Financial Appraisal of Investment Projects in Agriculture – Tools and Techniques

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Presentation Contents

- Project concepts
- Project financing in Agriculture
- Aspects of Project appraisal
- Appraisal Techniques
- Bankability

Project

Project is an Investment activity in which Financial resources are spent to create capital assets that produce benefits over an extended period of time and which logically lend itself to planning, financing, and implementing as a unit.

Need for Project Approach

- A comprehensive and systematic review of all aspects of a project
- Integrated approach for systematic exploitation of resources
- A second look to the project by one not involved in the project formulation
- Highlight the weak areas of the project for due rectification
- Encourage examination of alternatives
- A joint assessment by the promoter and financial institution
- Time bound implementation to avoid cost overrun
- Impact of investment on the stakeholders

Need for Agricultural Project Financing

Long-term Investment: Supports capital formation and infrastructure development

Risk Management: Investment Credit helps to mitigate risks related to climate change, market fluctuations, and crop failures.

Resource Optimization: Ensures efficient use of land, water, and other agricultural inputs.

Increased Productivity: Enables adoption of modern farming techniques and mechanization.

Sustainability & Environmental Impact: Supports eco-friendly practices and sustainable agriculture.

Income Stability for Farmers: Reduces financial stress and enhances rural livelihoods, promote alternate agri activities.

Market Linkages & Value Chain Development: Strengthens access to markets, storage, and processing facilities.

Government & Policy Support: Aligns with national agricultural policies and development goals.

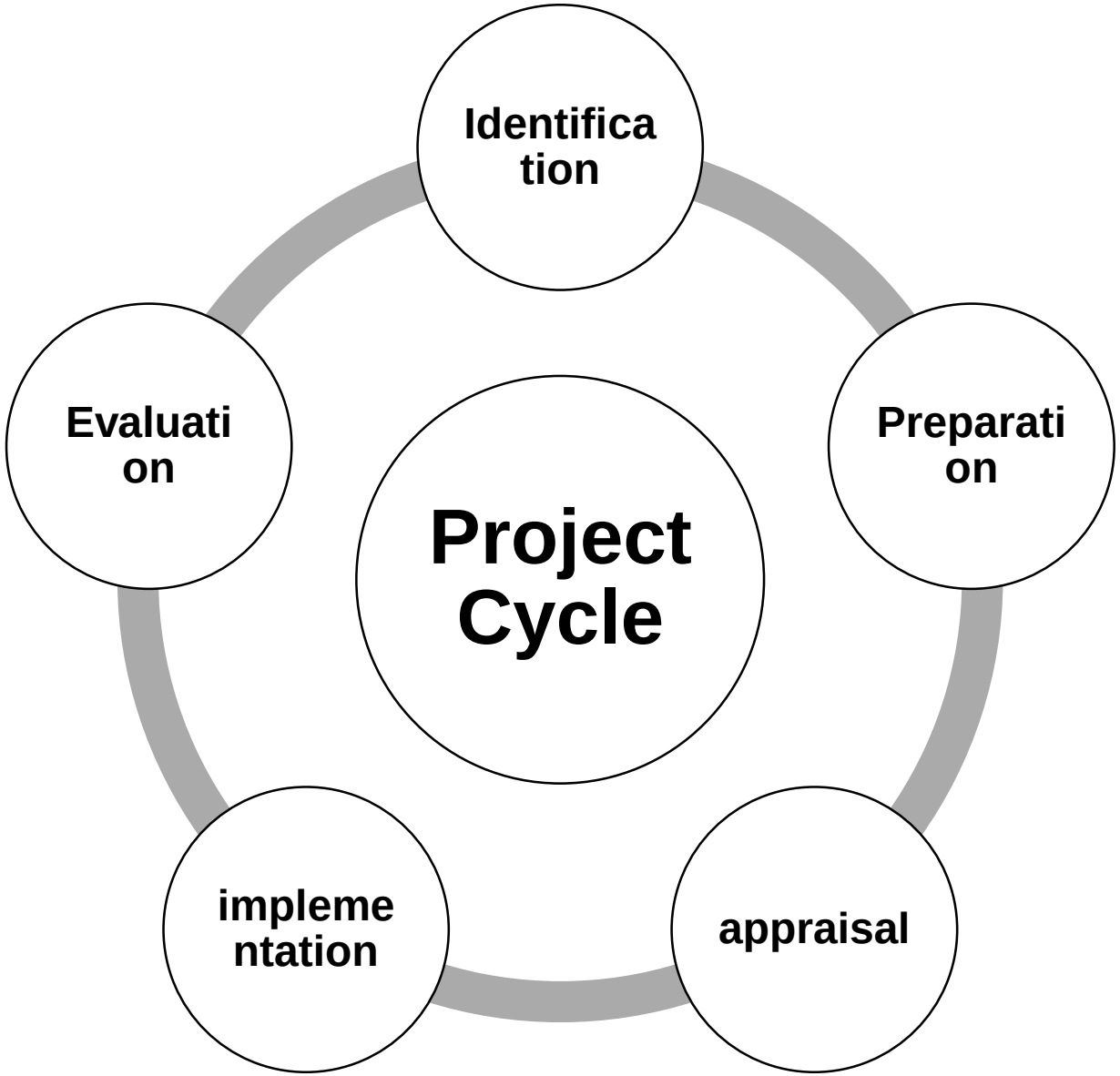
Technology & Innovation: Encourages investment in agri-tech solutions like precision farming and irrigation systems.

Food Security & Rural Development: Contributes to national food security and socio-economic development in rural areas.

Types of Agri Investment Project Examples

Sector	Term Loan Investment Activity
Land and Water Resources Development	- Land Development (Leveling, Bunding, Reclamation) - Irrigation (Wells, Borewells, Drip Irrigation, Sprinklers) - Soil Conservation and Water Harvesting
Farm Mechanization Loans	- Tractors, Power Tillers - Harvesters, Sprayers, Seed Drills - Dairy and Poultry Equipment
Plantation & Horticulture Loans	- Fruit Orchards (Mango, Guava, Apple, etc.) - Spices and Medicinal Plants - Floriculture and Greenhouse Farming
Allied Agricultural Activities Loans	- Dairy Farming (Cattle, Buffalo) - Poultry Farming (Broilers, Layers) - Sheep, Goat, and Piggery Farming - Fisheries and Aquaculture
Post-Harvest & Processing Loans	- Cold Storage and Warehousing - Food Processing Units - Packaging and Value Addition
Agri-Infrastructure Loans	- Rural Godowns and Silos - Farm Roads and Fencing - Solar Pumps and Renewable Energy for Farms

Project Cycle



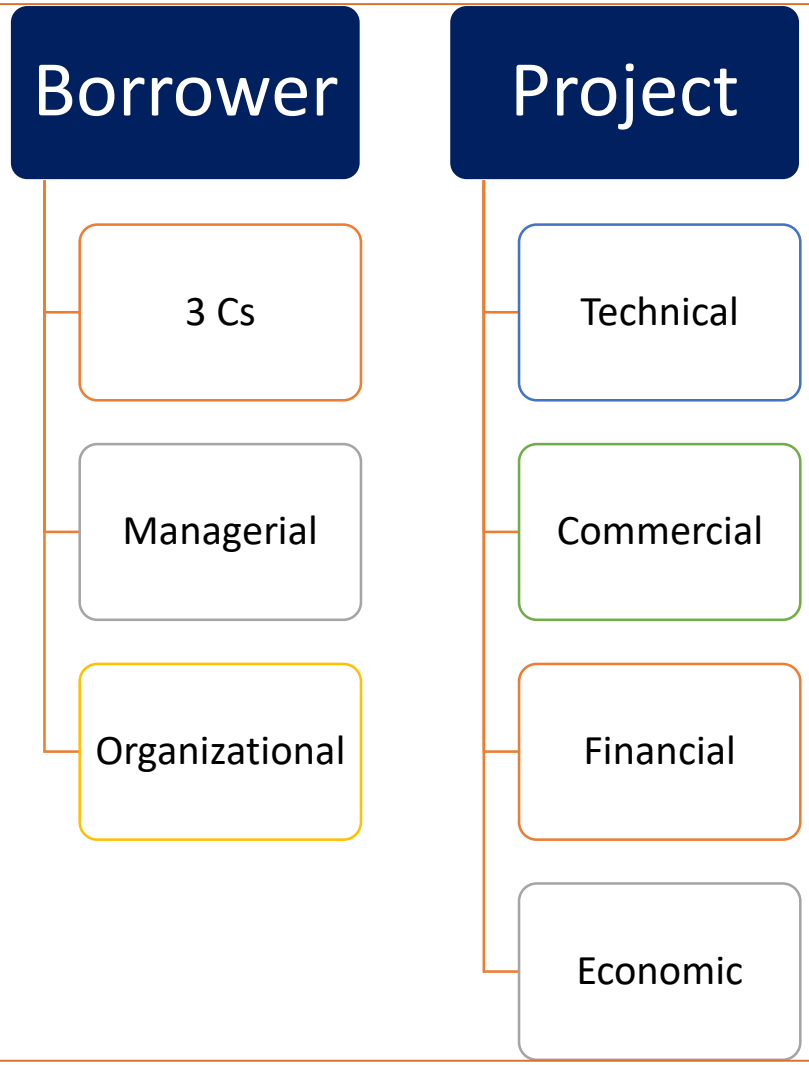
1. Identification of the Project

- Availability of resources like soil, water, labour, power, capital, etc.,
- **Availability of backward and forward Linkages**
- Availability of infrastructure like transport, services, etc.,
- Availability of appropriate technology
- **Social factors**
- Availability of Market, Storage facilities, etc.

2. Project Report Aspects

- Technical
- Commercial
- Managerial
- Organisational
- Social
- Economic
- Financial

3. Project Appraisal Aspects



Borrower Appraisal – 3 Cs

Character

- Honesty
- Intention, Drive
- Patience, Behavior
- Risk ability, Confidence

Capacity

- Qualification, Knowledge
- Experience, Exposure, Expertise
- Competency

Capital

- Margin
- Crisis Management

Borrower Appraisal

Managerial

- Project Manager Skills
- Training
- Attitude
- Ability to hire qualified persons

Organizational

- Organizational Set up
- BoD composition
- Decision making mechanism
- Monitoring mechanism

Technical Appraisal Aspects (Depending on Investment)

Suitability of the Area: Agro-climatic conditions (Temperature, Humidity, Rain fall), Soil: pH, Depth, Topography/ Slope

Availability of Water: Type of cropping systems, use of irrigation methodology

Availability of Inputs: Planting Material, Fertilizers, Chemicals, Labour, Extension service, Electricity

Spacing & Layout: Depending on the cropping pattern – Horticulture, Forestry, Agro-Forestry, Integrated Farming Systems, etc.

Building and civil works: Suitability/layout, necessity, reasonableness of cost-Variety-HYV -Package of practices

Plant & Machinery: Utilities-Technology

Commercial Appraisal

Backward Linkages

- Availability of quality raw material
- Inputs
- Procurement of equipment
- Roads, Culverts
- Workmen quarters
- Irrigation water
- Technical guidance

Forward Linkages

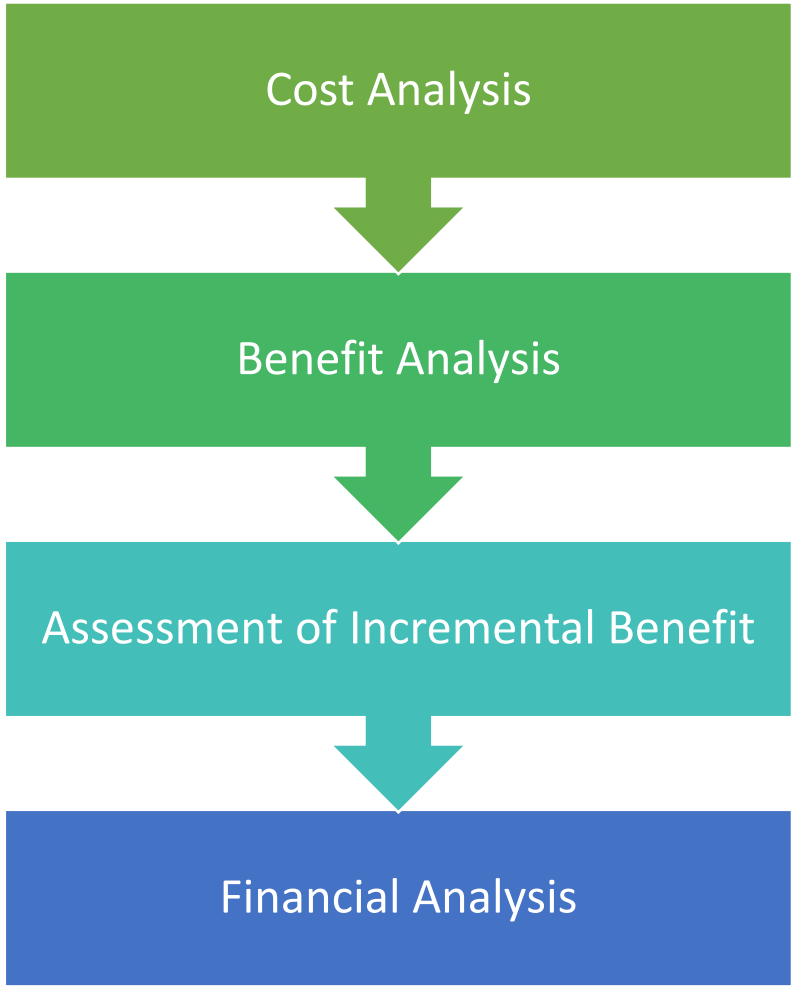
- Storage
- Processing
- Marketing
- Transportation

Economical Appraisal

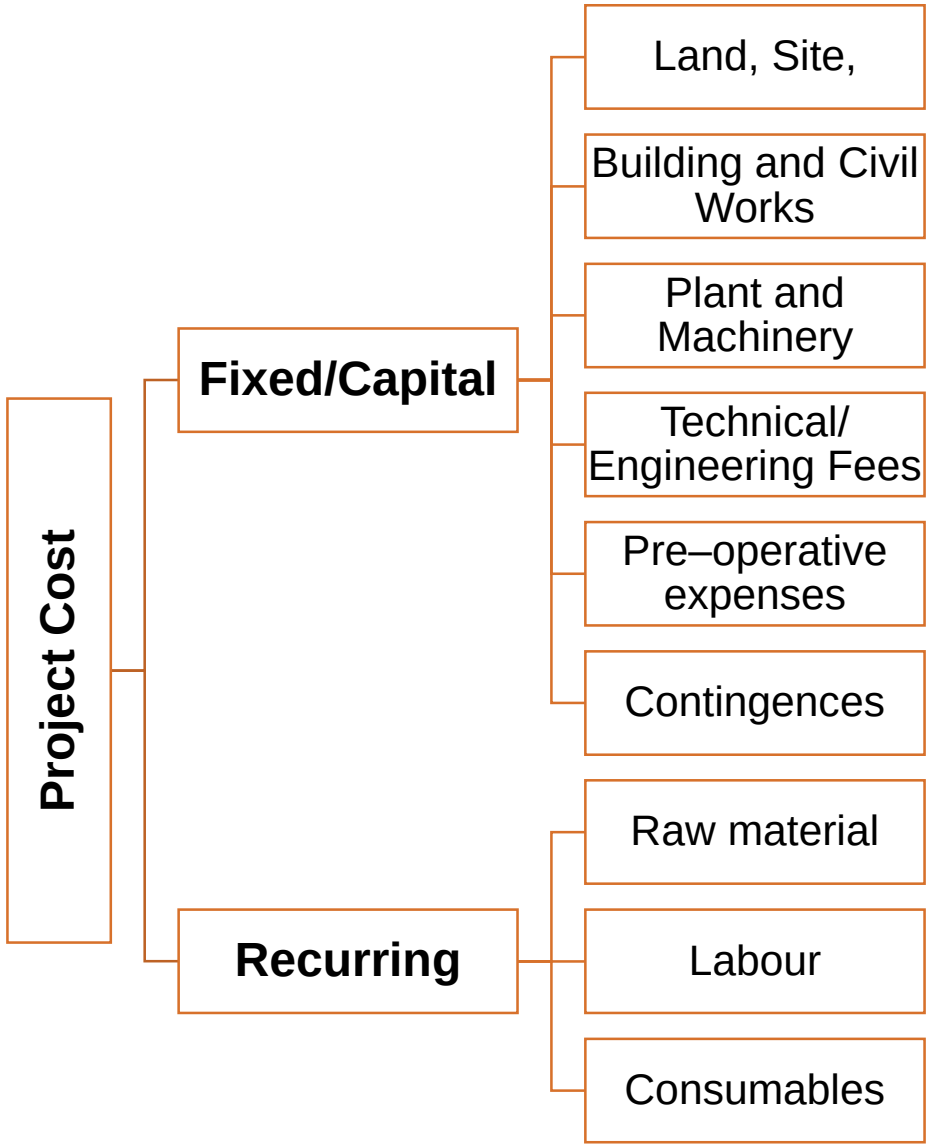
- Social Acceptance/ desirability
- Pollution control
- Beneficiaries: Are all the sections of the society covered?
- Labour resistance
- Export ? foreign exchange earner?
- Contribution to GDP?
- National Priority?
- Thrust area
- Social costs and benefits (Taxes/Subsidies)

Financial Appraisal Steps

1. Assessment of costs
2. Means of finance
3. Working Capital Requirement
4. Assessment of benefits
5. Preparation of cash flow statement
6. Assessment of financial viability (tools):
    - NPW / NPV
    - BCR
    - IRR
    - DSCR
    - Break-Even Analysis
    - Sensitivity Analysis
7. Projected Balance Sheet



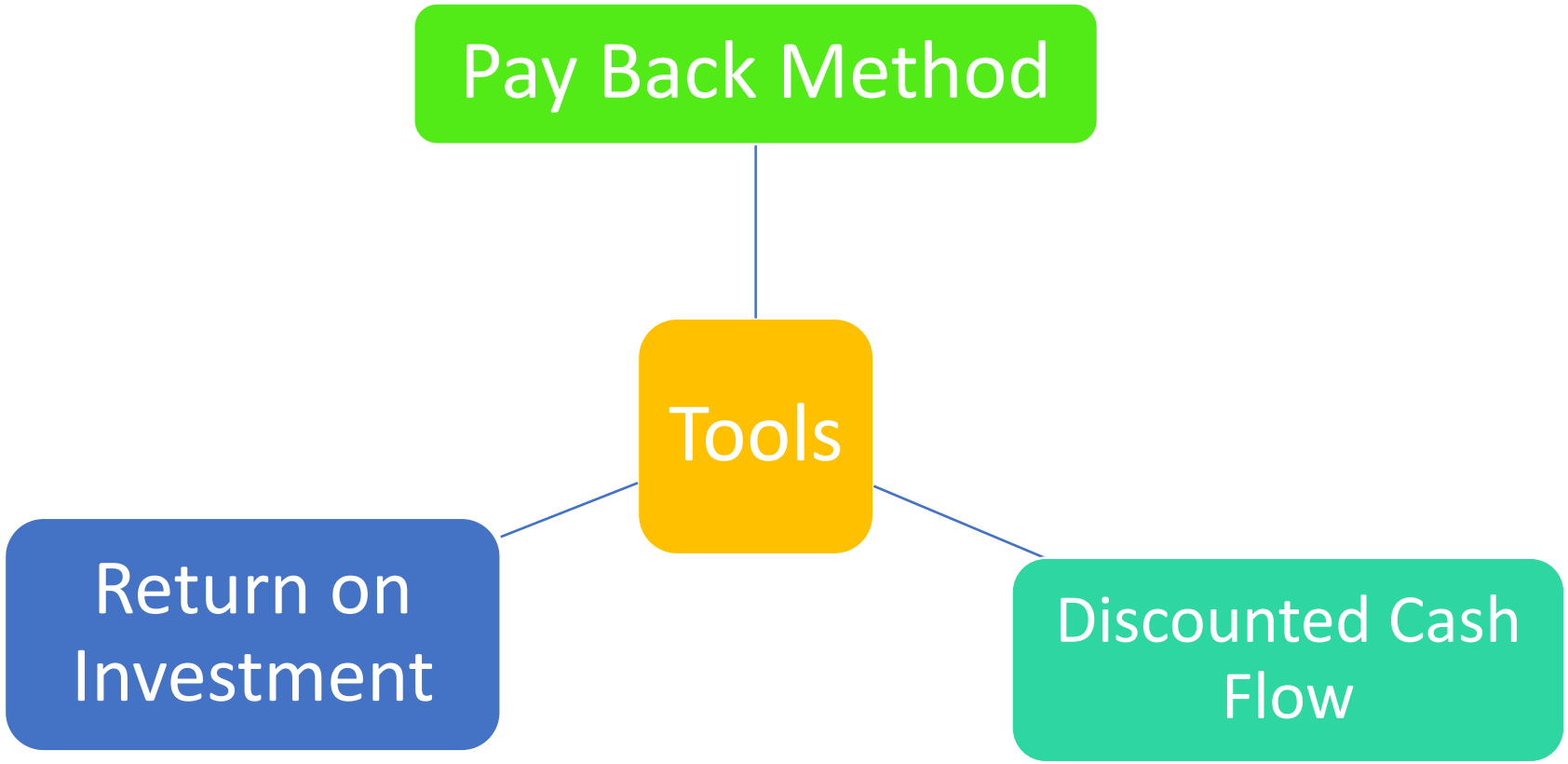
1. Assessment of Cost



2. Means of finance

- Equity Capital
- Preference Share
- Debenture
- Deferred Credit
- Incentive Sources – seed capital or subsidy
- Bank Loan
- Lease Finance etc.

Financial Appraisal Techniques



Pay Back Method

SL No	Pay Back Period Calculation	Harvester
A	Investment -Combine Harvester (Rs.)	20,00,000
	Interest per year (@12% PA)	2,40,000
	Depreciation per year	2,00,000
B	**Operating Capacity (Acres/ year)**	**420**
C	**Operating Cost per acre (Rs.)**	
	Diesel per acre (Rs.)	600
	Operator (Rs./ acre)	300
	Interest	571
	Depreciation	476
	Others (Insurance, Maintenace, etc)	250
	Total Operating Cost per acre	**2,197**
D	Rental charges per acre (Rs)	3,500
	Profit per acre	1,303
	Total Profit	**5,47,260**
E	**Pay back period (Years)**	**3.65**

Merit: Helps to invest in quick return funds with shorter pay back
Demerit: More on liquidity than profitability, Not covering earning beyond pay back

Return on Investment (ROI)

Investment Example: (e.g. Paddy Transplanter)

- Capital cost : Rs. 20,00,000
- Total profit :Rs. 1300 X 420 acres = Rs. 5,46,000/-
- Return on Investment : 5,46,000/ 20,00,000 = 27.3%

- **Merit: Simple to calculate, Consider net earnings after depreciation.**
- **Demerit: Ignores Time Value of Money**

Discounted Cash Flow

Time Value of Money

- The concept of the **time value** of **money** is **as old as money itself** money costs money.
- Because money has **both earning power and purchasing power** over time
- Money has a time value because its purchasing power changes over time (**inflation**).
- The time value of money is measured in terms of **interest rate**.
- Interest is the cost of money i.e. a **cost** to the borrower and an **earning** to the lender.

Time Value of Money

- **PV (Principle or Present Value)**: Initial amount of money invested or borrowed.
- **i (Interest rate)**: expressed as a percentage per period of time.
- **n (Interest period)**: determines how frequently interest is calculated.
- **FV (Future Value)**: cumulative effects of the interest.

$$FV = PV\,(1+i)^n$$

$$PV = \frac{FV}{(1+i)^n} = FV\ x \left\{ \frac{1}{(1+i)^n} \right\}$$

$$DF = \frac{1}{(1+i)^n}$$

Year	DF @ 15%
1	0.870
2	0.756
3	0.658
4	0.572
5	0.497
6	0.432
7	0.376

Discount Factor (DF) is a multiplier used to determine the present value of future cash flows.

- ***Compounding:*** *Future Value (FV) of money (of Present Cash Flow*
- ***Discounting:*** *Present Value (PV) of money (of Future Cash Flow)*

NET PRESENT VALUE CALCULATION

- The Net Present Value (NPV) of a project is the sum of the present values of all the cashflows associated with it.
- The cash flows are discounted at an appropriate discount rate (cost of capital)

Sample Calculation: Net Present Value Calculation

Year	Cash Flow	Discount Factor @12%	Present Value
0	-100	1	-100
1	34	0.87	29.58
2	32.5	0.756	24.57
3	31.37	0.658	20.64
4	30.53	0.572	17.46
5	79.9	0.497	39.71
		Sum (NPV)	**31.96**

Project Viability Analysis: BCR & NPV Methods

Benefit-Cost Ratio (BCR)

$$\text{BCR} = \frac{Present\ Worth\ of\ Costs}{Present\ Worth\ of\ Benefits}$$

If **BCR > 1**, the project is considered **viable**.

Net Present Value (NPV)

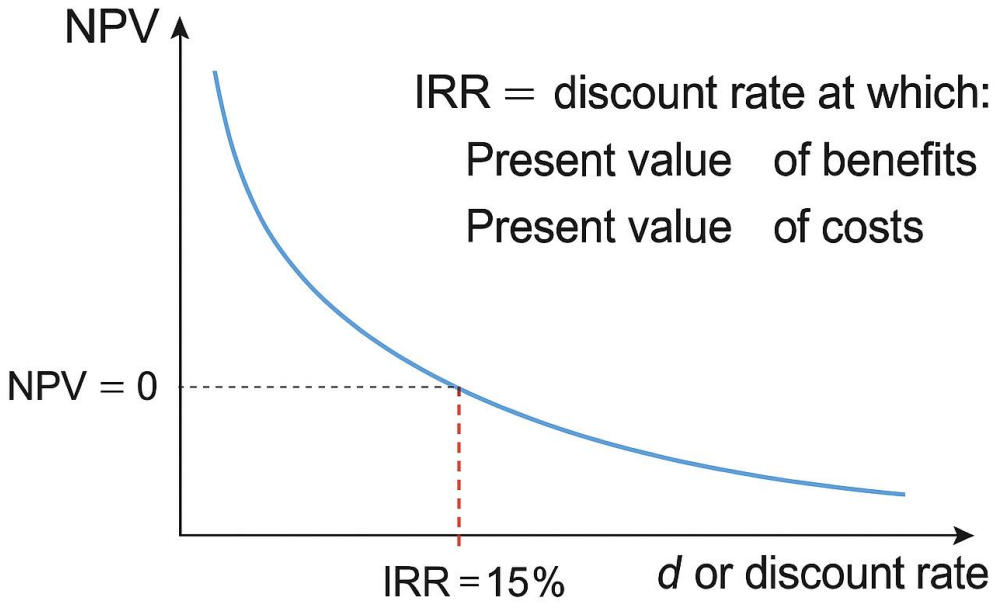
NPV=PWB−PWC

Where:

PWB = Present Worth of Benefits
PWC = Present Worth of Costs
If **NPV > 0**, the project is considered **viable**.

Internal Rate of Return (IRR)

IRR is the discount rate at which the present value of benefits equals the present value of costs, making the **Net Present Value (NPV) = 0**.



$$\text{IRR} = \text{Lower Discount Rate} + \text{Difference between the two discount rates} \left\{ \frac{\text{NPW at lower discount rate}}{\text{Absolute difference between NPWs at two discount rates}} \right\}$$

Internal Rate of Return (IRR) Example

Year	0 year	1st year	2 to 9 yrs
Cost	60000	45000	70000
Benefit	-	50000	90000
Net Benefit	-60000	5000	20000
DF @ 20%	1	0.833	3.198
PW @ 20%	- 60000	+ 4170	+ 63960
DF @ 25%	1	0.800	2.663
PW @ 25%	-60000	+ 4000	+ 53260

=NPW @ 20% = 8130

=NPW @ 25% = (2740)

$$IRR = 20 + 5 \left\{ \frac{8130}{8130 - [(-2740)]} \right\} = 23.74\%$$

Decision Making

BCR	NPV	IRR	Remarks	Decision
More than 1	NPV + ve	IRR >15%	Financially viable	May be financed
Equal to 1	NPV =0	IRR =15%	Marginal	Not to be considered for finance
Less than 1	NPV - ve	IRR < 15%	Financially not viable	---do-------

MARR is the Minimum Attractive Rate of Return (Market Interest Rate),

Sensitive analysis

Sensitivity analysis, also known as "what-if" analysis, assesses how changes in key input variables (like interest rates or project costs) impact project outcomes (like NPV or IRR), helping identify critical risk factors and inform decision-making.

This tests the viability of the project in the worst circumstances

1. Reducing the sale price/sales volume,
2. Increasing the cost of inputs, etc.,
3. Combination of (i) and (ii).

Sensitivity Analysis Approach

1. Consideration of the lengthy period over the existing one to generate cash flow and capacity utilisation
2. Changes (increasing or decreasing) in the prices of goods and services by certain proportions of the project say by 10%, 20%, 30 %, 40%, 50% etc.
3. Changes (increasing or decreasing) in the levels of costs say by 10%, 20%, 30%, 40 %, etc.
4. Changes (increasing or decreasing) in the yield level of crops and livestock
5. Delay in the implementation i.e. varying gestation period.

Debt Service Coverage Ratio (DSCR)

$$DSCR = \frac{(Profits\ After\ Tax\ (PAT) + Depreciation + Interest\ on\ Term\ Loan)}{(Interest\ on\ Term\ Loan + Installment\ on\ Term\ Loan)}$$

DSCR helps in understanding if the profits projected are adequate to service the interest burden and instalments of the loan

Acts as a guide to determine the period of loan and arrive at an appropriate repayment schedule

Project on a stand-alone basis and also for the business as a whole (taking into account the existing term loan obligations and the proposed term loan obligations)

DSCR has to be worked for each year and average DSCR for the entire period of the loan.

Particulars	Year 1	Year 2	Year 3
Profit After Tax	8.93	51.83	94.69
Interest on Term Loan	42.67	40.02	53.51
Depreciation	32.33	56.20	56.20
Total (Numerator : A)	**83.93**	**148.06**	**204.40**
Principal repayment term loan	25.07	42.15	60.15
Ineterst on Term Loan	42.67	40.02	53.51
Total (Denominator: B)	**67.74**	**82.17**	**113.66**
DSCR (A/B)	**1.24**	**1.80**	**1.80**

Banks fix the benchmarks DSCR as per their internal policy. Most of them want to see a minimum of 1.25x but strongly prefer something closer to 2x or more.

Thank you