



**Training for Trainers
Integrated Flood Management for Sustainable
Development**

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Economic Aspects of IFM

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Objectives

- Role of economic analysis
- Methodologies/techniques of economic analysis
- limitations and issues of economic analysis
- Multi Criteria Analysis as a complementary approach to Cost Benefit Analysis



Economic analysis

Purposes:

- **Simplify the complex** to a level that we can comprehend
- **Gain an understanding** of what the choice involves
- **Enable comparison** of proposed options and judge the economic viability

Numbers are a succinct means of summarizing the complex.

However, it is the understanding that matters and not the numbers.



Appraisal methods

Project appraisal method is:

- Support stakeholders in the process of making choice
- Provide an analytical framework in and through which they can argue, debate and negotiate choice

1. Cost-benefit analysis (CBA)

2. Multi-criteria analysis (MCA)

Supported by public participation



Cost-Benefit Analysis

- i. Identifying items of benefit and cost (direct and indirect)
- ii. Selecting appropriate prices
- iii. Adjusting the future prices to present value

Economic analysis:

- use economic price
- measure the legitimacy of using national resources

Financial analysis:

- use market price
- check the balance of investment and the sustainability of project

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Benefits of project

1. Primary benefits

Direct benefits

- Reduction in physical damage
- Increase of land value and production

Indirect benefits

- Avoiding disruption to business, transport networks and public services
- Avoiding the costs of emergency response and recovery

2. Secondary benefits

- New investment
- Activation of economic development activities

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Costs of project

- Construction cost
- Operation and maintenance cost
- Relocation or restoration
- Preventive expenditure or mitigating costs

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Market failure

Markets may fail to make optimum allocation of resources because of :

- Absence of competitive markets
- Presence of externalities
- No reflection of environmental and societal values, etc.
- Value of a prevented fatality or prevented injury
- Value of time lost prevented
- Value of health benefits
- Value of design quality
- Value of environmental services lost (air quality, landscape, water, biodiversity, noise, recreational and amenity values for forests etc.)
- Value of disamenity

(Source: The Green Book, HM Treasury)

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Non-market valuation methods

1. Stated preference method

- **Contingent Valuation Method (CVM)**

Willingness to pay (WTP)

Willingness to accept compensation (WTA)

2. Revealed preference method

- **Travel cost method (TCM)**

parks, forests, lakes, reservoirs, historical sites etc.

- **Hedonic pricing**

noise, flood risk, air quality etc.

- **Replacement costs**

true costs of replacement

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Economic evaluation techniques: Net Present Value (NPV)

Present Value of Net benefits

(Net benefits: Benefits minus cost)

- should use constant price
- should be adjusted for the time value of money

Discounting technique

$$B = \frac{b_t}{(1 + r)^t}$$

t = Year

r = Discount rate

b_t = Value at t (net benefit)

B = Present value (NPV)

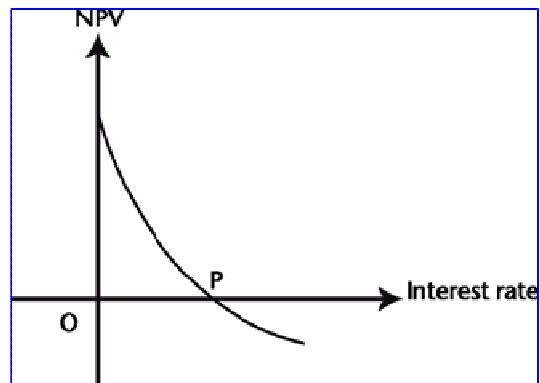
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Internal Rate of Return (IRR)

- P: Interest rate that the Net Present Value (NPV) is zero

Relationship between the NPV and the interest rate



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Cost-Benefit Analysis

Potentials

- Selecting optimal measures during planning and implementation processes

Limitations

- Market imperfections
- Quantification of intangibles
- Income distribution
- Discount rate and intergeneration equity

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Multi-Criteria Analysis (MCA)

- Judging the expected performance of each development option against a number of criteria or objectives
- Taking an overall view on the basis of a pre-assigned importance to each criterion

The essence of MCA lies in the preparation of a performance matrix and performance indicators

Potentials

- Ranking options, short-listing of a limited number of options for subsequent appraisal.

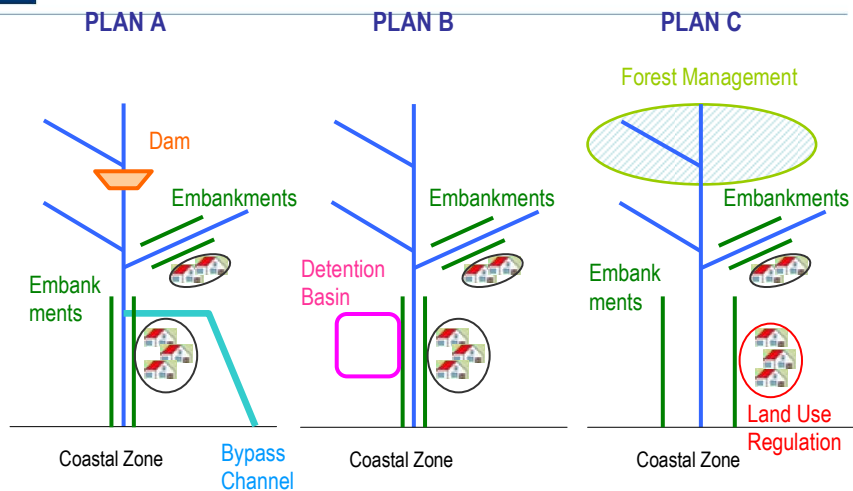
Limitations

- Making inter-temporal comparisons: no analytical technique like discounting to compare impacts (benefits and costs) occurring in different years.

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Example of MCA



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Example of MCA

	Option A (Plan A)	Option B (Plan B)	Option C (Plan C)	Option D (Plan D)
Criterion 1	1	3	5	4
Criterion 2	5	2	2	3
Criterion 3	2	1	4	3
Criterion 4	2	5	2	3
Total Score	10	11	13	13

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What is Important?

- **CBA and MCA should be adopted as supplements rather than substitutes**
- **Public participation in decision-making and CBA/MCA:**
 - Raising the level of their consciousness
 - Making them more socially responsive

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Thank you
