

6.0 Decision Criteria for choice of Agricultural Investments /Projects

Investment in agriculture is a combination of "ability and willingness to invest". In investment, certain level of infrastructure is essential to absorb production-oriented loan, thus making development financing a pre-requisite for the production financing. Financial management is generally meant to involve decisions made towards investment, production, and dividend handling. Together, these decisions are not always made independent of one another and they determine the rate at which the farm business will grow over time. Effective decision making in agri-business therefore requires a comprehensive farm management and accounting system to identify the level and timing of financing needed to facilitate production and marketing of the farm produce.

The basis for identifying and choosing viable agricultural investment will depend on the type of enterprise to be established and the motive of establishing it. Generally, factors to consider include:

(i) Feasibility of the project /investment

(ii) socio-political factors;

(iii) economic significance of the project;

(iv) sociological considerations;

(v) organisational and managerial considerations;

(vi) Resource availability;

(vii) Comparative advantage of the project over other alternative and similar projects;

(viii) Financial consideration etc.

In all efforts need to be made to consider whether the cost of the investment can be reduced through group farming;

Benefits derivable from the investment;

Volume or quantity of produce / services meant to be provided;

Extent of managerial and technical skills required for the investment to be viable and profitable etc.

Socio-political factors

The success of any agricultural investment will depend on the compatibility of such an investment with the social norms and culture of the people. It is therefore important to study the locality's characteristics in terms of the literacy levels, age distribution, wealth distribution of the people, interest in farm business enterprises. The characteristics of the people too will determine the type and complexity of the agricultural enterprise. If such is considered to be socially viable, efforts should be made to explore the political feasibility from policy and legal points of view. Institutional supports from governments and other external agencies could be considered so the investment will not stop during implementation. The effects of the investment on the society should also be considered.

Economic significance of the project

Whatever the type of investment, the profitability in terms of either least cost or increased returns should be the major goal. The investment should contribute significantly to the development of the society in which it is established and justify use of resources committed to the investment. Where justifiable answer can be given to some of the under-mentioned questions, then the project can continue, otherwise, get at alternative investments. These questions include the following.

(i) What is the trend of production for a similar investment?

(ii) Are there necessary changes in the production practices and what are the likely effects; if any, on the production level, if technologies were to change?

(iii) What are the likely effects of the changes on price?

Note that monetary values should be attached to inputs and outputs so that profitability of the investment can be easily determined. Produce from the investment should be such that the investors can produce profitably and in reasonable quantities. Estimation of the inputs requirements, availability of these inputs and the possible changes in their prices as well as their likely effects on the outputs should be considered as well. There is a need to estimate the

cost of production and the gross returns per unit. Administrative and running costs should be estimated to ensure sustainability of the investment.

It is also important to identify agricultural commodities that the public will be interested in, the volume to be produced or handled per unit time, availability of the food crops and its effect on demand for the commodities. Also important are the trends in the demands for the proposed produce from the investment in terms of seasonality, other sources of the same produce if any, the distance of the farm enterprise to the various sources around as well as the ability of the sources to meet public demands for the commodities.

The performance of the existing similar agricultural investment producing the commodities and substitutes, the profitability such that the gross margins can easily be estimated. These values need to be compared with similar agricultural projects in the area to ensure that available resources are committed to the best use.

Some of the required facilities like water supply, medical services, electricity, transportation should be ensured before the implementation of the investment projects. This therefore requires the need to identify the goods that the community really needs, the estimated life span of the required equipment, their costs and ability to maintain them, their sources of procurement as well as availability of their parts etc.

Financial considerations

The success of any investment is a function of the ability to handle all financial obligations. This has to do with the consideration of the financial effects of the investment on the community. There is therefore the need to consider all the capital requirements, when and where it can be raised (time required). Amounts of capital that can be generated from the various sources. Efforts should be made to distinguish between the long term capital requirements for fixed assets and the short term requirements for operating expenses so that the sourcing of the required capital can justify the expected returns for it.

Technical considerations

In selecting a viable agricultural project, some of the technical factors to be considered include:

- (i) Size of the Investment – should be optimal so that resources are not underutilized. It is a function of resources availability.
- (ii) Environmental and climatic conditions
- (iii) Availability of physical resources
- (iv) Transportation to ensure access to inputs and sales of produce
- (v) Adequate storage facilities
- (vi) Availability of trained personnel and labour for the business etc.

Organisational/ managerial considerations

There are needs to consider:

- (i) if the lines of authority are clear, properly linked and coordinated.
- (ii) If the organisational design encourage delegation of authority ? .
- (iii) If it take proper care of the custom and organisational procedures common in the area?
- (iv) If the projects have enough authority to keep its accounts and make prompts disbursement when needed/ Do the project personnel require training on managerial skills?

Competitive advantages

The nature and severity of competition in any investment vary from one enterprise to the other. It is important to know the level of advantages the investment will have over the others in the area, in terms of the production, transportation ,storage cost etc. and to compare with other similar investments around and outside the community,. The quantity, quality and timeliness of the produce should all be taken into consideration in order to ensure that the competitors do not take over the markets. Technological changes and advantages should be recognized a with their effects on the produce to meet consumers' tastes. New methods of production should reduce the total cost of production.

Resource Availability

Facilities required for the project need to be determined from the onset. The capital for the project, the sources of funds as well as the proportion of equity to the borrowed funds must be determined. The capacity, the farm location, and the number of plants as well as available labour force (skilled and unskilled), all have to be put into consideration. The marketing channel for the farm produce must also be determined to ensure continuous production and sustainability of the project.

Other Criteria for consideration

Other criteria that could be considered in the choice of an agricultural investment project include:

***The presence of business and financial risks**

Farm operators' risk-returns preferences (i.e. whether they are risk averse, risk neutral or risk taker), can have effects on the ranking and acceptance of alternative agricultural investment projects. To reduce exposure to risks, farm operators can adopt one or combinations of strategies like product diversification, sequential marketing of produce, insurance, and forward contract using either future market contract or cash forward contract

*Terms of loans can also have effect on the decision to invest when at least part of the assets purchase cost can be debt-financed.

* Different methods of computing interest charges for loans can also have effects on the explicit cost of the debt capital. Note that when making investment decisions, both explicit and implicit costs of debt capital should be accounted for as both will affect the Manager's desired use of the capital as well as the rate of growth in the farm business.

* Legal considerations in the investment

* Return on capital employed

* Forms of security on loans

* Net profit/gross margin

* Lending terms and conditions i.e

- Amount of loan portfolio

- security requirements
- Interest rates and fees
- Repayment schedules etc.

Traditional Investment criterion

This is based on the principle of productivity which believes that resources are best committed to projects in which input-output ratio is high.

Factor Intensity criterion

The principle is to make maximum use of abundant resources and minimum use of the apparently scarce resources. Project can therefore be justified on the basis of justifying employment of abundant resources and facilities like labour. Emphasis on employment of resources is justified in situations when human resources are drifted.

Capital output criterion

This criterion is considered highly relevant if the overall goal of the society is on growth maximization. The principle of growth argues that growth could be attained by selecting projects which promises highest rate of investment potentials in a way that the maximization of capital-output ratio is ensured. The essence of using the criterion is to differentiate between the use of salaries, profits and wages for re-investment. The principle assumed that all profits should be saved while salaries and wages could be consumed. Since investment = f (savings) and economic growth in a society = f (re-investment), this principle favours project that promises highest returns to capital.

Foreign Exchange criterion

The criterion supports that projects which have potentials for savings and foreign exchange earnings should be given high priority. However, a number of constraints like inflation in product prices, crops/agricultural facilities, war etc. can all affect the use of the criterion.

Integrated productivity criterion

The principle is based on the variance of the benefit: cost ratio (total or marginal, discounted or undiscounted). The crucial issue is that the additional contribution to the society which is often referred to as the "social marginal productivity" (SMP), should be as high as possible i.e the principle agrees to the choice of projects based on the net contributions of the marginal units to the national production. A project should therefore be selected when it has a high SMP irrespective of whether it is capital or labour intensive.

Use of Financial and Economic Analysis of the Project

Use of project Analysis Measures

Economic analysis of an investment is based on the total returns to community in relation to the committed resources while the financial analysis of investment measures the productivity of the resources to the individuals demanding the product of the investment. Both are useful in providing the basis for evaluating all aspects of the project in a more coordinated and systematic way. In both cases, the benefits and costs of the projects are imputed to determine its viability and to take decisions for choice.

Two major methods usually used are:

- (i) Discounted measures and**
- (ii) Undiscounted measures**

The discounted measures take time value of money into consideration while the other uses the rule of thumb like the payback period i.e. the length of time a project takes to recoup the initial investment from the net cash flow generated by the investment.

Undiscounted Measures

- (i) Ranking by Inspection
- (ii) Use of pay back period
- (iii) Rate of Returns

- (iv) Proceed per ₦ invested
- (v) Average Annual Proceed per ₦ invested

(a) Ranking by Inspection

By this the Assessor will be interested in the

- (i) Investment cost of the project
- (ii) Cash flow patterns and rates

Note: Examples and Class work to be given during Lectures.

(b) “Pay Back Period” as a criterion for agricultural project choice

- Also referred to as the “Cash recovery period” and “Pay off period’
- Period of time it takes for an investment to generate net incremental cash that would be sufficient to recover its initial incremental capital layout in full.
- Can be used as an initial criteria or screening device to see if the project can or cannot pay back its initial capital.
- Note: If the net cash flow is constant over an infinite period of time, the reciprocal of the undiscounted cash flow of the pay back sum = to IRR or the yield
- Among alternative projects, the one with the shortest payback period is more desirable .This measure does not consider the time value of money.
- **Disadvantages as an investment criterion**
 - It fails to measure profitability
 - It considers the net cash flow only to the point where they are equal to the initial capital outlay i.e. it does not account for any additional cash flow generated beyond the pay back period.

(c) Rate of Returns (RR)

Estimated as the ratio of profits net taxes and depreciation on capital employed

$$RR = \frac{\text{Profits (net of taxes \& depreciation)}}{\text{Capital used}}$$

$$= \frac{\pi}{K}$$

Where: π = Net profit and K = Capital used

Decision Rule: Project is considered worthwhile for choice and acceptance if, the rate of Returns (RR) is greater or equal to the cost of capital employed.

RR could be calculated using different approaches.

Net profits as Initial profit i.e profit in the 1st year of operating the project

OR

Average profit i.e over the life span of the project or profit in the first 5 -10 years of the project.

Capital : Initial capital or average capital employed

Disadvantages of using Rate of Returns criterion

Fails to account for the time value of the capital outlays and earnings i.e ₦1 earned is also assumed to be the same value in future which is not so.

It underestimates yield if it fails to take into consideration the earnings and capital employed throughout the life span of the project.

Cannot be used to compare internal investments (within the farm) and external investments (outside the farm) which yield over time. It is therefore difficult to use the rate of returns measures to determine the worthiness of investment and compare it with other investment opportunities

(c) Proceeds per ₦ invested

This is the ratio of the net value of production to the total volume of the capital invested.

$$\text{Proceed per ₦ invested} = \frac{\text{Net value of production (N)}}{\text{Total volume of capital invested}}$$

Weakness

This criterion also fails to consider timeliness in returns on investment because it does not take care of the time value of money.

(d) Average Annual Proceeds per ₦ invested

Another investment choice criterion which does not consider the length of time of the stream of benefits, hence used with bias especially for short term investments with high cash proceeds

Computation

Stage 1: Calculate the Average annual proceed or Proceed per year

$$\text{Average Annual proceeds} = \frac{\text{Total proceeds (₦)}}{\text{Total number of investment years or project life span}}$$

Stage 2: Calculate the average annual proceeds per Naira invested

$$\text{Average Annual proceeds per Naira invested} = \frac{\text{Average proceeds/ year}}{\text{Initial capital invested}}$$

Note : Examples to be given as class work during the Lectures.

Discounted cash flow Criteria

- (i) Benefit /Cost Analysis **OR** Cost/ Benefit Analysis
- (ii) Net present Values
- (iii) Internal Rate of Returns on Investment etc.

Note : Students will be taught the concepts and principles of compounding and discounting as the basis for calculating the time values of money.

Knowledge of calculating the Simple interest, time, due dates for loans, maturity value or Sum etc, will also be introduced.

Discounted Measures

A. Net Present Value (NPV)

This is the present worth of the incremental net benefits derivable from an investment. It is the difference between the present worth of the stream of benefits and the present worth of the stream of costs.

$$NPV = \sum_{t=1}^n \frac{B - C}{(1+i)^t}$$

where NPV = Net Present Value

n = Expected lifespan of the project

B = Benefits (Inflows)

C = Costs (out flows)

i = interest rate

T = specified years of investment

Decision Rule: The Net Present Value (NPV) criterion stipulates that the project should be accepted if ,the NPV is positive . A positive NPV indicates a viable project . This implies that **NPV Benefits > NPV of Costs.**

Note : This decision rule assumes that the optimal scale of investment and starting time are already given and do not have to be determined simultaneously with the project choice.

Examples will be given as class work on the calculation of NPV and present Values of Annuities.

B. Benefit: Cost Ratio Analysis

In comparing alternative investment for decision making on choice of the investments, there is a need to compare the costs and benefits in relation to the time of the streams, by discounting method. One of such measures of project worth is the Benefit/Cost ratio or the Cost/Benefit ratio. This is the ratio of the discounted stream of project benefits to the discounted stream of project costs. A Benefit /cost ration greater than one implies a potentially viable project and such project could be chosen. Often used in economic analysis to measure the social benefits of investments.

Benefit: Cost = Present Values of Benefits (PVB)
Present Values of Costs (PVC)

Computed as :

$$\frac{\sum_{t=1}^n \frac{B_t}{(1+r)^t}}{\sum_{t=1}^n \frac{C_t}{(1+r)^t}}$$

where: $\sum_{t=1}^n \frac{1}{(1+r)^t}$ = the sum of

n = Number of years for which the stream of benefits are expected or costs incurred

B_n = Benefit in each year or Year n

C_n = Cost in each year or Year n

t = time beginning from the 1st year of project stream of income or costs

Steps in Calculating the B: ratio

Step1: Decide on the discount rate to use.

There are 3 options

- (i) Opportunity cost of capital
- (ii) Borrowing rate
- (iii) Social rate of returns

Step2: Discount the streams of benefits and costs to their present values.

Step3: Divide the sum of present value of benefits by the sum of present value of costs.

Examples will be illustrated during class Lectures.

Decision Rule:

- (i) **B:C < 1 implies PVB < PVC.** The cost may not be recovered It is better not to invest but to save the money at the existing interest rate . Note that the absolute value of Benefit :Cost ratio depends on the interest rate charges . The greater the rate of interest the less the Benefit : Cost
- (ii) **B:C > 1 implies PVB > PVC.** Accept the project
- (i) **B:C = 1 implies PVB = PVC.** Break-even point

C. Internal Rate of Returns (IRR)

This is the interest rate that equates the net present worth of a stream of benefits to zero.

$$IRR = \sum_{t=1}^n \frac{B_n - C_n}{(1+r)^t} = 0$$

It represents the average earning power of the money invested over the entire period of the project as well as the maximum real interest rate that the project can pay for if, it is to recover its investment and operating cost and still break even. Estimation of the Internal Rate of Return could be made through extrapolation method in which two discount factors are used against

their respective cash flows. The net benefits from the cash flow relating to the lower discount factor is always negative while the one with the higher factor will be positive. This implies that the IRR lies in between the discount factors.

The formula for calculating the Internal Rate of Returns (IRR) is represented as"

$$\text{IRR} = I + C (PV_1/E)$$

Where:

I = Lower Discount rate

C = Difference between the two discount rate

Pv₁= Present value of the lower discount rate

E = Absolute difference between the PVs of cash flows at the two discount rates.

Example will be illustrated during class Lectures.

Note: In choosing the discount factors, the efficiency of the estimates is enhance if the difference is not more than 5 %. The decision rule is to accept the project if the IRR is greater than the Interest rate. Absolute difference is the sum of the values ignoring the signs attached to the figures. Always round off to the nearest whole % figures

Comparisons of the Net Present Value (NPV) and Internal Rate of Returns (IRR) Techniques as Project Selection Criteria.

*NPV technique appraises investment opportunities by estimating the sums of their future cash flows discounted at some discount rates. It represents the change in value of the firm measured in current terms.

*Using IRR involves finding which discount rate gives NPV of zero when applied to project outflows. It represents a break even discount rate. Projects which have IRR higher than the firm's rate of return are acceptable while projects with IRR below the required rate should not be accepted.

*For a single investment opportunity, NPV AND IRR criteria will lead to the same conclusion.

*NPV reduces as discount rate increases .Therefore at interest rate below IRR it will be positive and vice versa.

* The NPV technique has the advantage of measuring the value of the farms in absolute terms. Where discount rates fluctuates over the project life span, it is possible to discount at different rates in each year. The technique therefore relies heavily on the estimation of the correct discount rates.

*Discount rates used for calculating NPV and IRR should represent the opportunity cost of capital needed and generated by the investment opportunity. The method of calculating the cost of capital is difficult and uncertain. Therefore, farms need to be cautious of using high positive NPV in calculating the cost of capital.

IRR though gives no indication on how valuable a project might be, in absolute terms, has two advantages over the NPV technique

(i) The technique is easier to visualize and interpret because of the concept of returns and percentages.

(ii) IRR gives no margins for errors in the cost of capital estimate. Can be regarded as the upper limit in situations where the cost of capital is uncertain or likely to fluctuate. Provided the IRR is greater than all the possible costs of capital estimates, NPV must be positive for project to be accepted. IRR is more widely used than the NPV technique.

Disadvantages

*Problem in using the IRR occurs in situations where the appraisal depends on choice among alternative projects. Choosing project on the basis of the highest IRR can lead to wrong decision because the technique is a relative measure of worth without regard for the scale of investment.

*Where cash flows are unconventional (i.e.) one or more outflows are followed by a number of inflows or vice versa), then there may be one or more discount rates giving rise to NPV of zero. Potentially, the number of IRR implies the number of times the flow changes from positive to negative or vice versa and that limits the usefulness of IRR as an appraisal technique. Since the IRRs may be above or below the cost of capital, none can be chosen as a measure of the value of investment capital but choice may depend on the pattern of cash flows and use of appropriate discount rates.