NATIONAL OPEN UNIVERSITY OF NIGERIA

FACULTY OF AGRICULLTURAL SCEINCES

DEPARTMENT OF
AGRICULTURAL ECONOMICS AND EXTENSION

FPY/SIWES PRACTICAL GUIDE

AEA 403:
FARM APPRAISAL AND EVALUATION

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400 LEVEL (FPY/SIWES) PRACTICAL GUIDE

AEA 403: FARM APPRAISAL AND EVALUATION

Unit 1   PROJECT IDENTIFICATION

1. Introduction

The first step to take when you are venturing into agribusiness is the identification of the project you are to embark upon. In the identification of project, usually many ideas about different kinds of projects will occupy your mind. However your ability to select one project from the pool of ideas before you is called project identification. This task is not easy to undertake since it involves a lot of risk and uncertainties that has to be checked before selection in order to avoid project failure. The purpose of project identification is to help develop a preliminary proposal for the most appropriate set of intervention and course of action within time and budget frame (Food and Agricultural Organization – FA0-2018).

2. Objectives

At the end of the lesson, students should be able to:

- Define a project
- Explain how to identify a project
- State the characteristics of a project

3. Definition of a Project

Project is a specific activity with a starting point and a specific ending point intended to accomplish specific objectives.

Project can also be said to be an activity for which money will be spent in expectation of returns which logically seems to lend itself to planning, financing and implementation as a unit. It is the smallest operational element prepared and implemented as a separate entity.

Agricultural project on the other hand is investment activity in agriculture in which financial resources are expended to create capital assets that produce benefits over an extended period of time.

4. **Project Identification**

An important question that often comes up in project analysis or management is how you will arrive at the decision to start a project. In other words what are the forces that will stimulate you to venture into a project? Most often you are moved by the impulse of challenge. You feel challenged on a situation and various ideas begin to flow and run through your mind. These ideas are usually called business idea. Ability to select one of these ideas is called project identification.

There are many sources from which ideas may come to you for selection, these include:

- Hobbies and interest,
- Personal skills and experience,
- Analysis of government policy statements, budget, plans, especially in respect of areas of change and future priority,
- Research findings,
- Natural resources, local raw materials and investment priority of state and local government,
- Agriculture and industrial trade fairs,
- Analysis of companies annual reports,
- Analysis of the trend and patterns of imports and exports,
- Mentors,
- Mass media such as newspapers, magazines, television and internets,
- Exhibitions,
- Survey,
- Complaints and
- Brainstorming

Your selection must always be based on costs and returns. This can often be measured through valuation at the market prices of the selected project. This is also a part of project appraisal. We shall discuss about appraisal later in the course.

Some example of agricultural areas from where you can select a project include crops (arable and tree crops, livestock, credits, irrigation, agricultural machinery, agricultural education, fishery, marketing, land settlement, product processing and preservation, rural development among others.

There are so many sub sets of the ideas listed above which you can also select from. For example in livestock there are projects like poultry, ruminants and non–ruminants, grass cutter or cane farming, snailry and so on

5. Characteristics of a Project

Project share the following characteristics:

- Unique in nature.
- Have definite objectives (goals) to achieve.
- Require set of resources.
- Have a specific time frame for completion with a definite start and finish.
- Involves risk and uncertainty.

6. Summary

* We have learnt that project is an activity in which money is spent with expectation for a return.

* When you want to start a project, many ideas come to your mind from different sources. Your ability to identify the project to be embarked upon is the first step in project appraisal.

* Usually there are many agribusiness ideas that can be converted to projects. It is your responsibility to make the best choice.

* Your selection will be based on the valuation of the cost and return of the idea.

7. Practical Assignment

* Define an agribusiness project?

* Yusuf Dalhatu has just passed out from National Youth Service Corps and had some money saved during the service. He wants to go into agribusiness venture. Advise him on how he can identify a viable agribusiness project.

8. References

Food and Agricultural Organisation – FAO – (2018). "Project Identification

Investment Learning Platform (ILP), Food and Agricultural Organisation of the United Nation.

Unit 2.   **FEASIBIBLITY STUDY**

1. **Introduction**

As we learnt in Unit 1, the first step towards venturing into agribusiness is identification of the project or business idea you want to embark upon. It is advisable to select at least 2 or 3 projects even though you will eventually end up choosing one of them. This is because when you do the arithmetic of cost and return of each project putting into consideration the resources within your reach, you may end up selecting the alternative project for execution. The next step after project identification is the preparation of a feasibility study of the project selected.

2. Objectives

At the end of the lesson, students should be able to:

1. Define feasibility study
2. State the need for a feasibility study
3. Discuss the contents of a feasibility study
4. Write a feasibility study

3. What is a Feasibility Study?

As the name implies, a feasibility study is an analysis of the viability of an idea. It is putting ideas and information you collected for a business venture together. The feasibility study focuses on helping answer the important question of ''should you proceed with the proposed project idea?'' All activities of the study are directed toward helping answer this question. It is expected that you should conduct a feasibility study to determine the viability of your idea before proceeding with the development of the agribusiness you have chosen. Finding out early that a business idea will not work saves your time, money and heartache later. The feasibility study is a critical step in your agribusiness assessment process. If properly conducted, it may be the best investment you ever made. (Hofstrand, and Hoiz – Clause (2009).

4. Reasons why you do a Feasibility Study

A feasibility study helps you to:

1. Decide if you should start your agribusiness or not.
2. Organise your ideas so that you will start and run your agribusiness in the best way.
3. Present your agribusiness idea to a lending institution such as a bank to secure loan for your agribusiness.
4. Guide for implementation of your agribusiness idea.
5. Gives focus to your agribusiness and outline alternative.
6. Identifies reasons not to proceed.
7. Provides quality information for decision making.
8. Provides documentation that the agribusiness venture was thoroughly investigated.
9. Helps to attract equity investment.

5. Content of a feasibility Study Report

These are the main parts of the feasibility study.

- **Executive Summary**
  It contains the important information from the rest of the feasibility study. It is important that the summary is clearly worked out and that it looks tidy, because it is the first impression anyone who reads the feasibility study will get of your business. Executive summary should contain brief information on the:
  - Business name,
  -philosophies and goals for setting up the business,
  -need the business will satisfy in the society,
  -the form of business,
  -why that forms of business was chosen,
  -staffing,
  -legal issues,
  -marketing plan,
  -financial issues and
  -viability of the business.
- The executive summary is usually the last part of the feasibility study to be written but the first to be read. We shall now take each of this content of a feasibility study and try to explain them in detail.

Business Name

A little description of how you come about the business name.

- **Goals Setting**

The goals and objectives of the business must fit into the national goals on such sectors of the economy.

- **Business Idea**

This is the short and precise description of the basic operations of the business.
- What product or services you will produce,
- Whom you will produce for or sell to,
- How you will produce the products and
- Which need your business will fulfill for the customer.

- **Form of Business**

There are different forms of business. These are sole proprietorship, partnership, Limited Liability Company and cooperative.
- Which form of business will you engage in?
- Why did you choose that form of business?
- Number of people that will manage the business if the form is not sole proprietorship.

- **Legal Responsibilities and Insurance**

Every business has legal responsibilities and insurance.

The **legal** responsibilities that must be specified include:
- Registration of the business
- Licenses and permits
- Taxes, this include:
  - ❖ VAT
  - ❖ Employees income tax
  - ❖ Profit tax
  - ❖ Local council levies
  - ❖ Union Levies

Employees

- ❖ Minimum wage
- ❖ Working hours
- ❖ Holiday
- ❖ Occupation safety

- ❖ Annual leave, sick leave, etc.
  - Credit lease and other contractual agreements. Most agribusiness requires **insurance** coverage to give financial security against different kinds of risks.
  - Specify properties like machines, vehicles, stock, etc that must be insured against theft, damage, fire accident or natural disaster.
  - Specify also about how to insure yourself and employees against accidents and medical expenses.
- **Staffing**
  Personnel you require for your agribusiness in terms of skills, experience and number.
  - List the task that needs to be performed in the business.
  - Decide which task you will not have time and skills to perform yourself.
  - Determine skills, experience and other requirements needed in the staff for their tasks.
  - Decide how many employees are needed for each task depending on the nature of the business. It may be.
  - Skilled
  - Semi skilled
  - Unskilled
  - Seasonal
  - Permanent
  - Casual
  - Gender

Specify their remunerations which can be categorized as high (consultant), average (salaries) and low (wages).

- **Costing**

Costing is a very important aspect of your business. You need to be able to do the following under costing:

- cost the fixed assets

- Cost the variable inputs which include:

  - ❖ Direct material costs and spare parts
  - ❖ Direct labour cost
  - ❖ Indirect cost like transport, electricity, rent and interests.

Costing should be detailed and every item of the business must be valued. Costing also include fixing of prices for your products.

Marketing Plan

You must specify how you want to market your product which includes the 4Ps product, Price, place and promotion.

Product

- Quality
- Availability
- Packaging

Price

- Affordability
- Flexibility

Place

- Target customers
- Storage

Promotion

- Personal contact
- Fliers/posters
- Mass media
- Bill boards
- Town criers
- Internets

- **Financial Responsibilities**

Required Start-Up Capital and Sources

This is usually estimated from the costing of the business. They should also include your operating cost and personal expenses.

Having determined the amount of money required to start, it then becomes necessary to ascertain where to get the money. These sources must be specified.

Example   -owner's equity
-friends and relatives
-Banks
-cooperative societies
-stock exchange, etc

Financial Planning

There must be plan for cash flow and profit. Financial planning must specify cash flows and cash inflows usually on annual basis.

The worth and viability of the business is determined here. This is done using cost and revenue figures within the projected life span of the business. The viability is determined by using the traditional methods and discounted cash flow (DCF) methods.

The traditional methods include:

    -payback period
    -accounting rate return

The discounted cash flow methods include:

    - Net present value (NPV)

    -internal rate of return (IRR)

    -profitability index (PI) / Benefit Cost Ratio (BCR)

These tools must be used to assess the worth of the project and its viability or profitability using the prevailing interest rate (Nwandu, 2009).

6. Summary

You have studied that feasibility study tells you to go ahead and implement the business idea that you have or not. It reveals to you the viability or worth of the agribusiness. Feasibility study also gives you an early warning, saves your time and money against an agribusiness venture among others.

You have also learnt about the various items you will gather and study under feasibility study that will give you insight into the agribusiness environment. This will help you, take your take decision. Such areas include looking into the aims and objectives of setting up such an agribusiness venture, the legal responsibilities, costing of the agribusiness, staffing, marketing and finance among others.

It is advisable that you do not go into an agribusiness venture without carrying out a feasibility study.

7. Practical Assignment

- Adamu Ibrahim wants to establish a poultry farm. As his son that participated in a workshop on writing of feasibility studies, give him reasons why it is necessary to carry out a feasibility study before the establishment of the poultry farm.
- Explain to Chukwuemeka an illiterate farmer the meaning of a feasibility study.
- Following the guidelines, write a feasibility study for Oma Farms Limited on their establishment of their new fish pond project with a capital outlay of ₦ 5,000,000.

8. References

Hofstrand, D. and Hoiz – Clause, M. (2009). "What is a Feasibility Study?" Extension and Outreach, IOWA State University, USA.

Nwandu, P. I. (2009). *"Entrepreneurship in Agribusiness".* Onitsha: Jo-Gene Publishers.

UNIT 3. AGRIBUSINESS PROJECT APPRAISAL

1. Introduction

When you have conducted a successful feasibility study and selected the agribusiness project you want to implement, the next step is to construct an agribusiness project plan. This is easy to achieve since it is just adopting the feasibility study of the agribusiness project selected into a working document called agribusiness plan or agribusiness ''blue print.''

Agribusiness project plan is then appraised before implementation. For better understanding you should note that appraisal of agribusiness project starts from feasibility study where you questioned the viability of the agribusiness project. Unit 3 will elaborate more on agribusiness project plan and agribusiness project appraisals.

2. Objectives

At the end of the lesson students should be able to:

1. Explain the difference between feasibility study and agribusiness project plan
2. Explain agribusiness project appraisals
3. Mention tools used for agribusiness appraisals or analysis

3.   Feasibility Study versus Agribusiness Plan

It is necessary that you know the difference between a feasibility study and agribusiness plan. The feasibility study provides an investigating function. It addresses the question "Is this a viable agribusiness venture?'' On the other hand an agribusiness plan provides a planning function. Agribusiness plan outlines the actions needed to take the proposal from idea to reality. In feasibility study you are considering many alternatives but the agribusiness project plan deals with only one alternative. That is the selection of the best idea from the pool of ideas as the project to implement.

The feasibility study is conducted before the agribusiness plan. An agribusiness plan is prepared only after the agribusiness venture has been deemed to be feasible. If a proposed agribusiness venture is considered to be feasible, an agribusiness plan is usually constructed as the next step that provides a roadmap of how the agribusiness will be created and developed. The agribusiness plan provides the blue print for project implementation [Hofstrand and Hoiz-Clause, 2009].In other words an agribusiness plan is a feasibility study that is selected for implementation.

4. Explanation of Agribusiness Project Appraisals

Agribusiness project appraisal refers to the process of assessing and questioning the contents of a feasibility study before resources are committed to a project. It is the discipline that concern itself with calculating agribusiness project viability. Agribusiness project appraisal is an important decision making tool that lays the foundations for better delivery and justification for spending money on a project. The typical areas of investigation include economic, environmental, financial, social and technical aspects of the project. This is done to determine if a project will meet its objectives. Most often it involves comparing alternative options. Appraisals are done before the take-off of the project. From the foregoing you can also infer that project appraisal assesses the viability of a feasibility study or agribusiness plan.

5. Tools Used for Agribusiness Project Analysis [Appraisals]

The most widely accepted methods or criteria in use for project analysis are:

1. Traditional Criteria
2. Discounted Cash Flows [DCF]

Traditional Methods

Here we have the: *Payback Period and

                        * Accounting Rate of Return [ARR]

Discounted Cash Flow

Under the DCF we have:

*Net Present Value

*Benefit Cost Ratio [BCR] [Also called Profitability Index]

*Internal Rate of Return [IRR]

6. Summary

You have learnt that all the assessments that is done before taking the decision to go on and establish an agribusiness is an appraisal. This also tells you that feasibility study and agribusiness plan are all parts of appraisal of an agribusiness. Appraisal is also used to assess the viability of an agribusiness. Some appraisal tools include Payback period, Accounting rate of return, Net present value, Benefit cost ratio and Internal rate of return.

7. Practical Assignment

* As Farm Manager of Praise God Farms, how will you convince Chief Delight Dalu the owner, that there is difference between Feasibility study and Agribusiness project plan.

* Explain to young Agribusiness Entrepreneurs, agribusiness project appraisal.

* Appraising an agribusiness project requires some tools used for arithmetic calculations to find out if an agribusiness project is viable. Mention these tools.

8 Reference

Hofstrand, D. and Hoiz – Clause, M. (2009). "What is a Feasibility Study?" Extension and Outreach, IOWA State University, USA.

Unit 4.   ARITHMETIC OF PROJECT APPRAISALS

1. **Introduction**

In Unit 3 we mentioned some tools that are used for project analysis or appraisals. These tools are used to appraise the viability of a project. You can use more than one method to value your project. This will help you take the best decisions on your projects.

2. **Objectives**

At the end of the lesson students should be able to:

1. Explain the different methods of appraising agribusiness projects
2. Discuss the advantages and disadvantages of the different methods of appraising agribusiness project
3. Solve some arithmetic problems on the different methods of appraising agribusiness projects
4. Appraise an agribusiness project
5. Take decision on the viability of an agribusiness project

3. **Traditional Methods for Appraising Agribusiness Projects**

3.1. Payback Period Method

This is defined as the number of years required to recover the original cash outlay invested in the project. If the project generates constant annual cash inflows, the payback period can be computed by dividing cash outlay by the annual cash inflow.

Payback Period =   Cash Outlay

                              Annual Cash Inflow

Example:
 A project requires an outlay of ₦50, 000.00 and yields an annual
Cash inflow of₦12, 500.00 for 7 years calculate the payback period.

Solution:

Cash Outlay

Annual Cash Inflow   =   ₦50,000.00

$$\text{N12,500.00}$$
$$=4 \text{ Years}$$

In the case of unequal cash inflows, the payback period can be found out by adding up the cash inflows until the total is equal to the final cash outlay.

Example:

Calculate the payback period of a project which requires a cash outlay of ₦20,000.00 and generates cash inflows of ₦8,000.00; ₦7, 000.00; ₦4, 000.00 and ₦3,000.00.

Solution:

When you add up the cash inflows, you will find that in the first 3 years, ₦19, 000.00 of your original outlay has been recovered. In the 4th year, the cash inflow generated is ₦3,000.00 and only ₦1,000.00 of your original outlay remains to be recovered. Assuming that the cash inflows occur evenly during the 4th year, the time required to recover ₦1, 000.00 will be:

$$\frac{1,000 \times 12}{3,000} = 4 \text{ months}$$

Thus, the payback period becomes

3 years and 4 months

3.1.1. Acceptance Rule

The payback period can be used as an accepted or rejected criterion as well as ranking projects.

If the payback calculated for a project is less than the maximum payback period set up by management, it will be accepted and if not it will be rejected

In ranking, payback period gives the highest rankings to the projects which has shortest payback period and lowest ranking to projects with longest payback period. Thus if you are to chose between two mutually exclusive projects, the project with the shorter payback period should be selected [ranked first].

Example: Calculate the payback period [PBP] of the following projects, each requiring a cash outlay of ₦10,000.00. Suggest which projects are acceptable, if the standard payback period is 5 years.

Solution:

Cash Inflows

Year	Project X	Project Y	Project Z
	₦	₦	₦
1	2,500.00	4,000.00	1,000.00
2	2,500.00	3,000.00	2,000.00
3	2,500.00	2,000.00	3,000.00
4	2,500.00	1,000.00	4,000.00
5	2,500.00	0.00	0.00

Payback Period

For Project X is: $\underline{₦10,000}$

$\qquad$ ₦2,500

$\qquad$ = 4 years

For Project Y

₦4,000.00 + ₦ 3,000.00 + ₦2,000.00 + ₦1,000.00 = ₦10,000.00

₦10,000.00 is received in 4 years

For Project Z

₦1,000.00 + ₦2,000.00 + ₦3,000.00 + ₦4,000.00 = ₦10,000.00

₦10,000.00 is also received in 4 years

The payback period in each case is 4 years. That is at the end of the 4th year, the initial cash outlay of each project is received. This means that all the projects are acceptable because the standard payback period [5years] is higher than the actual payback period in all the projects.

3.1.2. Advantages of Payback Period
1. Payback period is simple to understand and easy to calculate.
2. It cost less than most of the sophisticated techniques which requires most of your time and use of computer.

3.1.3. Disadvantages

1. It fails to take account of cash inflows earned after the payback period. For example in the above illustration Project X is considered to be at par with Y and Z as these have the same payback period but Project X is more desirable than Y and Z as X yields cash inflows after the payback period.
2. It is not an appropriate method of measuring the profitability of an investment project as it does not consider the entire cash inflows yielded by the project.
3. It fails to consider the pattern of cash inflows. That is the magnitude and timing of cash inflows. In other words it gives equal weight to returns of equal amount even though they occur in different periods. For example compare projects Y and Z in the above illustration where the 2 projects involve equal cash outflows and yield equal total cash inflows over equal time periods [that is N10, 000 in 4 years]. Using payback period both are equally desirable, but Project Y should be preferable as large cash inflows come earlier in Project Ys life as in contrast with Project Z which generates greater cash inflows later in its life.
4. There are administrative difficulties in determining the maximum acceptable payback periods. There is no basis for setting a maximum payback period. It is generally a subjective decision.

3.2. Accounting Rate of Return Method

The Accounting Rate of Return [ARR] method uses accounting information as revealed by the financial statement to measure profitability of an investment proposals. ARR is found out by dividing the average income after taxes by the average investment.

The average investment will be equal to original investment with the salvage value if any divided by 2.

The formula is:

$$ARR = \frac{\text{Average Income}}{\text{Average Investment}}$$

This can be gotten from the balance sheet.

Example:

A project cost ₦50,000.00 and has a scrap value of ₦10,000.00. Its stream of income before depreciation and taxes during 1st year through 5years is ₦10,000.00;

₦12,000.00; ₦14,000.00; ₦18,000.00 and ₦20,000.00. Assume a 50% tax rate and depreciation on straight line basis of ₦8,000.00. Calculate the ARR for the project.

Solution:

Period	1	2	3	4	5	Average
Average earning before depreciation &taxes(₦)	10,000.00	12,000.00	14,000.00	16,000.00	20,000.00	14,000.00
Depreciation(₦)	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00	8,000.00
Net earnings before taxes(₦)	2,000.00	4,000.00	6,000.00	8,000.00	12,000.00	6,400.00
Taxes at 50%(₦)	1,000.00	2,000.00	3,000.00	4,000.00	6,000.00	3,200.00
Book value of Investment						
Beginning(₦)	50,000.00	42,000.00	34,000.00	26,000.00	18,000.00	
Ending(₦)	42,000.00	34,000.00	26,000.00	18,000.00	10,000.00	
Average(₦)	46,000.00	38,000.00	30,000.00	22,000.00	14,000.00	30,000.00

ARR = $\dfrac{3,200 \quad X \quad 100}{30,000}$

= 10.67%

3.2.1. Acceptance Rule:

As an accept or reject criterion, ARR method will accept all projects where ARR is higher than the minimum established by the management and reject projects which have ARR lesser than the minimum rate.

ARR method ranks project with the highest ARR as number 1 and the lowest rank is assigned to the project with the lowest ARR.

3.2.2. Advantages of ARR
1. ARR is simple to understand and use.
2. It can be readily calculated using accounting data.
3. It uses the entire stream of income in calculating the accounting rate.

3.2.2. Disadvantages
1. ARR ignores the time value of money.
2. It uses accounting profit not cash inflows in appraising projects.

3.3. Discounted Cash Flow

In order to determine the worth of your project, [that is whether it is viable or not] it is necessary to discount the cash flow using the appropriate rate of discount. After discounting the cash flow, the viability of your project can be determined using any of the following indices or criteria:

1. NPV – Net Present Value
2. BCR – Benefit Cost Ratio
3. IRR – Internal Rate of Return

Before you go into the application of these discounted cash flow indices, it is necessary that you understand the principles of discounting which is key to discounted cash flow methods.

3.3.1. Principles of Discounting

Discounting is the process of finding the present value of a series of future cash flows. Discounting is the reverse of compounding. This means that a present sum is compounded to find its future value and a future sum is discounted to back to the present to find its current or present value. We shall concentrate on only discounting since we are only concerned about the viability of a project using the discounted cash flow method.

Discounting is done because a sum to be received in the future is worth somewhat less now because of the time difference assuming a positive interest rate. Discounting is premised on the concept of time value of money. A present value can be interpreted as the sum of money which would have to be invested now at a given rate of interest to equal the future sum on the same rate.

Suppose you are offered the alternative of either ₦5,000.00 today or ₦6,085.00 at the end of 5 years, which option will you choose? A correct choice must be based on the concept of time value of money. To make the choice you should find the present value of ₦6,085.00 at the prevailing interest rate. Suppose the prevailing interest rate in the economy is 4% then the present value of ₦6,085.00 is ₦5,000.00 This means that you should be indifferent about the choice since ₦5,000.00 today is the same as ₦6,085.00 at the end of the next 5 years.

The formula for finding the present value is given as follows:

Present Value,

$$PV = FV \, \frac{1}{[1 + r]^n}$$

Where; PV = present value

     n = number of years

     FV = sum at the end of n years or future value

     r = discount rate or interest rate

The above figures may now be substituted to show that the present value of ₦6,085.00 is ₦5,000.00

PV = present value

n = 4

FV = ₦6,085

r = 4%

Substituting

$$PV = 6,085 \, \frac{1}{[1 + 0.04]^4}$$

PV　　=　　6,085　x　0.8219

PV　　　=　　₦5,000.00

Consider another illustration. Find the present value of ₦3,600.00 at 20% interest rate calculated annually.

Solution:

　　PV　=　present value

　　n　=　5 years

　　FV　=　₦3,600.00

　　r　=　20%

Substituting

　　PV　　=　　3,600　 $\dfrac{1}{[\,1+0.2\,]^5}$

　　PV　=　3,600　x　0.4019

　　PV　=　₦1,446.84

3.3.2. Discount Factor Table

In order to simplify calculations involving present value and other related factors, you can use the **interest factor table** also called the **discount factor table.** You can download the discount factor table from the internet especially Google. The table can also be obtained from reputable bookshops. The arithmetic of project appraisals or project analysis is hinged on this discount factor table. For the remaining part of this course, we shall not go into the rigorous exercise of calculating the discount factor with the formula but will use the discount table where applicable. However this does not mean you should not know how to calculate the discount factor since your knowledge of this could be tested.

Let us use the discount factor table to solve the following problem.

Problem

Use the interest factor table to find the present value of ₦121.67at the discount rate [interest rate] of 4% for 5 years.

Solution

First step is to open the page of the discount factor table where you have the Present value interest factor [PVIF].

The tables are arranged in such a way that on top of the page at the right hand side is the Interest rate while at the left hand side vertically arranged are the years. The second step in our problem is to obtain the discount factor by tracing where 4% [0.04] intercepts 5 years [periods]. This is at 0.8219.

 The 3rd and final step is to obtain the Present Value by multiplying the future value [N121.67] with the discount factor [0.8219]. The formula is given by:

PV   =   FV [PVIF or DF]

Where:

PV   =   Present value.

PVIF =   Present value interest factor or Discount factor]   =   [0.8219]

PV   =   ₦121.67 [0.8219]

PV   =   ₦121.67 x 0.8219

PV   =   ₦100.00

The interpretation is that ₦121.67 in 5 years time at an interest rate of 4% has a Present value of ₦100.00.

3.3.3. Role of Discount Rate in Investment Decision

1. The discount rate is used to convert future value into their present value. Investment can only be properly evaluated if cost and benefits occurring at different time periods are brought to their present value.
2. The discount rate is a means of testing the profitability of a project.

Project	IRR%
A	26
B	20
C	16
D	10
E	6
F	1

Application of the rule of project acceptance tells us that if sufficient resources are available and the discount rate is between 8% and 9%, projects A, B, C and D are acceptable while E and F will be rejected.

If discount rate is raised to 12%, only A, B and C will be acceptable. If discount rate is raised to 18% only A and B will be accepted. The discount rate in this case is being used as a profitable test measure of projects.

3. The discount rate is a means of allocating available capital resources to more lucrative businesses. Given the objective of profit maximization as a goal and given the fact that capital is a scarce resource; the available capital should be allocated to those projects which make the best use of them. In other words, the discount rate is a means of ensuring that capital resources are allocated to those projects which yields returns higher than the opportunity cost of the capital.
4. Discounting rate is a means of choosing appropriate (or determining the best alternative) technology of production especially concerning whether to adopt labour or capital intensive technology.

Recall that we suspended discussions on how to use the discounted cash flow methods to determine the viability of a project. We believe that by now you must have known the meaning of discounting. That is bringing the future cash inflows of a project to its present value using the prevailing interest rate [discount factor] and time [periods]. This is done to allow for better comparisons to be made on the projects.

We can now resume our discussions on the discounted cash flow methods of assessing the viability of a project. Remember that we mentioned 3 of them which include: Net Present Value [NPV]; Benefit Cost Ratio [BCR]; and Internal Rate of Return [IRR]. We can now take the methods individually and analyse them.

3.4. Net Present Value (NPV)

This involves finding the present value of the expected net flow of a project, discounted at a cost of capital [interest rate] and then subtracting from it the initial cost outlay of the project. If the present value is positive the project should be accepted but if it is negative, the project should be rejected. The formula for finding NPV is given by

NPV   sum of the discounted value of the PV of Revenue

      -   Sum of the discounted value of cost or

    = $\sum$DV of Rev – $\sum$DV of cost

<u>Example</u>

    Give the following information about a project calculate the NPV at 8%

<u>Example</u>

Years	Total cost(₦)	Total Revenue(₦)
0	10,000.00	-
1	4,500.00	12,000.00
2	5,000.00	13,000.00
3	6,000.00	14,000.00

<u>Solution</u>

Discount factor for year 0 = 1

Year	DF at 8%	TC (₦)	PV of TC (₦)	TR (₦)	PV of TR (₦)
0	1	10,000.00	10,000.00	-	-
1	0.926	4,500.00	4,167.00	12,000.00	11,112.00
2	0.857	5,000.00	4,285.00	13,000.00	11,141.00
3	0.794	6,000.00	4,764.00	14,000.00	11,116.00
		--			
		₦ 25,500	₦ 23,216	₦ 39,000	₦ 33,369

NPV   =   PV of Revenue - PV of Cost

NPV   =   ₦33,369 - ₦23,216   = ₦ 10,153

The project has a positive NPV and as such it is viable

3.5.   Benefit Cost Ratio

Benefit cost ratio evaluate cost with benefit that will be derived from the project. In evaluation, externalities of the project are included. In calculation the BCR the NPV of cost and revenues accruing to the project is calculated. For a project to be accepted as being viable it must have a BCR that is greater than or equal to one (1)

The BCR is calculated with the following formula

BCR = PV or Revenue

PV or Cost

Illustration

Using the figures from the NPV calculated above. Calculate the BCR

PV or cost = ₦ 23,216.00

PV of Revenue = ₦ 33,369.00

BCR = 33,369.00 = 1.437

23,216.00

The BCR is greater than 1 and the project is therefore accepted as being viable.

3.6.   Internal Rate of Return

IRR is defined as the interest rate that equates the present value or the expected future cash flow, or receipts, to the initial cost outlay.

Mathematically IRR is defined as the rate of discount which will make NPV = 0 or nearly equal to 0, or the rate of discount which makes PV of revenue equal to PV of cost.

i.e.   =   PVR   =   PVC

Or the rate of discount which will make the BCR = 1

i.e. $\dfrac{PVR}{PVC}$ = 1

In actual or practical terms the IRR measures the efficiency of capital resources invested in the project. This is why lending agencies prefer the IRR to other indices

If in measuring the earning capacity of capital resources invested in the project, the calculated IRR is higher than the banks lending rate, the bank would be willing to lend out money and vice versa.

3.6.1. Computation of IRR
IRR is usually computed by method of trial and error/arithmetic method.

This requires trying a number or discount rates on the cash flow until one is obtained to make the NPV = 0. This is done by method of interpolation.
Example

Calculate the IRR of the following cash flow from a project assuming that discount rate is 8%

Year	TC (₦)	TR(₦)
0	10,000.00	-
1	4,000.00	8,000.00
2	4,000.00	8,000.00
3	4,000.00	8,000.00

Solution

Year	Df at 8%	TC(₦)	PV of Cost(₦)	TR(₦)	PV of Rev.(₦)
0	1	10,000.00	10,000.00	-	-
1	0.926	4,000.00	3,704.00	8,000.00	7,408.00
2	0.857	4,000.00	3,428.00	8,000.00	6,856.00
3	0.794	4,000.00	3,175.00	8,000.00	3,352.00
			20,308.00		20,616.00

NPV = ₦20,616.00 - 20,308.00 = ₦3O8.00

NPV = ₦3O8.00

Having discounted the cash flow and having obtained a positive NPV, the next thing is to choose a discount rate with which to discount the same cash flow to obtain a negative NPV. This is by trial and error. Use a rate close to 8%.

Year	Df 10%	TC(₦)	PVC(₦)	TR(₦)	PV of TR(₦)
0	1	10,000.00	10,000.00	_	_
1	0.909	4,000.00	3,636.00	8,000.00	7,272.00
2	0.826	4,000.00	3,304.00	8,000.00	6,608.00
3	0.751	4,000.00	3,004.00	8,000.00	6,008.00
			19,944.00		19,888.00

NPV = ₦19,888.00 - ₦19,944.00 = -₦56.00

Having gotten positive NPV of ₦ 308 at 8% DR and a negative NPV of ₦ - 56 at 10% DR,

- DR = Discount Rate

IRR = Lower DR + Difference btw the 2DRS x NPV at lower DR
        Sum of the absolute value of the 2NPVS

IRR   = $8 + (10 - 8) \times \dfrac{(308.00)}{308.00 + 56.00}$

      = $8 + 2 \left(\dfrac{308}{364} \right)$

      =   8 + 1.69

      =   9.7

NB   forget any fraction during approximation
        IRR   = 9%

The 9% DR is compared with the bank of financial institution lending rates. If the IRR is higher the project is viable and it profitable to invest and vice versa.

- DR = Discount Rate

Exercises

The Agro feed Ltd has two investment proposal, project A & B which have initial outlay of ₦10,000 respectively and a life of 6 years each. The discount rate or cost of capital is 15%. The expected income streams are shown below.

Years	Project A	Project B
1	₦ 5,000.00	₦1,000.00
2	₦4,000.00	₦2,000.00
3	₦3,000.00	₦3,000.00
4	₦1,000.00	₦4,000.00
5	₦100.00	₦5,000.00
6	₦100.00	₦6,000.00

(a)   Calculate the payback period, NPV, BCR and IRR of project A and B;

(b)   Advise the farmer on the project to select if:

(i)   The projects are independent

(ii)   The projects are mutually exclusive.

(c)   State the advantages and the disadvantages of these methods.

Summary of the Analysis of Result

The summary of the results you will obtain from the above exercises are:

(a). Payback period, NPV,BCR and IRR of project A and B:

	Method	Project	Result
1	Payback period	A	$2\frac{1}{2}$ years
		B	4 years
2	Net Present Value	A	₦ 10.00
		B	₦ 1,172
3	Internal Rate of Return	A	15%
		B	20%
4	Benefit cost Ratio	A	1.0
		B	1.172

(b). Selection

The selection of projects depends on whether they are independent projects or mutually exclusive project. For the above illustration, we shall select from projects A and B (i) when they are independent and (ii) when they are mutually exclusive.

i.   Independent Projects

Independent projects are projects that could be executed separately without their execution affecting each other.

If projects A and B are independent, we shall select as follows:

Method	Project	Remark
P.B.P	A	May be accepted
	B	May be accepted
NPV	A	Acceptable
	B	Acceptable
IRR	A	Not Acceptable
	B	Acceptable
BCR	A	Acceptable
	B	Acceptable

ii.   Mutually Exclusive Projects

They are those projects that the implementation of one of them makes it technically, or commercially infeasible to implement the other.

If projects A and B are mutually exclusive, we shall select as follows:

Method	Project	Remark
P.B.P	A	Acceptable
	B	Not acceptable
N.P.V	A	Not acceptable
	B	Acceptable
I.R.R	A	Not acceptable
	B	Acceptable

Whenever there is a conflict among the methods, we rest our judgement on the result of NPV. This is because the NPV represents the value added by the agribusiness if the project is executed. But IRR measures only rate and not value added. Note that the IRR is the rate of return that comes to agribusiness beyond the project's cost of capital. The IRR should be greater than the cost of capital for the project to be profitable.

So if projects A and B are independent then both are accepted. But if they are mutually exclusive then only B is accepted.

In the above illustration, the expected cash flow from projects A and B varied over the years. But for some proposals, the expected annual cash flows are same throughout the life of the projects.

(c). **Advantages and Disadvantages of each method:**

Advantages of Net Present Value [NPV]

1. It recognises the time value of money

2. It considers all cash flows over the entire life of the project in its calculation.

3. It is claimed (for this method) that the ranking of projects is independent of discount rates chosen for the analysis.

Disadvantages

1. It is difficult to use.

2. It assumes that the cost of capital is known. This may not always be true.

3. It may not get satisfactory answers when the projects being compared involves different amount of investments (because they will give different net benefit amount. The benefit being bigger is no guarantee that it will be better depending on the Internal Rate of Return).

Advantages of Internal Rate of Return [IRR]

1. It recognises time value of money

2. It considers cash flows over the entire life of the project,

3. It has a psychological appeal to the users. The percentage figure calculated under this method is more meaningful and acceptable to users because it satisfied them in terms of the rate of return of capital.

4. It's also compactable with the firms' objectives of maximizing owners' welfare.

Disadvantages

1. It's difficult to understand and use in practice as it involves complicated computations;

2. It implies that the intermediate cash inflows generated by the project are reinvested at the internal rate of returns of the project; whereas the Net present value (NPV) method implies that cash flows are reinvested at the firms cost of capital, the letters assumption seems to be more appropriate;

3. It may yield results inconsistent with the Net present value (NPV) method, if the project differ in their: expected life and timing of cash flows.

4. It may not give unique answers in all situations.

Advantages of Benefit Cost Ratio [BCR]

1. Ranking.

2. Time value of money is considered.

Disadvantages

1. More computation.

2. The meaning of interest rate depends on the context.

Practical Assignment

1. Calculate the followings:

(a). present value of ₦10.00 accruing after 10 years at 6%

(b). Present value of ₦10.00 accruing after 5 years at 7%

(c). Present value of ₦50.00 accruing after 15 years at 8%

(d). Present value of ₦10.00 accruing after 10 annual instalment for 10 years at 5% [paid at the and each year).

2. A project capital cost is estimated at ₦1000.00 spread over 3 years. It is expected that ₦600.00 will be spent in year 0 and ₦200.00 in each of the following 2 years. What is the total cost discounted to the starting year. Discount rate of 8%.

3. (a). The benefits of a project are expected to be N100,000 annually for 10 years starting from year 1 what is the present value of this benefit stream at 10% discount rate.

(a) . What difference will it make if the benefit starts to accrue in year 3 instead of year 1 and continue in the same regular bases of ₦100,000.00 and continue to year 8 after which year 9 has no benefit and year 10 has ₦28,000.00 from terminal scrap value of the plant.

4. A project with a 12 years operative life is expected to yield the following streams of net benefits.

Year		Amount (₦)
Y_0	-	1,000,000.00
Y_1	-	100,000.00
Y_2	-	100,000.00
Y_3	-	200,000.00
Y_4	-	300,000.00
Y_5	-	400,000.00
Y_6		400,000.00
Y_7		400,000.00
Y_8		400,000.00
Y_9		400,000.00
Y_{10}		400,000.00
Y_{11}		400,000.00
Y_{12}		400,000.00

What is the present value of these net benefits streams assuming a discount rate of 10%.

5. An agribusiness proposal has a cost outlay of N 360,000 and the cash inflow of revenue is as follows:

Year 1: ₦60,000.00

Year 2: ₦75,000.00

Year 3: ₦90,000.00

Year 4: ₦125,000.00

If the prevailing interest rate is 10%, using (a) payback period, (b) NPV and (c) BCR, evaluate the: (i) Worth of the agribusiness (ii) Viability of the agribusiness.

6. The estimated cost and cash inflows for two agribusiness projects are given below:

Year	Cost of Project A(₦)	Revenue of Project A(₦)	Cost of Project B(₦)	Revenue of Project B(₦)
0	32,892.00	0.00	37,414.00	0.00
1		14,000.00		4,000.00
2		12,000.00		10,000.00
3		10,000.00		12,000.00
4		8,000.00		14,000.00
5		6,000.00		16,000.00

The cost of capital or discount rate is 8%

Calculate the (i) Net present value (NPV)

(ii) Benefit cost ratio (BCR)

(iii) Payback Period   (PBP)

(iv)Which of the project is more viable?

Unit 5.   EVALUATION OF AGRIBUSINESS PROJECTS

1. Introduction

When the agribusiness project has been established and it is up and running, there is need to intermittently find out if the objectives of setting up the agribusiness project are being achieved. The process of carrying out this function is called evaluation. However it is important to note that there have been some arguments on appraisals and evaluation of projects. To some according to (Abdullah, 2018) believe that evaluation starts from the appraisal stage. While others argue that evaluation starts when the project is ongoing and until the end of the project. For the purpose of this

course, we shall regard evaluation as assessments of ongoing projects and until the end of the project**.**

2. **Objectives**

   At the end of the lesson students should be able to:

- Define project evaluation

- State the purpose of project evaluation

- Outline the importance of project evaluation

- List and explain types of evaluation

- Describe what to be evaluated

- Explain the problems of project evaluation in developing countries

- Discuss evaluation of an ongoing project

3. **What is Project Evaluation?**

   Project evaluation is a systematic and objective assessment of an ongoing or completed project (International Labour Organisation –ILO- , 2018). Evaluation is a process that critically examines a project. It involves collecting and analysing information about activities, characteristics and outcomes of a project.

4. **Purpose of Project Evaluation**

- The purpose of project evaluation is to determine the relevance and level of achievement of project objectives, development, effectiveness, efficiency, impact and sustainability (ILO, 2018).

- To make judgements about a project and improve decisions.

5. **Importance of Project Evaluation**

  Evaluation is instrumental in:

- Providing you with information needed to guide your project strategy towards achieving set goals and objectives.

- Providing early warning of activities and processes that need corrective action.

- Helping empower project partners if any by creating opportunities for them to reflect critically on the projects direction and decide on improvements.

- Building understanding, motivation and capacity amongst those involved in the project.

- Assessing progress to enable reporting requirements to be met.

6. **Types of Evaluation**

The following are types of evaluation made in an agribusiness project:

- Self evaluation: This is managed and conducted by the members of staff.

- Internal Evaluation: This is managed by independent officials of the agribusiness project. The evaluation is conducted and led by external evaluator who has no previous link to the project

- External Evaluation: This is managed from outside the agribusiness organisation and conducted by evaluators who have no previous links to the project being evaluated.

7. **What to Evaluate**

- Relevance and Strategic Fit of the Project: Here you evaluate the extent to which the objectives of the project are being met.

- Validity of the Project Design: Here you evaluate the extent to which the project is logical and coherent.

- Project Progress and Effectiveness: Your evaluation should be on the extent to which the immediate objectives were achieved, or are expected to be achieved taking into account their relative importance.

- Efficiency of Resource Use: Here evaluation is a measure of how economically; resources or inputs (funds, expertise, time, etc) are converted into results.

- Comparison: Here you should compare the planned and actual performance.

- Effectiveness of Management Arrangements: This evaluates the extent which management capacities and arrangements put in place supports in the achievements of results.

- Impact of Orientation and Sustainability of the Project: Here you evaluate the strategy put in place to achieve sustainability of the project.

- Corrective Action: There should be evaluation of the corrective action required to get the project on track if the project is derailing.

8. **Evaluation of Ongoing Project**

An ongoing project evaluation must continuously seek feedback on how project is progressing. One effective way is to have the project team actively seek information on the status of the project by seeking answers to such questions as:

- What is going right on the project?

- What is going wrong on the project?

- What problems are emerging?

- What opportunities are emerging?

- Where is the project with respect to schedule, cost and technical performance objectives?

- Does the project continue to have a strategic fit with enterprises mission?

- Is there anything that should be done that is not done?

- Are you comfortable with the results of the project?

- Is the customer happy with the way things are going?

  Questions of this type can be used during regularly scheduled project review meetings to motivate discussions among the project team members and to encourage them to think retrospectively about the project. Such thinking will prompt the team members to evaluate the project.

9. **Writing Project Evaluation Report**

Writing a project evaluation report is a very important aspect of project analysis that you must carry out. This is because the report will tell you if the project was a success or failure. It also helps you to know if you can continue with the project or terminate the project. The report will show all aspects of the agribusiness plan that is being implemented. It should be written in simple language that will be easy to read and understand. The evaluation report done internally should be separated from the external evaluation. These two reports are compared to get a better over view of the project.

10. **Practical Problems of Project Evaluation in Developing Countries**

  a. Project planning and preparations are largely ineffective. Most often projects are hurriedly put together and ready for execution.
  b. Appraisal and selection of projects in developing countries are usually faulty.
  c. There are also problems in start-up and activation of projects. There are bureaucratic delays in obtaining license and in the disbursement of funds for the project.
  d. The execution, operation and supervision of projects are inadequate. Most often due to delays, the cost of executing the project over- runs the estimated cost. Sometimes there is insufficient capacity or incompetence on the part of contractors handling the projects. The projects very often are not properly supervised.
  e. There may be defective design of project. This results to either the resources going to be used for the project being short or surplus. There may be lack of contingency

planning to meet emergencies and unanticipated delays. Sometimes the resources of other projects that that are on-going are tampered in order execute the project.

f. External coordination of project activities may be inadequate or ineffective and sometimes lacking. Sometimes one agency or department required to carryout a part of the execution of the project for example training needs may decide not to perform the function because they are not the executors of the main project.

g. There may also be deficiencies in evaluation of project results follow-up action. These may include:

- Inadequate or inappropriate utilization of complete projects

- Faulty supervision and control on the part of international lending agencies

- Poor internal reporting and monitoring procedures

- Inadequate monitoring and control by central government ministries responsible for project implementation

- Failure to adapt appropriate project outputs and techniques to other developmental activities

- Failure to train and retain personnel following project completion and the transfer of project operations to routine production activities

- Failure to anticipate, plan for or adjust to the political and social impact of projects on local populations

- Long delays in submitting project completion reports

- Failure to terminate projects at appropriate time or to transfer project activities to established governmental organizations

- Inadequate or ineffective project post-evaluation methods and procedures

(Rondinelli, 1976)

11. Summary

We have learnt that evaluation and appraisal are tools used for the assessment of an agribusiness project. While appraisal is used to assess an agribusiness before establishment, evaluation is used to assess an ongoing or completed agribusiness project. However both assessments work towards the success of an agribusiness project.

12. Practical Assignment

- Ofuobi Foodstuff Traders Union obtained loan from Greenalf Micro Finance Institution to establish their businesses. Their businesses have been up and running. Greenalf MFI has a policy of carrying out an oversight function of helping their customers to evaluate their businesses. As a Greenalf MFI staff, you were sent to evaluate Ofuobi Foodstuff Traders Union businesses. How will you carry out the following evaluation to the understanding of the traders?

  - meaning of evaluation;

  - purpose of you carrying out the evaluation;

  - what you want to evaluate; and

  - report of your evaluation.

- Evaluating projects in developing countries is always fraught with problems. Discuss some these problems.

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