Participatory Integrated Water Resources Planning

DEVELOPMENT OF ACTION PLANS, SCENARIOS AND THEIR EVALUATION

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Learning objectives

This courses will assist participants in:

- Understand methods to define action plans and scenarios, understand the importance of scenarios and uncertainty
- Familiarize with the participatory definition of action plans, the information need and considerations on implementation and cost analysis
- Familiarize with the participatory evaluation of action plans, with and without indicators
- Understand the underlying information need for interpretation of preferred action plans

Contents

- Part 1 – Recap completed situation analysis (role play)
- Part 2 – Exercise on proposal of alternatives + links to institutions and implementation – towards analysis matrix
- Part 3 – Exercise on sustainability of options ifo different scenarios – towards evaluation matrix
- Part 4 – Theoretical considerations and final discussion

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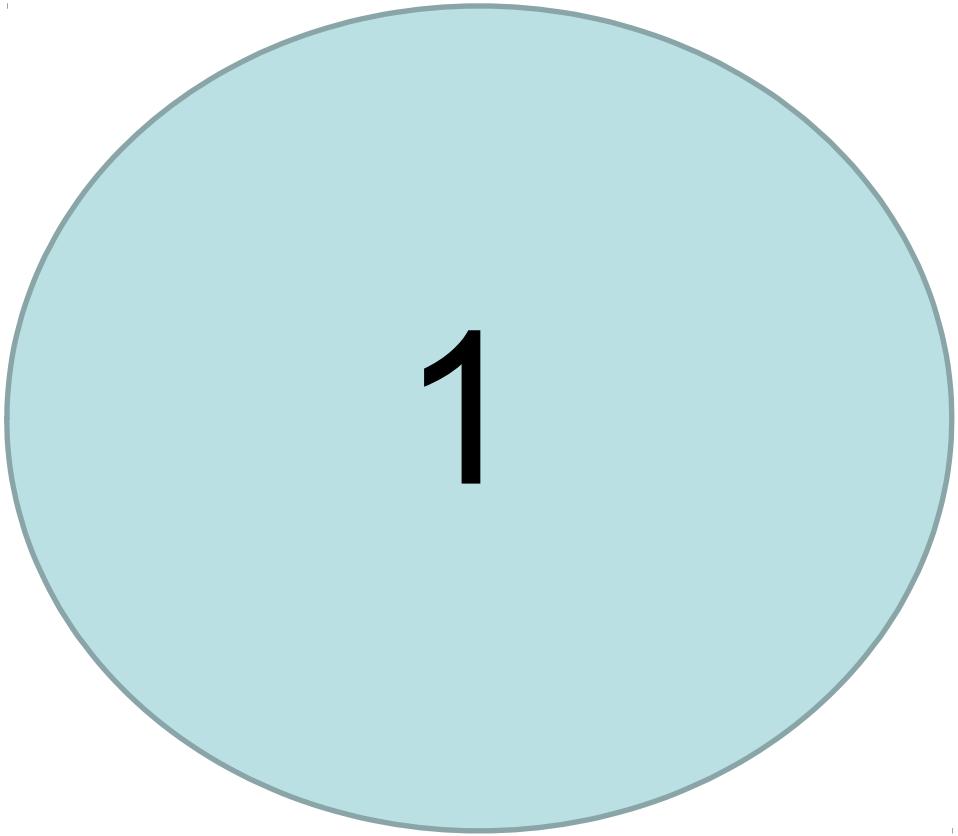


Role play

Name	Role	Name	Role
Fatma	CDR Gergal (dev greenhouses upstr)	Natalja	Ministry environment (Almeria – 6y)
Emanuela	Trad farmer (60y)	Mohanned	UAL hydrogeologist
Tatiana	Repr. Tourism (hotels + golf)		CDR 4 Vegas (president)
	Trad farmer (75y)	Tom	Mayor upstream village
Giorgio	UAL water research		Regional Industry (50y)
Prabin	RBA (10y)	Mona	CDR 4 Vegas
Ha	City council Almeria (50y)	Hadja	UAL law expert
Nic	Water Agency Sevilla	Maria (GE)	Cajamar (economy)
	CDR Sindicato 7 pueblos	Shukuru	Ecologist (outside – 15y)
Hesti	GEM (ecologista – Almeria born)	Lidia	Diputacion Almeria (Dep public works)
Han	Aqualia (chairman 5y)	Tam	UAL geography
	Mayor Viator (mancomunidad)		Ministry Environment (25y)

Situation analysis – general concepts

- Triggers
- Level
- Methods/Tools
- Sources and types of knowledge
- Link to stakeholders and institutions

Stakeholder analysis

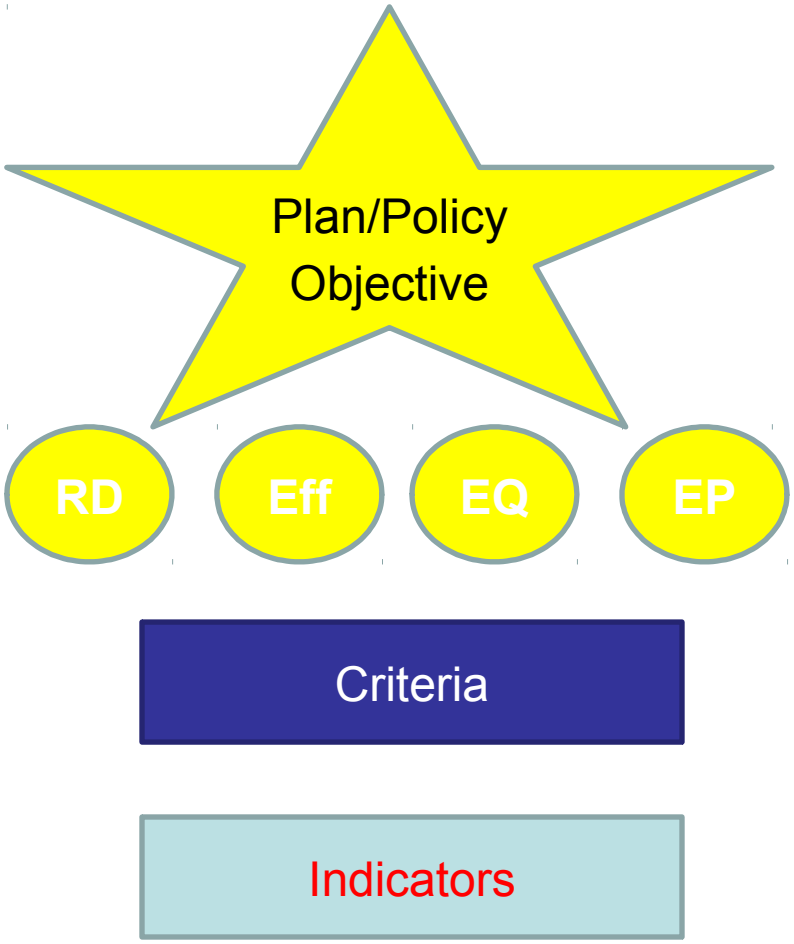
- Stakeholder analysis
  - Affects/Affected
  - Importance and power
  - Preferred stakeholder set
    - Land/resources ownership
    - Current resources use
    - Planners of development in the area
  - Snowball sampling, recall list and consensus on final composition

Stakeholder involvement

- Arguments and objectives
- Communication and transparency
- Learning environment
- Tools and methods
  - Workshops
  - Citizen juries
  - Bilateral meetings
  - Multi-stakeholder platform
  - Formal/Informal

Framing the problems and options

- Importance of priorization
- Importance of boundaries (spatial, temporal and of competences)
- Objectives and criteria as guiding structure for creation of analysis and evaluation matrix



Completing the situation analysis

- Based on outcomes workshop 1

- Small discussion

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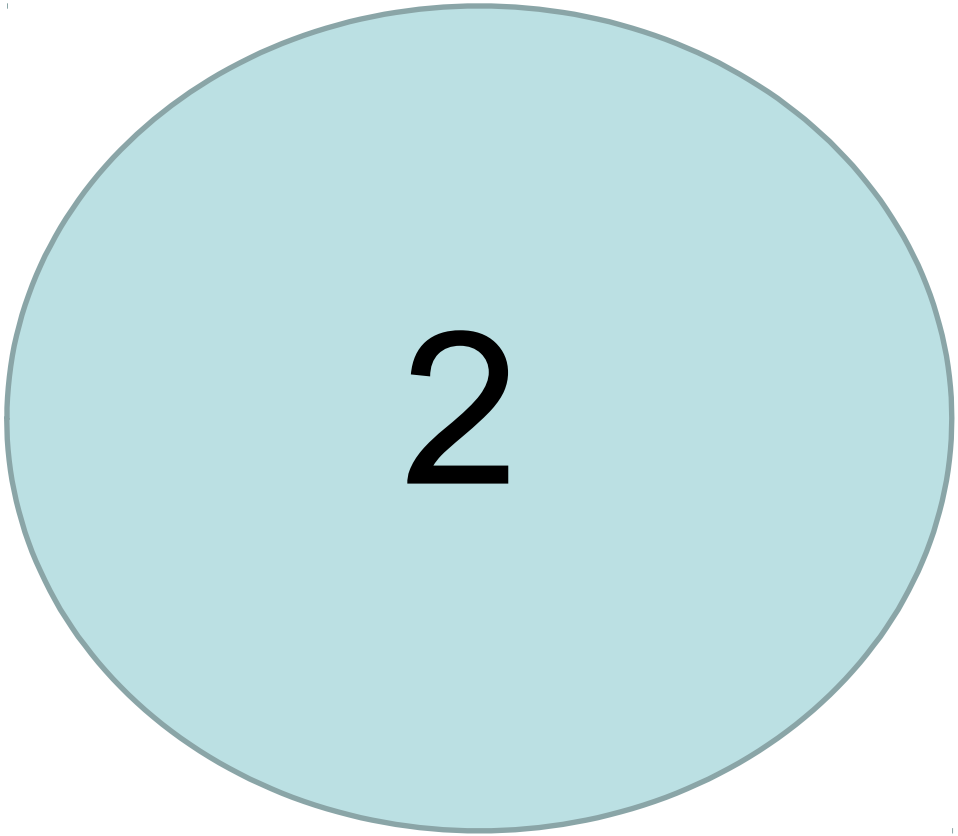
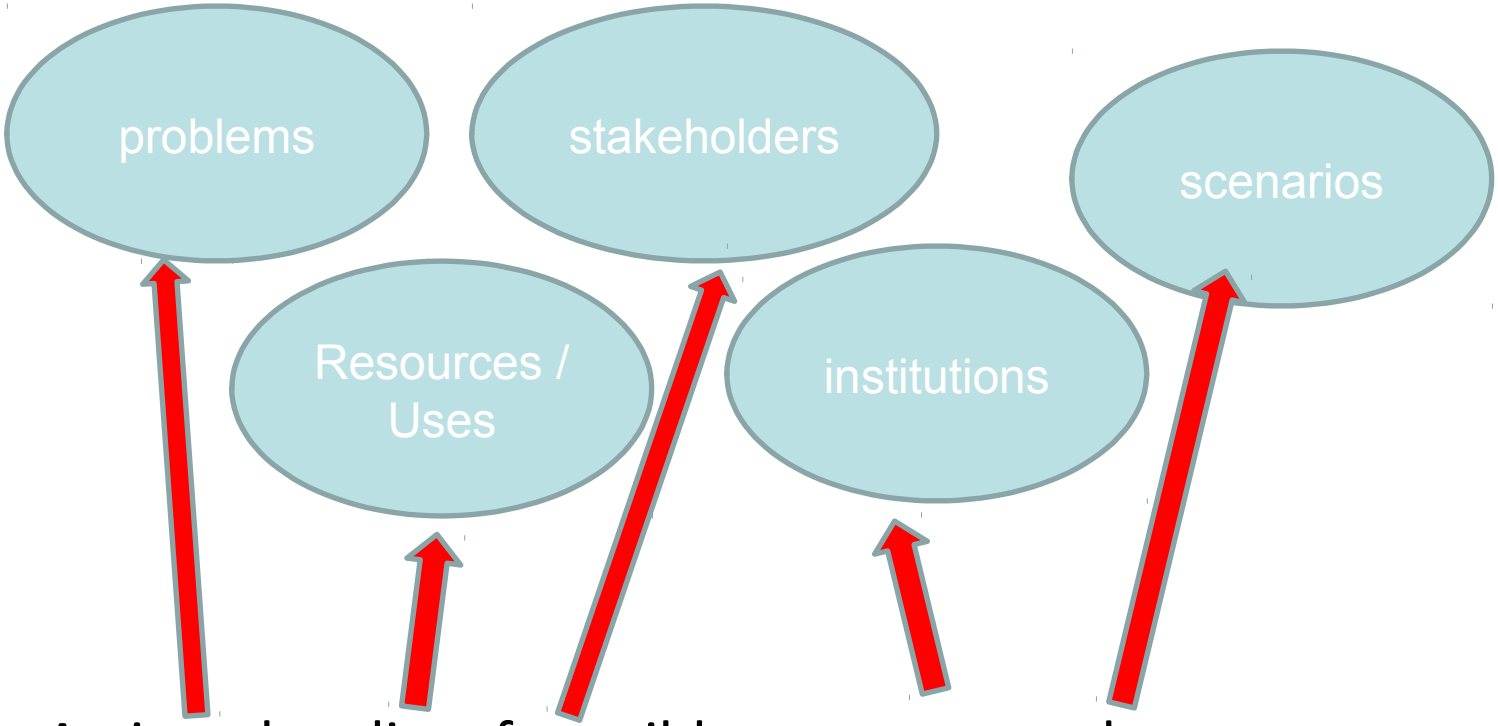


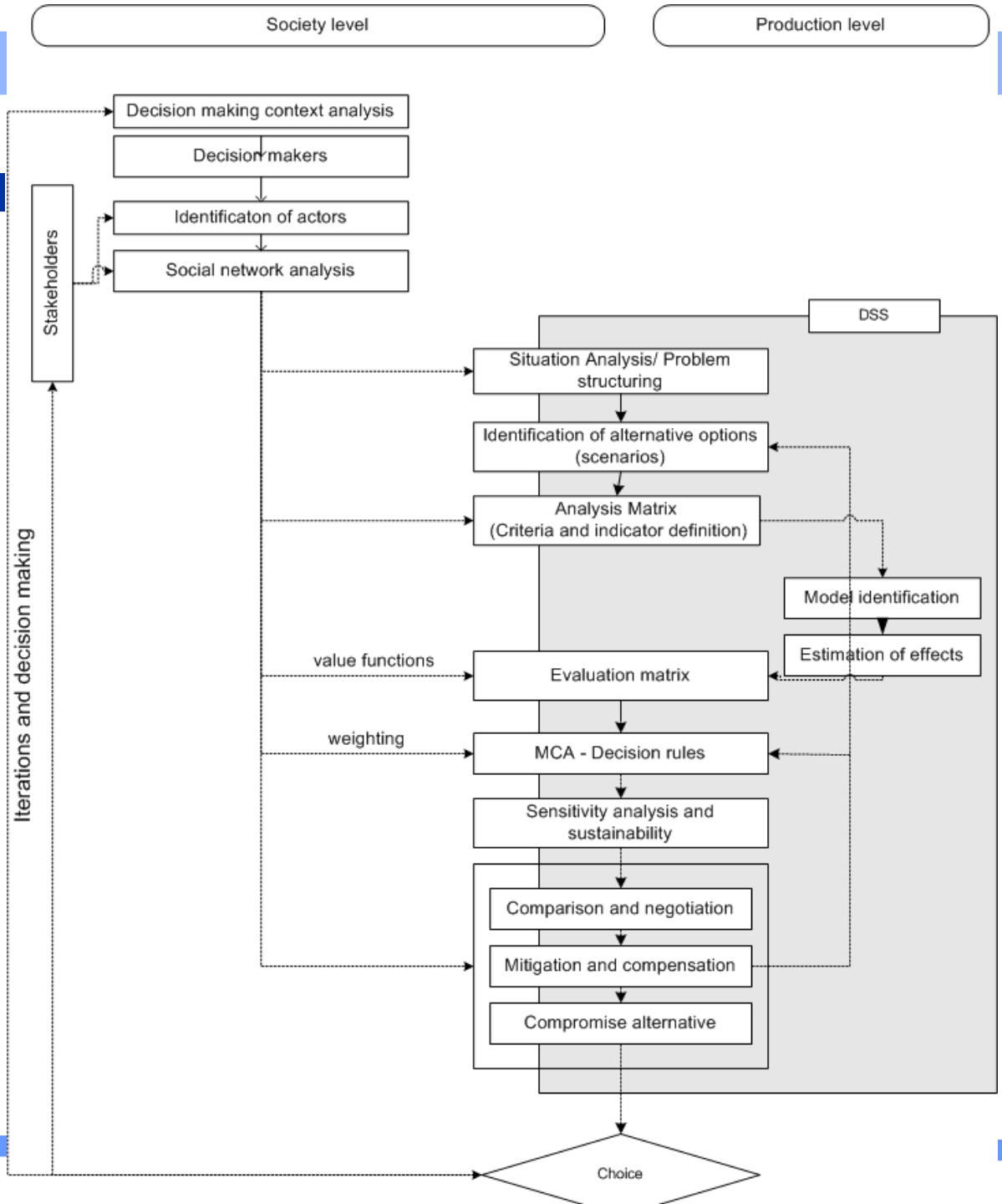
Action proposals vs problems and criteria

- Situation analysis



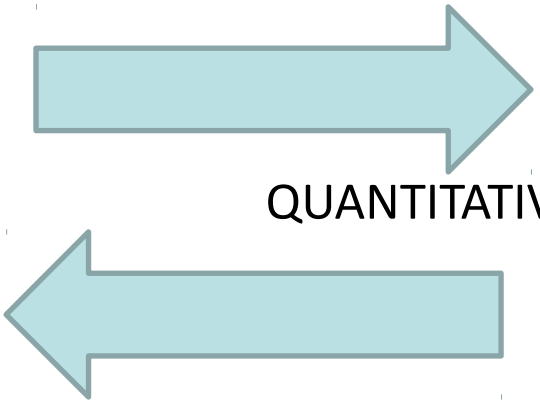
- Action plan: list of possible measures and management strategies as alternative options (aim = reach objectives)

Eval


Society level
Production level
Decision making context analysis
Decision makers
Identificaton of actors
Social network analysis
Stakeholders
DSS
Situation Analysis/ Problem structuring
Identification of alternative options (scenarios)
Analysis Matrix (Criteria and indicator definition)
Model identification
Estimation of effects
value functions
Evaluation matrix
weighting
MCA - Decision rules
Sensitivity analysis and sustainability
Comparison and negotiation
Mitigation and compensation
Compromise alternative
Iterations and decision making
Choice

Evaluation of action plans in WRP

- QUALITATIVE QUANTITATIVE

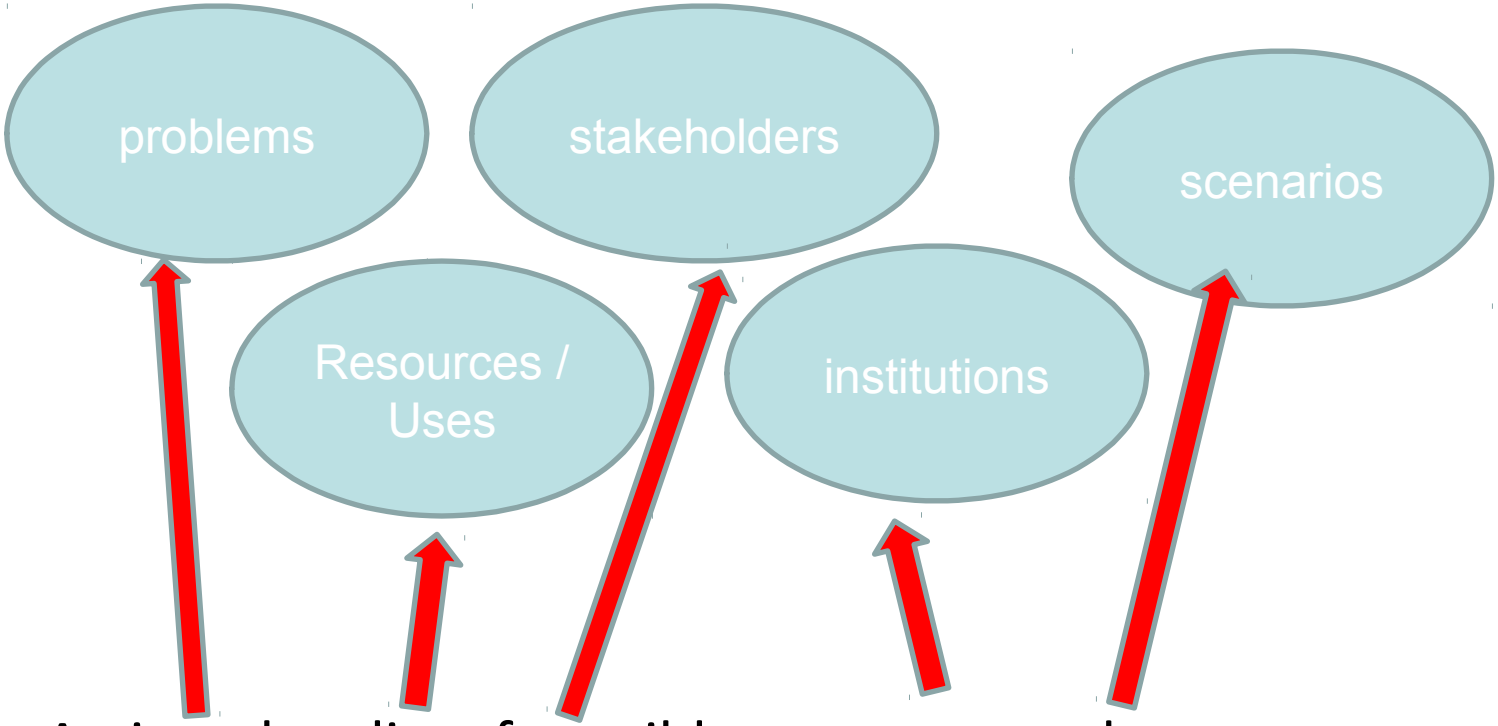


Exercise 1: Definition of a structured action plan

- (Re-) constructed problem tree as starting point
- Division in groups (4 – 5) / check materials
- Discuss and select action proposal / alternative management options for the Andarax basin from the list or add new ones that address problems
- Discuss objectives, problems addressed and relation to stakeholders in the catchment (responsibilities and co-opting)
- Discuss and motivate cost-effectiveness on short and long term
- Presentation in group and discussion (4 actions per group)

Action proposals vs problems and criteria

- Situation analysis



- Action plan: list of possible measures and management strategies as alternative options (aim = reach objectives)

Actions as basis for water management strategies

- A management strategy is composed of a series of actions
- Combination of actions on
  - Infrastructure development
  - Demand management
  - Institutional arrangements
  - Eco-hydrological measures
  - Pricing and cost recovery
  - Awareness
- Need to be detailed in terms of
  - Location and time
  - Actors involved (institutions and other stakeholders)
  - Budget, financing and cost-effectiveness

Considerations on cost-effectiveness

- Cost Benefit Analysis (CBA) is closely related to Cost Effectiveness Analysis (CEA).
- Is one of the methods of appraising policies and projects which impact on the environment
- Other methods that assess related impacts include:
  - Environmental impact assessment
  - Scenario analysis
  - Risk-effectiveness analysis
- CBA is a useful tool to the decision making process BUT is not sufficient as a “stand alone” criterion.
- CBA can be a useful economics tool aid for rational budget allocation decisions in water resources projects

Steps to define of cost-effectiveness

- There are several stages:

1. Defining the project
2. Identifying project impacts
3. Identifying project impacts which are economically relevant
4. Physically identifying impacts
5. Calculating a monetary valuation of relevant effects
6. Discounting of cost and benefit flows

....

7. Applying the net present value (NPV) test
8. Carrying out a sensitivity analysis

Considerations on responsibilities and implementation

- Actions are not stand-alone, they need to be implemented
- Upfront analysis of responsibles allows to overcome series of challenges
  - Link to the institutional analysis and stakeholder analysis (importance of understanding decision making context)
  - Assure coordination between different institutions working on the field
  - Think of buy-in from stakeholders

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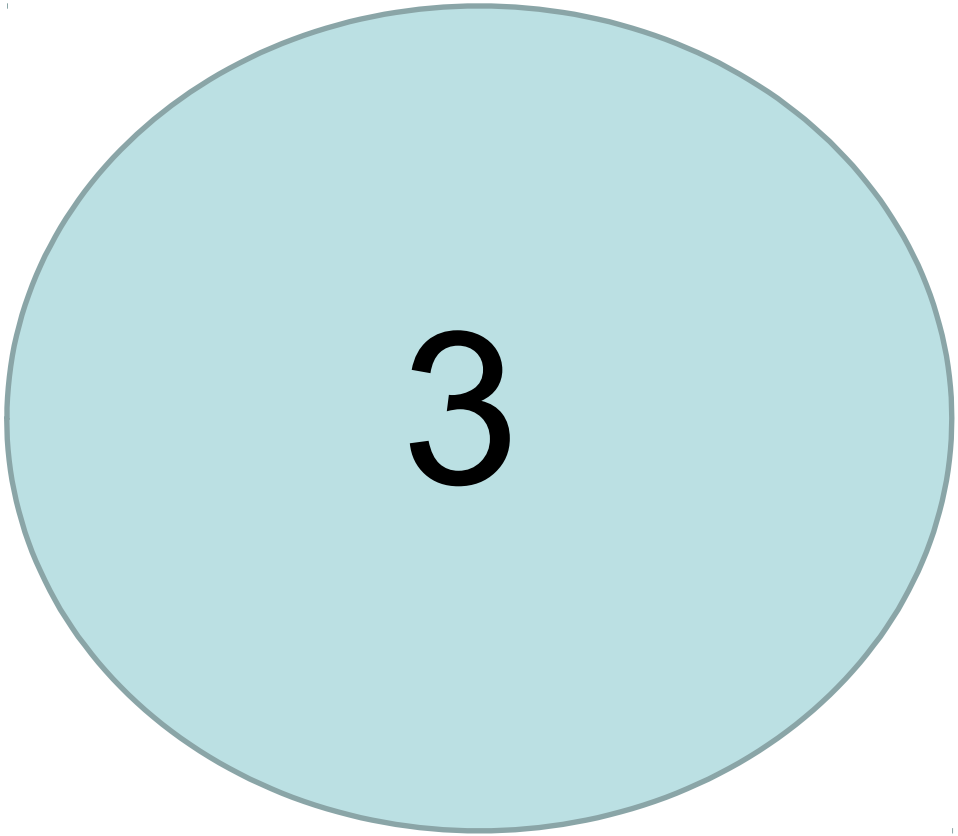


Exercise 2: Sustainability of options (evaluation matrix)

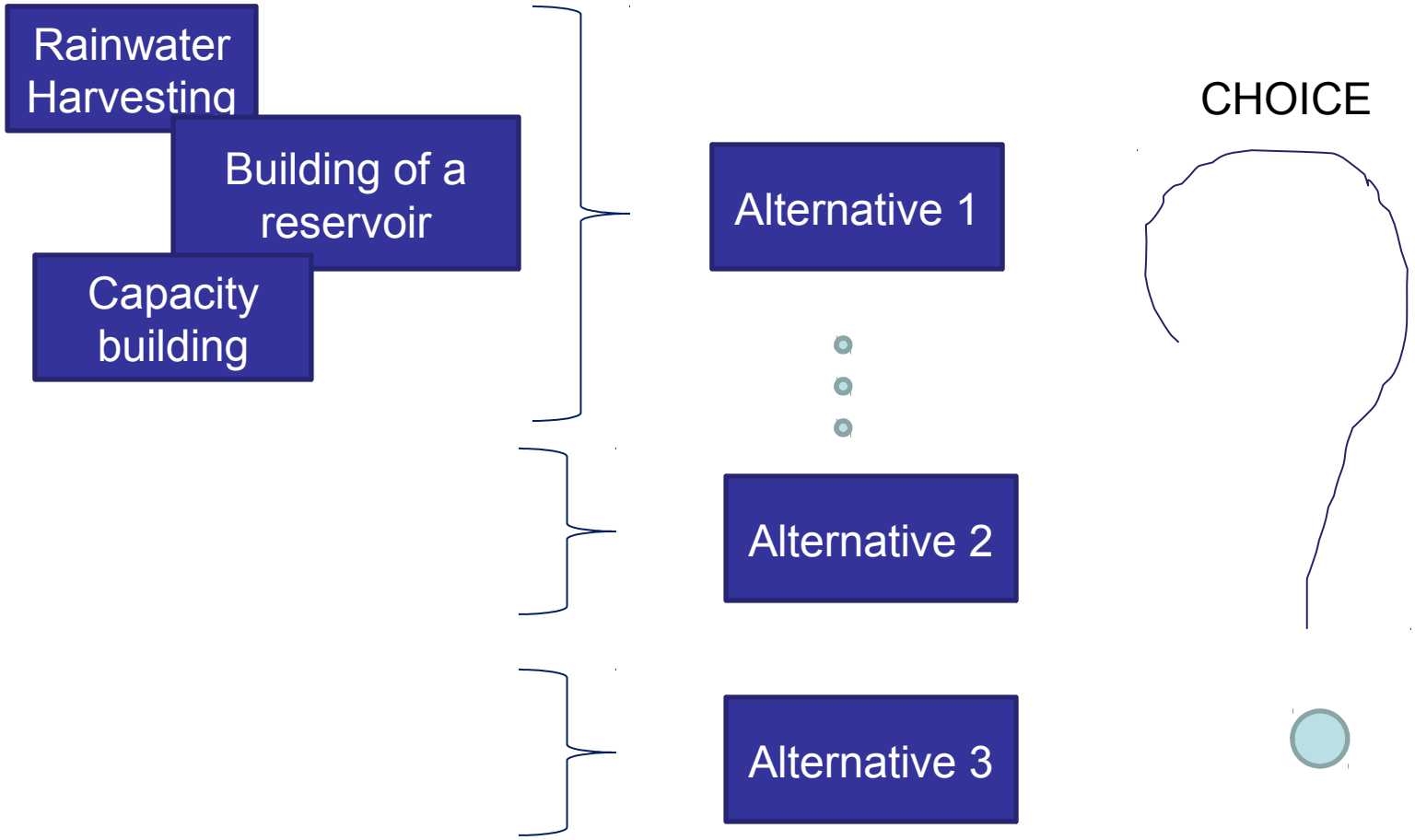
- ANALYSIS MATRIX  ATION MATRIX

- Each group gets a set of action plans that are prepared in exercise 1

- You are asked to score the action for its “sustainability” (considering environmental, economic and social impact)
- The score is from 1 to 10 (1 being the least sustainable)

- Motivate your score, assumptions made + information lacks identified

Comparing sustainability of management strategies and choice.....can we create consensus on score?



What would happen under different scenarios??

- Climate change
- Energy prices
- Market changes (e.g. Production in Morocco)
- Would your action be more/less sustainable??
- QUALITATIVE  TIVE

Methods for alternative and scenario development

- Surveys
- Interviews
- Envisioning workshops

Scenarios – alternatives: general concepts

- Considering factors
  - **External to system (driving forces)**:
    - climate change
    - market change (macro-economic)
  - **Internal to system (responses / medidas)**:
    - Offer oriented
    - Demand oriented
    - Water pricing
    - ...
  - **Variables**:
    - Physical
    - Socio-economic
    - Operational

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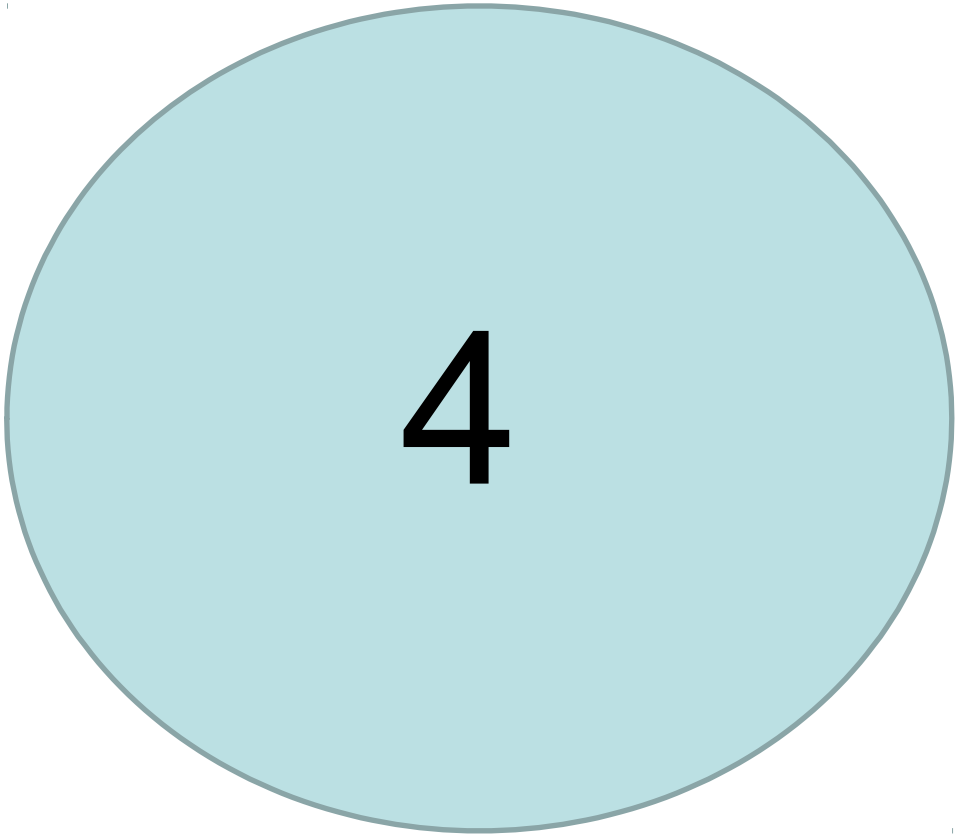

Information need

NOMBRE	UNIDAD	ORIGEN DATOS	EA	ME	EX	DM	ID
Nivel de pozos	m			↑	↑	↑	↓
Intrusión marina	m			↓	↓	↓	↑
Recarga natural	m³/año				↑		↓
Recarga lateral	m³/año				↑		↓
Recursos disponibles	m³/año				↑		
Eficiencia de distribución	%			85%			
Eficiencia de riego	%			85%			
Trasvases (min/max)	m³/año				Desalación + 7 Hm³/año, Bombeo Dalias - ? Hm³/y	Desalación + 7 Hm³/año, Bombeo Dalias - 7 Hm³/y	↑
Capacidad de bombeo bajo concesión	m³/año						↑
Bombeo privado	kWh/m³ o €/m³					↓	
Recarga artificial	m³/año				↑		
Cantidad de agua tratada	%			100%		100%	
Eficiencia de tratamiento	%			80%	80%	80%	
Reutilización	Hm³/año			15 Hm³/año	12 Hm³/año	15 Hm³/año	
Costes de bombeo	kWh/m³ o €/m³						
Costes de trasvase	kWh/m³ o €/m³			↓			
Costes de recarga	€/m³						
Penalidad descenso niveles	€/m³					↑	↓
Penalidad racionalidad	€/m³						
Precio del agua	€/m³				↑↑	↑↑	↑
Demanda urbana	m³/año					↓	↑
Demanda agrícola	m³/año						↑
Productividad del agua	€/m³					↑	
Productividad del agua (empleo)	EAE/m³						↑
Uso del suelo	ha						cambio
Densidad de población	hab/km²						
Migración	-						↑
Renta per capita	€/año.persona						
Grado de empleo	%			↑	↑	↑	↑↑
Ingresos por sector	€/año						↑
Población agrícola	número						
Turistas por habitantes	número						↑

LEYENDA:

- variables hidrológicas
- variables operación sistema
- variables calidad agua residual
- variables costes / precio
- variables demanda / uso
- variables socioeconómicas

- modelos hidrogeológicos
- Insituto Andaluz de Estadistica
- Inventario de Regadios (Ministerio Agricultura 2002)
- Inventario local (encuestas, entrevistas proyecto ALERT + Estudio Mercado empleo Local Diputación de Almeria 2002)

EAE: equivalente de años de empleo generado

Uso del suelo: tipo de uso y hectareas (natural, urbano, regadio, tipo de cultivo) utilizado para calcular demanda de agua y infiltración (recarga potencial)

Types of information:

- Hydrological
- Other environmental
- Economic
- Social

Sources:

- Reports
- Statistics
- Interviews
- Multi stakeholder platform

Evaluation of action plans for planning

- QUALITATIVE  VE

Selection of the models / quantification tools

- Available tools and databases
- Importance of well defined boundary conditions

- Depending on the type of data available you can use more or less advanced models to quantify the impact of alternative strategies

- Introduction of lay knowledge as complementary to modeling and technical analysis
  - Balance!
  - Need to facilitate introduction of lay knowledge

Scenarios and robustness of alternatives

- Climate scenarios
- Socio-economic scenarios
  - Pricing scenarios
  - Energy scenarios
  - Demographic scenarios

- Projections need to be made to be able to select robust management alternatives

Checking the learning objectives

?? Did the lecture help you to:

- Understand the need to define objectives and criteria for the planning exercise linking to existing policies and issues raised in the situation analysis?
- Familiarize with the participatory definition of action plans, the information need and considerations on implementation and cost analysis?
- Familiarize with the participatory evaluation of action plans, with and without indicators?
- Understand the underlying information need for interpretation of preferred action plans?

Next class – decision support systems participatory MCA






Thank you!