Economic Aspects of Integrated Flood Management

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PRESENTATION OBJECTIVE

- The session has the objectives to promote understanding in
  - the role of economic analysis in IFM
  - methodologies/techniques of economic analysis
  - limitations and issues of economic analysis
  - Multi Criteria Aanalysis as a complementary approach to Cost Benefit Analysis
- Key words
  - benefits, sustainability, impact, resilience, livelihood, disaster cycle

IS FLOOD A PROBLEM OR A BLESSING

- From the perspective of the
  - Community – livelihood in form of farming, fishing, transportation
  - Government – socioeconomic (GDP)
  - Ecosystem – catchment flow balance, wetlands and groundwater recharge

FLOODPLAIN MANAGEMENT SYSTEM

- The system should aim at fostering the wise, rational and sustainable use of flood prone land by:-
  - reducing the social and financial cost resulting from the risks of occupying the floodplain;
  - increasing the sustainable social, economic and ecological benefits of using the floodplain;
  - improving or maintaining the diversity and well-being of riverine and floodplain ecosystems.

Negative Impact on infrastructure

Positive socioeconomic impacts

AUGUST 2009

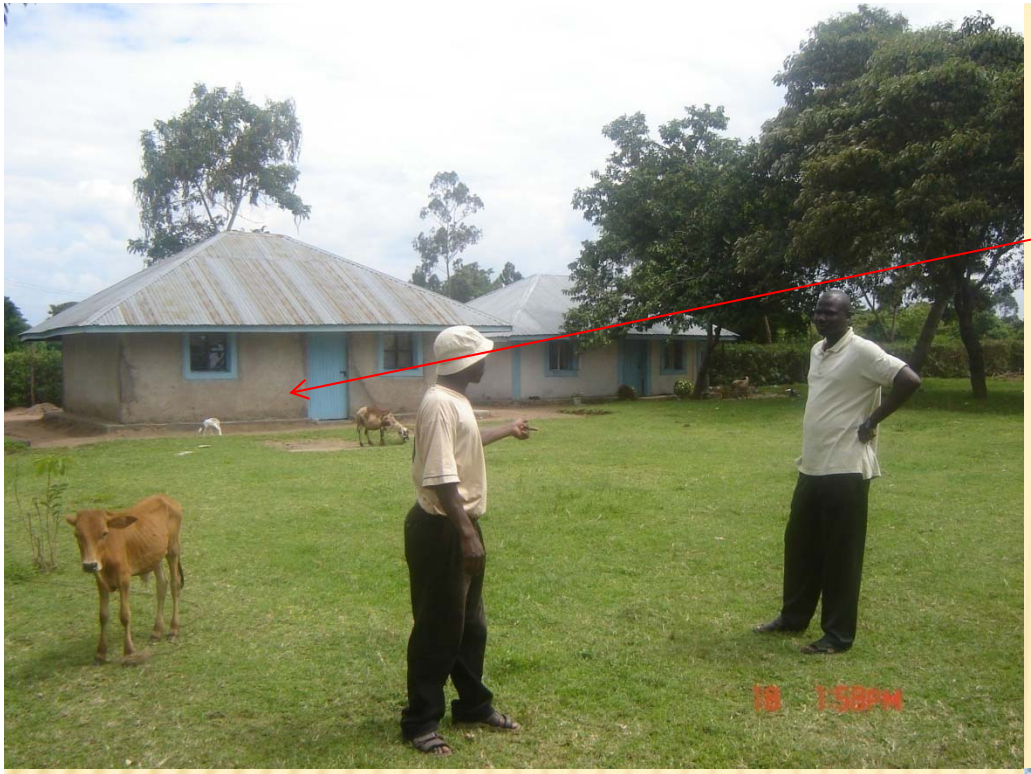
COMMUNITY INVOLVEMENT IN REHABILITATION

A SOCIO-ECONOMIC ASPECT

IRRIGATION CANAL

COMMUNITY WORKING IN A STREAM

CFMO - KASIRU



Indicative flood levels in the compound

Negative Impact on infrastructure

ECONOMICS

"Application of reason to choice"

- **to understand issue**
- **to determine the best means of managing floods and the risk of flooding**

How and why people make decisions about the use of valuable resources to obtain maximum benefits.

Various constraints

physical, financial, social, political, legal and environmental

WHAT IS THE APPROACH

- Making choices –
  - informed decision-making process
  - Through economic analysis
  - Understanding financial and economic analysis
- Use appropriate analytical tools
  - Cost benefit analysis
- Use economic evaluation techniques
  - Net present value (NPV), benefit-cost ratio (BC)

ECONOMICS ANALYSIS

(Purpose)

- To simplify the complex to a level that we can comprehend
- To gain an understanding of what the choice involves

To enable comparison of proposed options and judge the economic viability

It is the understanding that matters and not the numbers

The numbers are a succinct means of summarizing the complex

APPRAISAL METHOD

- Cost-benefit analysis
- Multi-criteria analysis

Public participation

- Public should determine the weights of the qualitative and subjective elements (social value) in appraisal
- Participation raise the level of public consciousness
- Participation enhance the interaction between stakeholders

COST-BENEFIT ANALYSIS

- Identifying items of benefit and cost
- Selecting appropriate prices
- 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

BENEFITS OF PROJECT

- Primary benefits
- Secondary benefits

Primary benefits

Direct benefits

- Reduction in physical damage
- Increase of land value

Indirect benefits

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

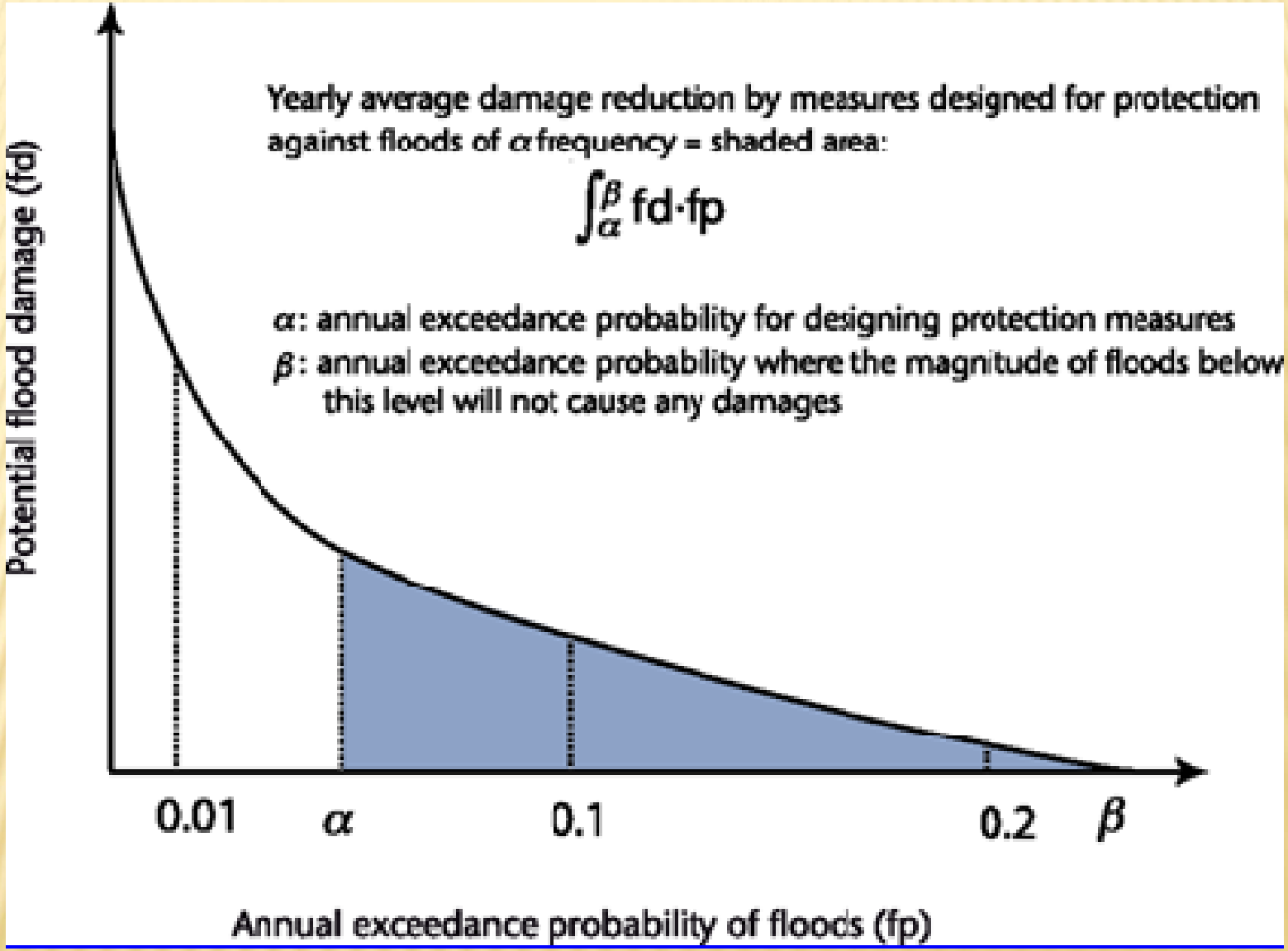


Figure 2. Damage frequency curve

SECONDARY BENEFITS

- New investment
- activation of economic development activities

Costs of project

- Construction cost
- Relocation or restoration
- Preventive expenditure or mitigating costs

NON-MARKET VALUATION

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.); and
- Value of dis-amenity.

(The Green Book, HM Treasury)

NON-MARKET VALUATION METHOD

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

LIMITATIONS OF COST-BENEFIT ANALYSIS

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

Economic evaluation techniques

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

B = Present value

Net Present Value (NPV)

- Present value of net benefits

Internal rate of return (IRR)

- P: Interest rate that the NPV is zero

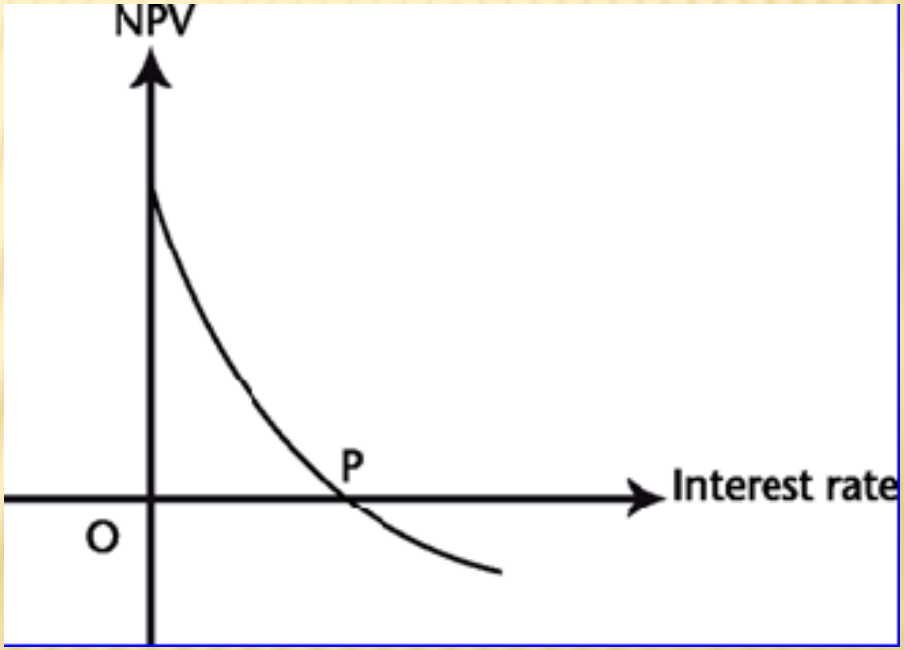


Figure 3. The relationship between the NPV and the interest rate

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

How to determine weights?

Inter-temporal comparisons

MCA and CBA

Project appraisal method is

- to support stakeholders in the process of making choice
- to provide a rigorous analytical framework in and through which they can argue, debate and negotiate choice

with

Capacity building of stakeholders

Appropriate institutional mechanism

Sources of financing

Flood management projects are difficult to collect charges from beneficiaries because

- Difficult to determine the extent of benefit
- Poverty of the beneficiaries
- Only focus on structural measures that require large financial resources

Risk-based approach to flood management

- Opportunity for financial contribution from individuals and communities
  - Flood proofing, preparedness, emergency response and recovery
  - Source control at individual level
- Involvement of communities enhance the mode of support
  - Patrol of dykes and flood fighting

Flood insurance

Challenge

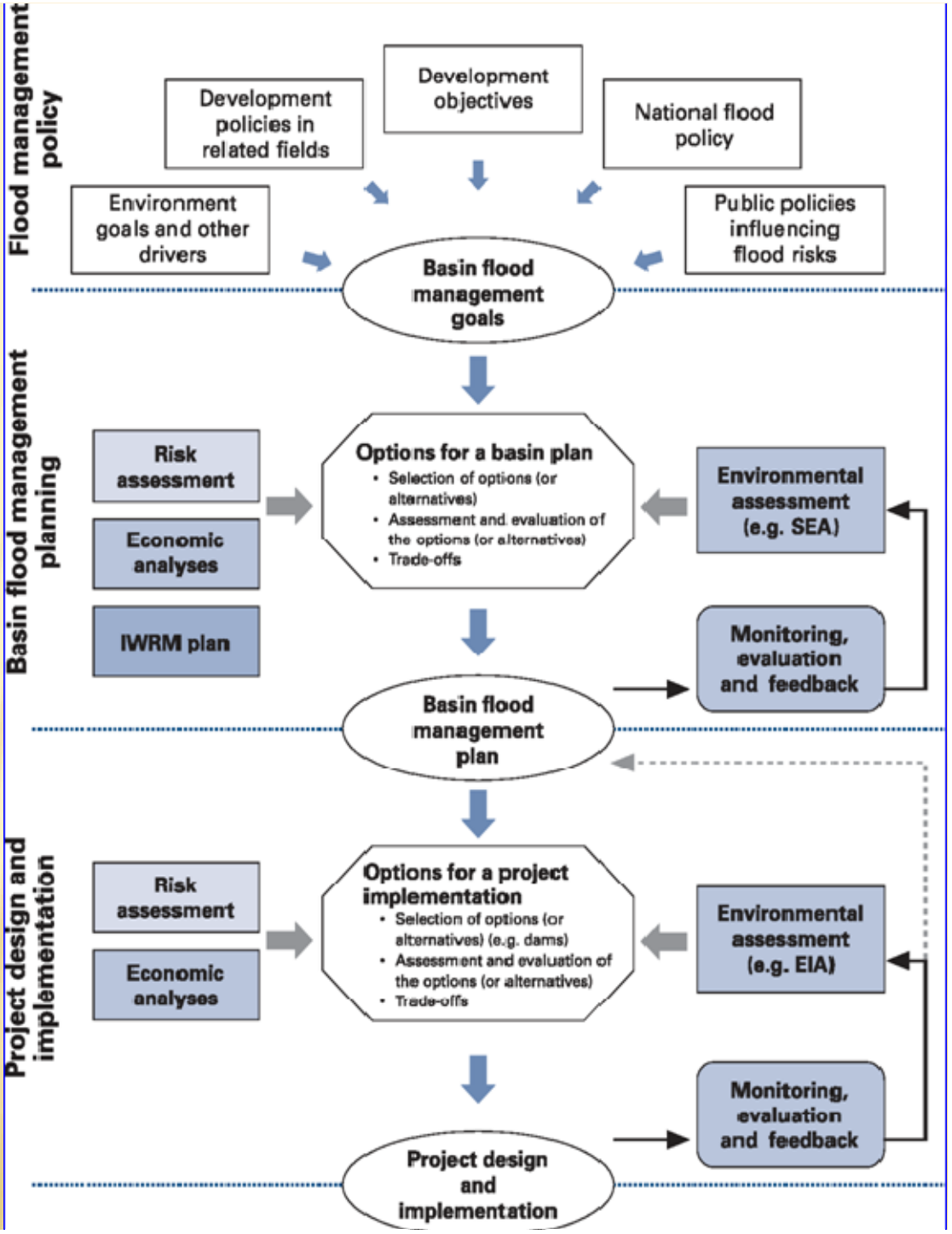
- Cost of operation
- Capacity of the flood affected people

→ Government subsidy

→ Reinsurance

→ Help of local communities and local administration

Figure 1. Environmentally sensitive flood management decision-making



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