \$200*

Task

**Calculate the NPV assuming a discount rate of 8 percent
(record the results in the table below)**

(space for calculations)

(8% discount rate)

Year	Investment (tractor)		
	Net cash flow (\$)	Discount rate	Present value (\$)
1			
2			
3			
4			
		Total	
		Less investment cost	
		Net present value	

(continued on the next page)

Training exercise 16 (continued)

Calculate the NPVs at different discount rates
(record the results in the table below)

--	--	--	--	--	--	--	--	--	--

(space for calculations)

Estimation of IRR for the investment

Year	Net cash flow (\$)	10%		14%	
		Present value factor	Present value (\$)	Present value factor	Present value (\$)
1					
2					
3					
4					
Total					
Less investment cost					
NPV					
Total					
Less cost					

Interpolate the IRR using the figures you have found

--	--	--	--	--	--	--	--	--	--

(Answer key on the following page)

Answer key for
Training exercise 16

The net present value can be calculated as in the following table.

(8% discount rate)

Year	Investment (tractor)		
	Net cash flow (\$)	Discount rate	Present value (\$)
1	500	0.926	463.0
2	400	0.857	342.8
3	300	0.794	238.2
4	200	0.735	147.0
		Total	1 191.0
		Less investment cost	-1 125.0
		Net present value	66.0

Since the IRR is calculated through a procedure of trial and error any two discount rates can be chosen as long as one results in a positive NPV and the other in a negative NPV. The discount rate that makes the NPV zero is then found by interpolation. Below are summarized the results with 10 and 14 percent as discount rates.

Estimation of IRR for the investment

Year	Net cash flow (\$)	10%		14%	
		Present value factor	Present value (\$)	Present value factor	Present value (\$)
1	500	0.909	454.5	0.862	431.0
2	400	0.826	330.4	0.743	297.2
3	300	0.751	225.3	0.641	192.3
4	200	0.683	136.6	0.552	110.4
		Total	1 146.8	Total	1 030.9
		Less investment cost	-1 125.0	Less cost	-1 125.0
		NPV	21.8		-94.1

The interpolation is calculated as follows and then rounded:

$$10\% + \frac{21.8}{21.8 - (-94.1)} \times (14 - 10)\% = 10.75\% \quad \boxed{11\%}$$

Training slides
for Session 6.1.3
Discounted methods of investment appraisal

103 Time value of money in investment appraisal

The **time value of money** means that a dollar today
will not have the same value a year from now ...

Discounted measures take into consideration the **time value of money**

Compounding is the process of finding the *future value* in some future year
of a present amount growing at compound interest calculated as follows ...

$$\text{Future worth} = \text{Present worth} (1 + \text{Rate of interest})^n$$

Discounting is the process of finding the *present value*
of a future amount calculated as follows ...

$$\text{Present worth} = \frac{1}{(1 + \text{Rate of interest})^n}$$

n = time frame used (days/weeks/months/years)

104 Discounted investment appraisal — net present value (NPV)

The **net present value** of an investment is the sum of the present values for each year's cash flow less the initial cost of the investment
(also called the discounted cash flow method since it uses discounting measures to appraise investments that take into consideration the time value of money)

Advantages: it accounts for (i) the scale of the project, (ii) the timing of cash flow over the life of the investment.

Disadvantages: (i) the capital required for the investment is ignored, (ii) it is difficult to understand, (iii) discount rates must be chosen by trial and error.

Module 6, Unit 6.1, Session 6.1.3

105 Calculating the net present value

(8% discount rate and no salvage values)

Year	Investment A			Investment B		
	Net cash flow (\$)	Discount rate	Present value (\$)	Net cash flow (\$)	Discount rate	Present value (\$)
1	3 000	0.926	2 778	1 000	0.926	926
2	3 000	0.857	2 571	2 000	0.857	1 714
3	3 000	0.794	2 382	3 000	0.794	2 382
4	3 000	0.735	2 205	4 000	0.735	2 940
5	3 000	0.681	2 043	6 000	0.681	4 086
		Total	11 979			12 048
		Less investment cost	10 000			10 000
		Net present value	1 979			2 048

Module 6, Unit 6.1, Session 6.1.3

106 Discounted investment appraisal – internal rate of return (IRR)

The **internal rate of return** is the interest rate at which the **net present value** of an investment equals zero (or the maximum rate of interest that the farmer can afford to pay for the resources used, in order to recover the original investment and its operating costs and still break even)

Advantages: (i) the return on capital invested can be measured, (ii) does not require discount rate approximation, (iii) IRR is easier to understand than the NPV.

Disadvantages: (i) does not take into account project scale or timing of the cash flow, (ii) can only be estimated when at least one value in the net cash flow is negative.

Module 6, Unit 6.1, Session 6.1.3

107 Calculating the internal rate of return

(estimating the IRR for Investment A)

Year	Net cash flow (\$)	14%		16%	
		Present value factor	Present value (\$)	Present value factor	Present value (\$)
1	3 000	0.877	2 631	0.862	2 586
2	3 000	0.769	2 307	0.743	2 229
3	3 000	0.675	2 025	0.641	1 923
4	3 000	0.592	1 776	0.552	1 656
5	3 000	0.519	1 557	0.476	1 428
	Total		10 296	Total	9 822
	Less investment cost		-10 000	Less cost	-10 000
	NPV		296		-178

Note: Since there is no formula for finding the IRR trial and error must be used to equate the NPV of the cash flow with the zero break-even point

Module 6, Unit 6.1, Session 6.1.3

108 Selection of discount rate

An appropriate **discount rate** has to be selected in order to use discounted measures of investment appraisal and the discount rate is usually the **cost of capital**

However, if the capital used to finance an investment is a **mixture of equity and borrowed capital** the discount rate should be weighted accordingly

Calculate the **weighted average cost of capital (WACC)** as follows ...

$$WACC = \frac{\text{Equity capital} \times \text{Return needed to attract equity capital}}{\text{Total capital}} + \frac{\text{Borrowed capital} \times \text{Borrowing rate}}{\text{Total capital}}$$

Note: This requires information on (i) the cost of capital funds from each source of employment, (ii) the weight to be given to each source of capital in computing a weighted average cost (see also Slide 109).

Module 6, Unit 6.1, Session 6.1.3

109 Weighted average cost of capital (WACC)

The proper set of weights to use is the relative proportion of each type of capital desired in financing the investment

If bank loans represent 67 percent of a farmer's funds (7 percent interest) and equity capital represents 33 percent of the investment (10 percent interest), then ...

Source	Amount	WACC
Loan (at 7% IR)	5 000 (67%)	7% of 67% = 4.7%
Equity capital (at 10% IR)	2 500 (33%)	10% of 33% = 3.3%
Total	\$7 500 (100%)	Total 8.0%

Note: Investments promising a return of less than 8 percent (i.e. investments with a negative net present value using 8 percent as the discount factor or investments with an IRR of less than 10 percent) would appear undesirable. Investments promising a rate of return of something over 8 percent would be acceptable.

Module 6, Unit 6.1, Session 6.1.3

Loan appraisal

This session considers a way of assessing the capacity of a farmer to repay loans taken out to finance a farm investment. The appraisal builds on the net cash flow projection before financing.

Investments often involve tying up money for a period of time. This money may have been borrowed and, therefore, it is important for farmers to understand whether or not they can repay loans. Also the farmer must consider repayment in terms of its affect on cash flow. It is particularly useful to assess the cash flow of an investment after negotiating a financial package.

Objectives

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



- understand the concept of debt repayment capacity;
- apply methods of assessing the capacity of the investment to cover debt services and repay loans.

Key points

1. The capacity of a farmer to repay a loan is assessed by examining the cash flow after taking into account the loan and accounting for the repayment of interest and principal.
2. The loan appraisal treats the loan as an inflow and repayment of debt as an outflow.
3. Debt repayment is conducted on the outstanding balance of the loan.
4. Net financing is calculated as the difference between the value of the loan taken and the repayment of interest and principal.

5. The net cash flow after financing is calculated by deducting the net financing costs from the cash flow before financing. The cumulative cash flow is used to assess whether the income and loan cover costs.
6. A negative cumulative cash flow indicates that the farmer requires either additional financing to cover a debt shortfall or better terms of financing. The loan appraisal provides a farmer with information to allow the renegotiation of a loan package.

Steps for instruction



1. Distribute Handout 6.1.4 (Loan appraisal) to the participants before the start of the session.
2. Encourage the participants to discuss the type of data needed to conduct a loan appraisal. Ask participants to suggest what items are needed: (i) interest on loan, (ii) time span of loan, (iii) cash flow, (iv) amount to be repaid. Write suggestions on the classroom board. The participants should be made aware that the presentation of the cash flow is a little different from the monthly cash flow schedule, discussed in Module 5. Also point out that in accounting terms loans are assumed to be received at the end of the year and the loan repayment is made in the consecutive year.
3. Show Slide 110 (Loan appraisal). Discuss the concept and its usefulness in practice. Explain how loan appraisal is computed with emphasis on the declining balance through the aid of Slide 111 (Computing loan repayment).
4. Involve the participants in a role play exercise, selecting one of the participants to play the role of the farmer. Use the data given in Table 6.2 in the handout. The example refers to a farmer who has taken a loan of \$1 000 at 10 percent interest and with a repayment period of 5 years.

Loan appraisal

Farmers are often interested in assessing their capacity to repay the loans that they take out. The capacity to repay loans is assessed by looking at its affect on the farmers' cash flow. The appraisal builds on the net cash flow projection before financing. The presentation of the cash flow is, however, seen a little differently.

In the table below, the annual net cash flow is presented horizontally. The vertical column explains in detail the net financing costs, the net cash flow after financing and the cumulative net cash flow. The methodology of appraising the capacity of the farmer to pay back the loan is also different following the accounting convention that loans are assumed to be received at the end of the year, and the debt service repayment is made in the consecutive year.

Table 6.2 – Computing loan repayment

Items	1	2	3	4	5	6	7
Cash flow before financing (\$)	-2 600	2 500	2 500	2 500	2 500	3 000	2 000
Loans							
Long-term loans	1 000						
Outstanding balance							
Long-term loans	1 000	800	600	400	200	0	0
Repayment of principal							
Long-term loans		200	200	200	200	200	0
Interest payments							
Long-term loans		100	80	60	40	20	0
Total cost of financing		300	280	260	240	220	0
Net financing	1 000	-300	-280	-260	-240	-220	0
Net cash flow after financing	-1 600	2 200	2 220	2 240	2 260	2 780	2 000
Cumulative cash flow	-1 600	600	2 820	5 060	7 320	10 100	12 100

Note: The net cash flow before financing is as given above.

Example
Computing loan repayment

The farmer takes out a loan for \$1 000 at 10 percent interest and a repayment period of 5 years. The calculations involved in appraising the capacity of the farmer to repay the loan are described as follows: The farmer receives a \$1 000 loan at an interest rate of 10 percent. Thus the interest paid in year 2 is \$100. The principal on the loan has to be repaid at equal instalments over a 5-year period of \$200 annually.

The interest payment for year 3 is calculated on the outstanding balance of the loan after the principal has been repaid. We assume that the loan repayment is made at the end of the year, so interest is due on the full amount of the principal outstanding at the end of the previous year. In year 3, the outstanding balance is the \$1 000 loan minus \$200 repaid as the *first instalment* of the principal (i.e. \$800).

The interest on \$800 is \$80 ($\$800 \times 10$ percent). This is entered as repayment on interest in year 3. It is assumed that the principal repayment is made at the end of the year, and interest must be paid for a full year on the amount outstanding at the end of the previous year.

Beginning year 6 the outstanding balance at the end of the previous year has been reduced by the principal repayment of \$200 made at the end of year 5, so the interest is calculated on the outstanding balance of \$200 and amounts to \$20.

In this particular example, the cumulative cash flow is positive for every year of the investment starting from year 2. This suggests that the farmer has a liquidity problem in year 1 but in year 2 is able to finance the costs of the loan. If the cumulative net cash flow shows a financial shortfall (i.e. a negative figure), in any year, the implication is that the farmer would need to find additional financing to cover that shortfall.

Training slides
for Session 6.1.4
Loan appraisal

110 Loan appraisal

Farmers are often interested in assessing their capacity to repay the loans that they take out

The capacity to repay loans is assessed by looking at its affect on the farmers' cash flow

The appraisal builds on the net cash flow projection before financing

However, the presentation of the cash flow is seen a little differently as shown in Slide 111 (Computing loan repayment)

Managing risk

This unit examines the risky environment in which farmers work and considers methods of assessing and managing the risk. It begins by defining exactly what risk is and separates risk into different categories. Strategies to understand risks and steps to take to help manage them are discussed. The unit also presents the use of sensitivity analysis as a tool to help predict possible changes in the assumptions used to assess risk.

Risk and risk management

There is a need to define and understand risk so that extension workers gain a better understanding of the risky environment within which farmers work. This session defines risk and discusses it in the context of the management decisions made by farmers.

Objectives

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



- define risk;
- understand the principles of managing risk;
- know how farmers make risky decisions.

Key points

1. Variability in yields and prices are major sources of risk in agriculture. Other factors are changing technologies, markets, policies and social factors.
2. Risk is the probable occurrence of an event that can be calculated with some accuracy.
3. Effective risk management involves:
 - anticipating that an unfavourable event may occur and acting to reduce the chance of its occurrence;
 - taking actions to reduce the adverse consequences should unfavourable events occur.

Steps for instruction



1. Distribute Handout 6.2.1 (Risk and risk management) before the start of the session.
2. Using Slide 112 (Risk) and Slide 113 (What is risk?) discuss the element of risk in farming with the class.

Risk and risk management

Farmers make decisions in a risky and ever-changing environment. The consequences of their decisions generally are not known when the decisions are made, and outcomes may be better or worse than expected. Variability of prices and yields are major sources of risk in agriculture. Changes in technologies, markets, policies and social factors all contribute to the risky environment of farming. Risks must be taken in order to grow a crop or raise livestock. Farmers cannot be sure about (i) the weather, (ii) disease, (iii) the price they may get if they choose to sell, (iv) what consumers want to buy.

What is risk?

Risk is defined as "the probable occurrence of an event, which can be calculated with some accuracy". Risk can be determined by identifying all of the possible outcomes of a given situation. It is impossible to predict what will really happen. This unknown factor is risk.

Risk factors in farming

1. Agriculture depends on biological processes and is subject to fluctuations in production as a result of weather change or disease.
2. Enterprises, such as vegetables, are subject to sudden changes in price.
3. Long-term enterprises, such as tree crops, require investment for a long period and may be subject to price changes that may make them uneconomic.
4. Certain crops may thrive under conditions prevalent in some parts of the country but prove uneconomic in others.

Farmers can never be sure of the outcome of their decisions

Risk is the chance that something will go wrong with the plans that farmers make

Effective risk management involves:

- anticipating that an unfavourable event may occur and acting to reduce the chance of it happening;
- taking actions to reduce the adverse consequences of risk should an unfavourable event take place.

For example, a risk management strategy for mechanization might involve a complete overhaul of an old tractor before the peak season workload. This is to reduce the chances of a major breakdown in operations over the period. During planting and harvesting, farmers may decide to keep some spare parts readily available. While they may not be able to prevent a breakdown from occurring, they can help to reduce the unfavourable consequences should it happen.

Farmers need to make choices. They will need to know about input and selling prices, yields, markets and technical information. However, very often farmers find that their best decisions turn out to be wrong because something changes between the time the decision is made and the time the crop is harvested or the animal is sold.

Farmers must make decisions early in the cropping season about things such as what crops to plant, what seeding rates and fertilizer levels to use. The final yield and prices may not be known for several months, or even several years in the case of tree crops. Risks in farming activities can come from unexpected places and result in low prices, drought or disease. Risk management is concerned with reducing the chances of less favourable outcomes occurring, or at least softening their effects.

Notes

Training slides
for Session 6.2.1
Risk and risk management

112 Risk

Farmers make decisions in a risky environment

The consequences of their decisions generally
are not known when the decisions are made and ...

... outcomes may be better or worse than expected

**Variability of prices and yields
are major sources of risk in agriculture**

**Changes in technologies, markets, policies, social factors
all contribute to the risky environment of farming**

113 What is risk?

Risk is defined as ...

**“the probable occurrence of an event,
which can be calculated with some accuracy”**

Risk can be determined by ...

**identifying all of the possible outcomes
of a given situation**

*It is impossible to predict what will really happen
and this unknown factor is risk*

Module 6, Unit 6.2, Session 6.2.1

114 Risk management

Effective risk management involves ...

**Anticipating that an unfavourable event may occur
and acting to reduce the chance of it happening**
(e.g. a complete overhaul of an old tractor
before the peak season and workload)

**Taking actions to reduce
the adverse consequences of risk
should an unfavourable event take place**
(e.g. decide to keep spare parts for equipment
readily available during planting and harvesting)

*Risk management is concerned with reducing
the chances of less favourable outcomes occurring*

Module 6, Unit 6.2, Session 6.2.1

Sources of risk

This session discusses the different sources of risk. Knowing what type of risk would enable the farmer to determine which ones can be controlled and/or minimized and thereby lessening their negative effects. Each category of risk will be discussed in turn.

Objectives

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



- understand the sources of risk;
- identify which risks are within the farmer's control and which are not.

Key points

1. The most common sources of risks are described as:

- production and technical risk;
- marketing or price risk;
- financial risk;
- institutional risk;
- human or personal risk.

2. Many of these risks are interrelated.

Sources of risk

Although risk is present in all farms, risk management is a personal matter and can vary between farmers. Risks can be classified in several ways. Some of them are:

- production and technical risk;
- marketing or price risk;
- financial risk;
- institutional risk;
- human or personal risk.

Production and technical risk. Crop and livestock performance depend on biological processes, which are affected by weather, soil, pests and disease. These processes cannot be predicted accurately. Farmers experience a wide range of weather conditions and refer to them simply as a "good" year, "normal" year or "bad" year. In periods of drought, poor plant growth means that livestock-fodder supplies and livestock production are likely to be reduced.

Then again outbreaks of pests or diseases can cause major yield losses. Inputs, such as seed and fertilizer, are applied before the farmer knows what the weather will be, and regardless of the levels used the weather often affects results. Another source of production risk is the introduction of a new technology. The question is often posed whether the new technology will perform as expected. Will it actually reduce costs and/or increase yields?

Marketing or price risk. Prices of farm products not only vary from year to year but also in some situations on a daily basis because of reasons beyond the control of the farmer. Supply of a product is affected by a combination of production decisions made and the resulting weather. Demand for a product is affected by the level of income that consumers have, the exchange rate and other policies, the strength of the general economy and the supply of competing products.

*Risk exists
in many
different
forms ...*

*... and with
potentially
devastating
effect*

Price movements can often follow seasonal or cyclical trends, which can be predicted. Costs of production represent another source of price risk. Although input prices tend to be less variable than output prices, the cost of production depends on both costs and yield and is subsequently highly variable.

Financial risk. This occurs when money is borrowed to finance the operation of the farm. This risk is caused by uncertainty about future interest rates, a lender's willingness to continue lending and the ability of the farm to generate the cash flows necessary for debt payments.

Institutional risk. This refers to irregularities in the provision of services, such as the supply of credit, purchased inputs and needed information deriving from both traditional and modern institutions. Part of institutional risk is the uncertainties of government policy with respect to price support and subsidies.

All too often these risks are a result of weak management and poor institutional performance. Subsidies, regulation in food quality and chemical use, rules for animal waste disposal and the level of price or income support payments are examples of decisions taken by government that can have a major effect on the farm activities.

Human or personal risk. Human risk refers to problems of human health and personal relationships that can affect the farm business. Accidents, illness and death, for example, often threaten and disrupt farm performance. In many countries, labour migration away from the farm is a common phenomenon that occurs as a result of poverty and food insecurity, and this often brings with it additional risks of contraction of human disease and illness.

Training slides
for Session 6.2.2
Sources of risk

115 Sources of risk

Production/technical risk. Crop and livestock production are affected by weather, soil, pests and disease or by the introduction of a new technology.

Marketing or price risk. Prices of farm products vary from year to year and in some situations on a daily basis.

Financial risk. Occurs when money is borrowed to finance the operation of the farm.

Institutional risk. Irregularities in the provision of services, (i.e. supply of credit, purchased inputs, needed information).

Human or personal risk. Human risk refers to problems of human health and personal relationships that can affect the farm business.

Risk management strategies

This session presents five steps in decision-making and risk management and describes management strategies in greater depth.

Extension workers should have an understanding of typical risk management strategies. They can then help farmers recognize different ways to reduce risk through better management practices.

Objectives

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



- have learned the steps in making risky decisions;
- understand the different types of responses when dealing with risk.

Key points

1. There are five steps that are usually followed when making risky decisions. These are:
 - identification of possible sources of risk;
 - identification of possible outcomes or events that could occur;
 - deciding on the alternative strategies available;
 - quantifying the consequences or results of each possible outcome for each strategy;
 - evaluating trade-offs between risk and returns.

2. The common risk management strategies are summarized here.

Production-led responses:

- choosing low risk activities;
- diversifying enterprises;
- dispersing production geographically;
- selecting and diversifying production practices;
- maintaining flexibility.

Marketing-led responses:

- obtaining market information;
- participating in government programs;
- spreading sales;
- forward contracting;
- minimum price contracts.

Financial responses:

- insurance;
- maintaining liquidity reserves;
- working off-farm;
- pacing investments;
- limiting credits.

Steps for instruction



1. Distribute Handout 6.2.3 (Risk management strategies) among the participants before the start of the session.
2. Explain the steps involved in decision-making under risk with the aid of Slide 116 (Steps in managing risk). Initiate group discussions and discuss ways to minimize and cope with risks. List the main types of risk on a posterboard (production, market and financial). Brainstorm possible risk management strategies for each category.

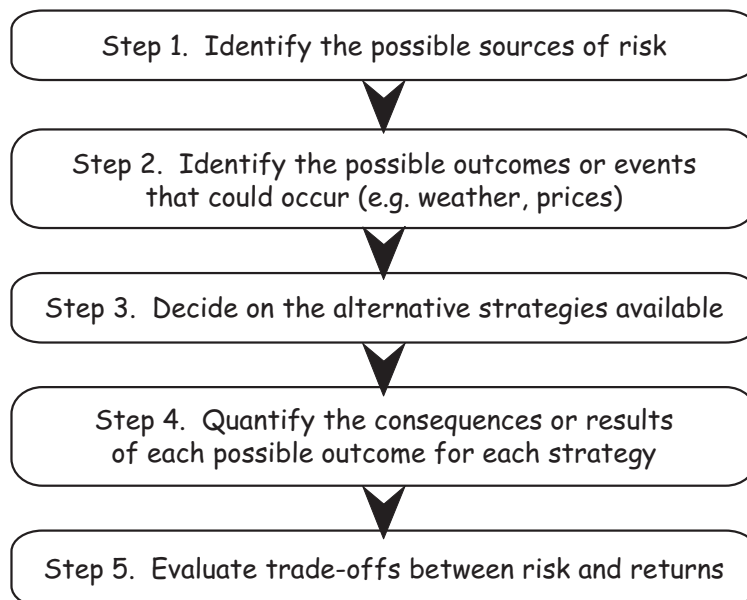
3. On completion of the brainstorming session compare the information provided by the class against that given in Slide 117 (Strategies for risk management).
4. Review the following conclusions to the session and discuss each thoroughly with the participants.
 - Farmers should be encouraged to "grow what they know".
 - Farmers should make use of extension services and adopt the most appropriate agricultural techniques.
 - Farmers should diversify crops and enterprises to minimize the risks of market prices and crop yield variability.
 - Farmers should save some of the profits earned as savings.
 - Farmers should keep farm and enterprise records.
 - Farmers should diversify their farming system into non-agricultural activities.
 - Farmers should collaborate among themselves.

Evaluation: (i) review objectives in relation to key points, (ii) refer to Handout 6.2.3

Notes

Risk management strategies

Farmers need to cope with risk and protect themselves from the decisions they make today, not knowing what may happen tomorrow. There are many risk management strategies that may reduce the chance of a "bad" event occurring and/or reduce the effect of the bad event if it occurs. The decision-making process can be broken down into the following steps:



*Steps
in risk
management
strategies*

Making decisions in which there is a high risk requires careful consideration of the various strategies available and the possible outcome of each. Risk responses are commonly grouped into production, marketing and finance (money). Most farmers use a combination of strategies for each of these groups. Examples are listed on the following page.

Risk responses by function	
Function	Strategy
Production	Choosing low-risk activities Diversifying enterprises Dispersing production geographically Selecting and diversifying production practices Maintaining flexibility Varying production capacity
Marketing	Obtaining market information Spreading sales Contract farming Participating in government programmes Minimum price contracts
Financial	Working off-farm Maintaining liquidity reserves Phasing investments Acquiring assets Limiting credit Insuring against losses

Production responses

Production responses have traditionally been very important in risk management. There are a number of response strategies that can be followed to reduce the risks that farmers face, such as the following:

- choosing low-risk enterprises;
- growing many things (diversification);
- growing crops on different land parcels or plots;
- selecting and changing production practices;
- maintaining flexibility.

Choosing low-risk enterprises. Most farmers have experience with farm enterprises that are more stable than others. Farmers may select farm enterprises or crop varieties that produce a reliable and stable yield. Although the yield of a new improved variety may be more stable than those of local

varieties, farmers may not have had the experience of growing that variety, and the risk to the farmer in its cultivation may be high. Some of the crops grown and livestock enterprises raised by the farmer may be simple while others are more complex.

Growing many things (diversification). Farmers often diversify their enterprises as a way of reducing risk. They do so by managing a number of enterprises together on the farm, producing the same enterprise in different physical locations or managing the same enterprise at different periods of time.

An example of diversification is the growing of several different crops or the keeping of livestock. If one enterprise fails, the income from the other enterprises is expected to be sufficient to keep going. While the income from any two enterprises may be equally risky, the combined risk will be less than the risk from either crop alone, because the two crops react in different ways to risk. This strategy ensures that farmers avoid having their income totally dependent on the production and price of a single enterprise.

Farmers rotate crops to protect their soils and stop diseases building up. This reduces costs and increases yields. For most farmers, combining crops (crop rotation or diversification) is not a risk management activity, it is simply good management.

Some factors can make crop diversification difficult. For example, some crops use similar machinery and equipment, while other crops may require specialized equipment. The benefit of diversification is often offset by increased costs. Other enterprises may make very little money. Consequently, the incomes farmers make from the crop may not be as high as if they were to specialize in growing just one crop, but the differences in year-to-year yields are reduced.

Farmers can spread risks by growing more than one enterprise

*Farmers must
be flexible
in choosing
farm-crop
locations ...*

*... and
appropriate
production
practices*

Growing crops on different land parcels or plots. Growing crops in different locations on the farm reduces the impact of localized disease and microclimatic factors. In order to increase the scale of their crop production, farmers must cultivate over a wide area. This costs more money as operating costs increase. Spreading out production is one way of reducing risk. Another is to increase efficiency in machinery and labour use.

Selecting and changing production practices. Farmers often spread risk by doing things in different ways. Some farmers may purchase inputs and materials that control crop diseases, pests and water use, and by doing so diminish deterioration in animal health. The application of these inputs might reduce the chances of low yields occurring, in particular, in situations of rain-fed farming. Drought-resistant seed varieties, for instance, could reduce the likelihood of crop failure when low rainfall occurs.

Pesticides and fungicides are more expensive inputs that might affect yield and farm income in different ways. These more costly inputs may reduce the risk of low yields but could increase the risk of income shortfall. More stable yields as a result of their application may not lead to a more stable income. Profits are affected also by the prices of products and inputs. The additional cost of doing this has to be compared against what could happen if they were not.

Maintaining flexibility. Flexibility of the farming system allows the farmer to shift from one cropping pattern to another, smoothly and easily, without having a negative effect on farm profitability. Farmers may change the area of land under cultivation and/or the number of livestock kept if, for example, market prices change markedly. Some farmers might decide to keep land fallow at times of low rainfall in order not to risk unnecessary expenditure on inputs. Farmers who raise intensive small stock, such as pigs, sheep and poultry, might vary the use of housing facilities if external conditions, such

as price changes, call for it. If farmers believe that product prices are likely to be good, they could increase production by intensifying the use of the facilities. Or alternatively, if prices are not satisfactory, they may try to increase efficiency and cut costs. Often, however, the costs associated with flexibility in production are higher than most farmers are willing to risk.

Market-related responses

The rapid change of food prices in the marketplace has increased farmers' awareness of price risks and has made good marketing skills important. Farmers can improve their knowledge of marketing and develop new marketing skills. Some of the ways this can be done are:

- obtaining market information;
- spreading sales;
- contract farming;
- minimum price contracts.

Obtaining market information. No one can predict the future exactly. But the more knowledge farmers have about price changes and the past profitability of enterprises, the better position they are in when predicting the future. Better information on seasonal variations in prices and changes in prices over the years can be used to plan when produce should be marketed. A farmer can reduce risk by collecting information about market prices and costs, and the returns of the alternatives open to them.

Spreading sales. Making several sales of a product during a year, or spreading sales, is a method commonly used by farmers to reduce risk. Dairy and other livestock producers are often forced to spread the sales over the entire year because of the nature of their production. With frequent sales throughout the year, the average price received by a farmer is nearly equal to the average price for the season or year.

*Farmers
need good
management
skills to deal
with market
changes*

Farmers should consider ways of stabilizing prices and ensuring market outlets

Farmers with marketing flexibility can also spread sales and obtain a price similar to the seasonal average price. This method enables a farmer to avoid selling all production at the lowest price in the market.

Contract farming. Price uncertainty can be eliminated entirely if the farmer could make advance contracts, both with the buyer of the produce and with the seller of agricultural inputs. Some farmers make contracts with suppliers so that inputs are provided at specified prices. This avoids the risk of price increases and the unavailability of key inputs at critical times.

Farmers, similarly, contract production sales at given prices agreed upon by both parties.

Contract farming may result in the farmers getting a lower price than they would have if they had sold on the "day". However, a guaranteed price for the farmers allows them to plan. If farmers are satisfied with the gross margin received and feel that they can safely supply the quantities contracted, then forward contracting is a good strategy to avoid risk.

Minimum price contracts. Minimum price contracts provide farmers with a "price insurance", but this is not always a guarantee of profit. It does provide the farmer, however, with greater flexibility.

Financial responses

The following are responses that help farmers reduce financial risks:

- crop and livestock insurance;
- maintaining liquidity reserves;
- working off-farm;
- pacing investments;
- limiting credits.

Crop and livestock insurance. Typhoons, fire or crop failure

can have a serious impact on the survival of the farm business. Without insurance the financial setback could be so large as to cause the farm business to fail and even cease operations. Formal insurance can reduce these risks.

Maintaining liquidity reserves. Holding reserves also reduces financial risks. It can be viewed as a "self-insuring" form of protection. Reserves may take the form of extra cash to meet unusual increases in the prices of inputs, such as livestock feeds that are needed on a daily basis. Other assets that can be easily converted to cash can also be used.

Working off-farm. Farmers may not work all day and every day of the week on their farm. They may choose to work in other jobs in order to augment their income. Farmers can work off-farm as salaried labour, either as a hired hand on other farms, or alternatively may find employment in non-farm work.

Scheduling investments. Proper scheduling or timing of investments on the farm can also help reduce financial risk. There are some cases in which investments can be staggered beginning with the most urgent or important ones, especially for fixed investments. However, provisions for expansion always need to be made available.

Limiting credits. Credit supplies should be carefully programmed so that payment coincides with the inflow of receipts from the sale of the produce. If farmers borrow beyond their capacity to pay or the period of loan payment is ill-timed, there is a likelihood that the farm business will be in financial difficulty. Although they have the option to borrow funds from several sources, caution needs to be exercised. There comes a time when loans taken out will have to be repaid with interest.

Farmers need to know how to increase their financial security

Common farmer responses

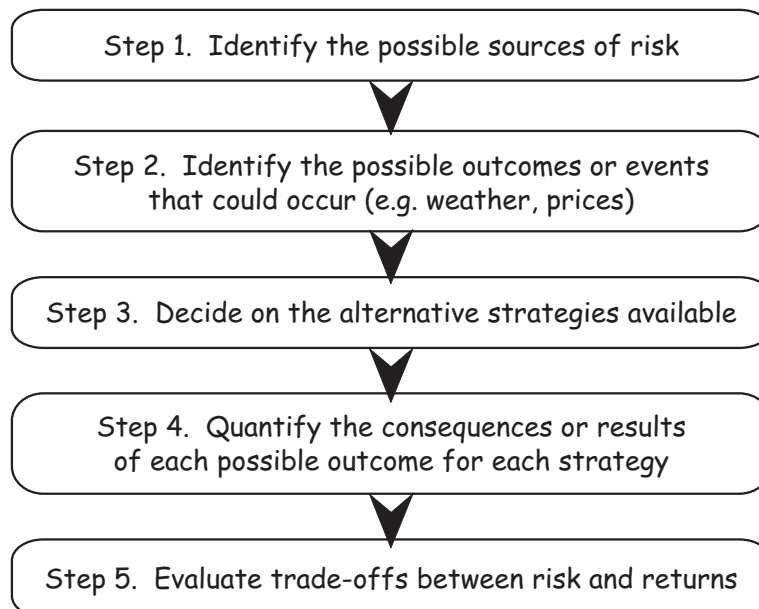
The general lessons that can be learned from these experiences are summarized below:

1. Farmers should be encouraged to grow what they know, although trying new potentially attractive farm enterprises should not be avoided. They should be tried out on a small scale.
2. Farmers should make use of extension services and adopt the most appropriate agricultural techniques.
3. Farmers would do well to diversify within the farming system by planting several types of crops and/or introducing livestock.
4. Farmers should set aside profits and save some of their funds as a reserve.
5. Farmers should be well-informed of the implications of risk on the profitability of their farm enterprise by keeping records, collecting market information and better utilizing extension information.
6. Farmers may need to undertake off-farm income generating activities as a supplementary source of income.
7. Farmers should be encouraged to work with other farmers to reduce costs and increase profits.

Notes

Training slides
for Session 6.2.3
Risk management strategies

**116
Steps in
managing
risk**



Dealing with risk

This session looks at ways farmers can better plan farm decisions through the use of one simple tool: sensitivity analysis.

Risk is inherent in any farm decision and it is important to consider the extent to which it affects the different types of farm management decisions taken.

Understanding the effects of change when making our assumptions is a valuable tool in understanding the potential risks.

Objectives

At the end of the session participants are expected to:



- understand the concept and application of sensitivity analysis;
- know how to interpret the decisions made.

Key points

1. In order to reduce the risks involved in making a decision, farmers need both technical and financial information.
2. Sensitivity analysis examines what might happen if changes are made to selected factors.
3. Sensitivity analysis deals with changes to both single and multiple factors.
4. Sensitivity analysis can be applied to many of the farm management techniques mentioned in this training.

5. The procedure for conducting sensitivity analysis is to:

- summarize the enterprise budget or investment cash flow;
- identify the key factors that are most likely to change as a result of risk;
- compute the change in gross margin or net cash flow as a result of the change in the factors selected (either single factors or a number of factors together);
- compare the results with the original information.

Steps for instruction



1. Distribute Handout 6.2.4 (Dealing with risk) to the participants before the start of the session.
2. Explain that all farm decisions entail risk. Reference could be made to the farm management tools and techniques covered so far in the training.
3. Show Slide 118 (Procedure for conducting sensitivity analyses) and explain its use in enterprise budgets, farm plans and investment analysis.
4. Provide examples by showing Slide 119 (Making a sensitivity analysis) and Slide 120 (Example of a sensitivity analysis). Explain what happens to the computed values as a result of selected changes.
5. Distribute Training exercise 17 (Risk in farming). Divide participants into groups, each one representing a different farm type. Have each group select a farm enterprise, identify the risks involved and the strategies to deal with them. Ask each group to justify its decisions.

Dealing with risk

Making risky decisions requires careful consideration of the various strategies available and their possible outcomes. Decision-making is the principal activity of the farmer. The farmer needs to have all the necessary information about input prices, output prices, yields and other technical data. Farmers, however, find that their best decisions often turn out to be less than perfect because of changes that take place between the time the decision is made and the time the outcome of that decision is realized.

As we have seen throughout this training programme, farm enterprise budgeting is a basic farm management tool used for analysing the performance of farm enterprises and planning the farm operations. This tool and others are used under the assumption that every year is a normal year where the outcomes can be predicted accurately. In practice, this is far from reality. The risks associated with farming need to be included in the management decisions taken. There is a simple method that takes into account the risks involved in farm planning and management. This is called sensitivity analysis.

Sensitivity analysis

Once an enterprise budget and cash flow have been prepared, sensitivity analysis is often conducted as a way of testing profitability and cash availability in the light of risk. The degree to which the farm enterprise gross margin, farm profit or cash flow changes, reflects the element of risk facing the farmer. Sensitivity analysis is a necessary part of the farmer's decision-making process. Sensitivity analysis assesses how sensitive the activity is to external factors. It involves identifying the critical variables and studying the effect of changes in these variables on profitability. These include yield, product price, quantity of inputs and materials used, and cost of inputs. It looks at "what if" the assumed values are changed. What happens? The technique then quantifies the outcome the changes.

Sensitivity analysis examines the effect of change on the farm enterprise

The procedure for conducting sensitivity analysis is summarized below:

- Summarize the enterprise budget or investment cash flow.
- Determine the assumptions for every scenario.
- Identify the key parameters that are most likely to change as a result of risk factors.
- Compute the change in gross margin or cash flow as a result of the change in parameters selected (either single parameters or a number of parameters together).
- Compare the original results with the results following the sensitivity analysis.

The extension worker could determine the effect on profitability of a percentage increase or decrease in benefits and costs or both. If the value of production changes by a certain percentage, how much of an effect would this have on expected profit? If the effect of a small change is very great, this would suggest that the proposed activity is sensitive to change and may not be financially stable.

Making a sensitivity analysis

When taking a farm decision, there is a need to predict what happens to farm profit in the future. What will happen if weather conditions change drastically or prices of inputs and produce sold increase? If these events occur, the actual benefits attained would be different from that expected. Farmers have to consider the extent to which these changes could affect their profit and make a final decision as to whether or not to proceed with the activity as planned or alternatively make necessary adjustments. On the following page there is an example.

Example

A sensitivity analysis

(projected gross margin for the next year based on the figures below is \$2 251)

The price of 1 kg of rice	\$10
Yield per ha	2 250 kg
Post-harvest losses	10%
<hr/>	
Gross income	\$20 250
Variable costs	\$17 999
Gross margin	\$2 251

Farmers are concerned because they heard that crop disease broke out last year on a neighbouring farm. The disease resulted in a 25 percent decrease in yields. The question that now needs to be answered is "how will gross margin change if their crop contracts the same disease?" The following is an answer.

The price of 1 kg of rice	\$10
Reduction in yield by 25%	562 kg
Yield per ha	1 688 kg
Post-harvest losses	10%
<hr/>	
Gross income	\$15 192
<i>Savings in variable costs*</i>	<i>\$3 000</i>
Variable costs	\$14 999
Gross margin	\$193

**Savings here are a side effect of crop losses*

In this case the likely gross margin would be greatly reduced from \$2 251 to \$193. The conclusion is that the gross margin is very sensitive to the risk of a disease outbreak that could reduce the yield by 25 percent. However, this still brings the farmer a positive gross margin. If yields drop below the 25 percent mark, the profitability of the crop will be questioned.

Unit 6.2 — Training exercise 17

Risk in farming

This is a management exercise intended to help participants understand some of the risks involved in farming. Trainees in small groups should each choose a different farm type such as: (i) annual crops, (ii) cattle, (iii) small stock, (iv) tree crops.

Task 1

**Identify the risks involved in farming
for the enterprise chosen**

Identify strategies to overcome these risks

Justify the decisions made

(continued on the next page)

Training exercise 17 (continued)

Task 2

A farmer is considering purchasing a tractor at a cost of \$10 000 and has sufficient financing to do this from equity resources alone.

Is it feasible to make the investment?

What additional information is needed to appraise the viability of the investment?

(each group should estimate its own data)

What are the risks involved in making that decision?

How can the investment and its riskiness be appraised?

Training slides
for Session 6.2.4
Dealing with risk

118 Procedure for conducting sensitivity analyses

Summarize the enterprise budget or investment cash flow

Determine the assumptions for every scenario

**Identify the key parameters
that are most likely to change as a result of risk factors**

**Compute the change in gross margin or cash flow
as a result of the change in parameters selected**

**Compare the original results
with the results following the sensitivity analysis**

119 Making a sensitivity analysis

When making a farm decision, there is a need to predict what happens to farm profit in the future. What will happen if weather conditions change drastically or prices of inputs and produce sold increase?

If these events occur, the actual benefits attained would be different from that expected

Farmers must consider the extent to which changes could affect profit and make a final decision as to whether or not to proceed with the activity as planned or alternatively make necessary adjustments.

Module 6, Unit 6.2, Session 6.2.4

The price of 1 kg of rice	\$10
Yield per ha	2 250 kg
Post-harvest losses	10%
<hr/>	
Gross income	\$20 250
Variable costs	\$17 999
Gross margin	\$2 251

A crop disease broke out last year on a nearby farm resulting in a 25% decrease in yields.

Question: "How will gross margin change if the crop contracts the same disease?"

120 Example of a sensitivity analysis

The price of 1 kg of rice	\$10
Reduction in yield by 25%	562 kg
Yield per ha	1 688 kg
Post-harvest losses	10%
<hr/>	
Gross income	\$15 192
<i>Savings in variable costs*</i>	<i>\$3 000</i>
Variable costs	\$14 999
Gross margin	\$193

**Savings here are a side effect of crop losses*

Module 6, Unit 6.2, Session 6.2.4

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 6 presents farm investment and risk management. The first part of the module introduces some of the management tools used in making farm investment decisions and explains how to appraise loans. The second part of the module discusses the risks that farmers face in managing their businesses and describes some of the strategies and techniques that farmers can employ to manage these risks more effectively.