

A photograph of the UNESCO-IHE building, a modern structure with a white tiled facade and large windows. A tall flagpole with a blue flag is visible in the foreground. The image is overlaid with a semi-transparent white banner containing the title and author information.

# Participatory Integrated Water Resources Planning

FROM SITUATION ANALYSIS TO OBJECTIVES, CRITERIA AND INDICATORS  
UNESCO-IHE, April 2013  
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# Learning objectives

This courses will assist participants in:

- Understand the importance of a good definition of **OBJECTIVES** and **CRITERIA/indicators**, the different types and their selection
- Identify **objectives** and **criteria** for the planning exercise linking to existing policies and issues raised in the situation analysis
- Familiarize with the participatory definition of **CRITERIA/indicators** (check with exercises LIBRA)
- Understand the process of **priorization** in problems and (later on) action plans through repetitive rounds of analysis

# Contents

- Part 1 – Group discussion on criteria/objectives and indicators (**what do you remember from LIBRA exercise?**)
- Part 2 – Linking objectives/criteria with policies and boundary conditions (example of EU WFD)
- Part 3 – A case study on participatory indicator selection + reflections
- Part 4 – Situation analysis – second round: re-creation of problem tree + prioritization of problems based on the ANDARAX case study

PART

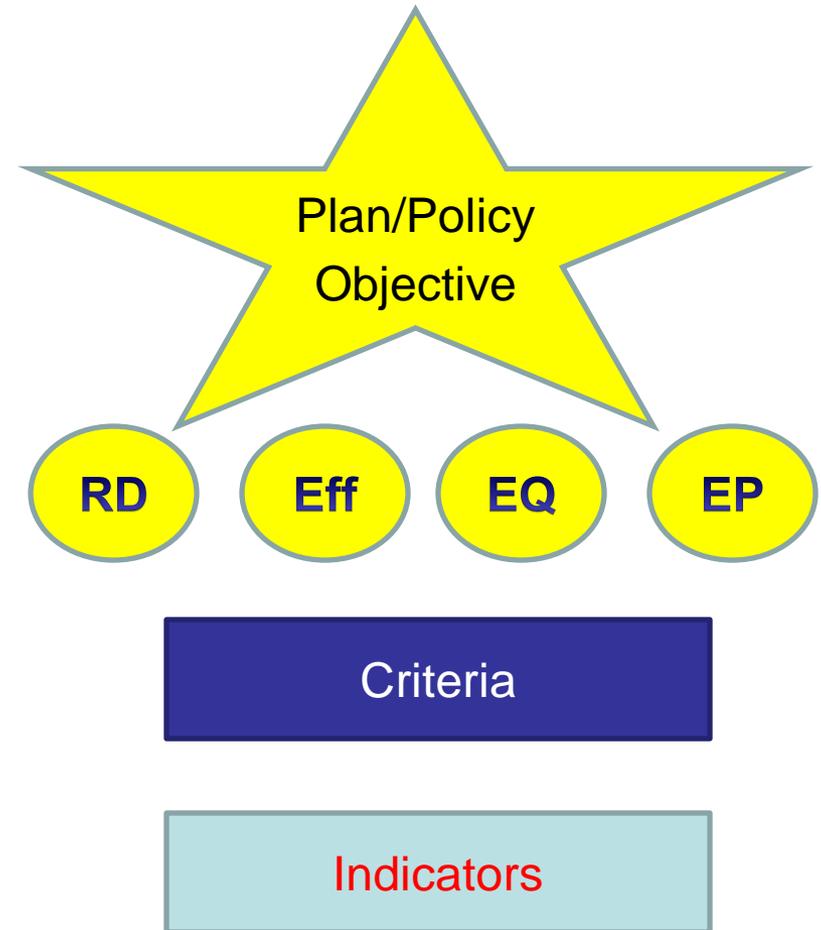
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## Brainstorming

- Objectives
- Criteria/Indicators
- Boundary conditions
- Different scopes of planning

## Framing the problems and options

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



## Planning goal, objectives and criteria

- GOAL = A policy level statement on the purpose of the management activities
- Objective: a very clear, measurable, focussed statement on what is needed to accomplish the goal
- Need objectives/criteria to evaluate the actions plans, guidance for situation analysis, identification of interventions
- Criteria: yardsticks by which performance of plan with respect to objectives can be evaluated

## Definition of objectives and criteria + linking indicators

- Methodology ~ policy analysis, top down once policy is formulated
- SMART objectives
  - Specific
  - Measurable
  - Agreed
  - Realistic
  - Timely

## Indicators as unit of measurement

- measure or objectivize changes that are related to different types of management (impacts) → evaluate sustainability (economic, social, env)
- based on quantitative and qualitative parameters
- support political actions and evaluate advances and objectives.
- give objective information on a situation (state + evolution over time) + facilitate comparison
- Objectives such as resource development, economic efficiency, equity and environmental protection are translated into a set of indicators covering these aspects

## Indicators as unit of measurement

- Characteristics: specific, measurable, usable, sensitive, available, cost-effective
- Participatory indicator selection
  - Draft set based on identified criteria
  - Linking to existing indicators
  - Extended list and selection of subset preferred by the stakeholders and adapted to the catchment problems
  - Importance of clear definition of calculation/simulation methods

# PART – POLICY AND PLANNING OBJECTIVES

2

## Policy changes and planning objectives – a case study

- Analysis of 80 years of water policy and planning objectives in Spain – water as politics
- How are planning objectives defined?
- Can this be done in a participatory way? Representative or deliberative democracy?
- How are institutions evolving? What does that mean for planning?
- → What is the influence of changing policies and changing planning objectives for the planning process and outcomes

# National Hydrological Plan

## PHN 2001 – enormous protest



- Zaragoza 2002
- CONTRA



- Valencia 2003
- PRO



- Blue March
- Brussels 2001
- CONTRA

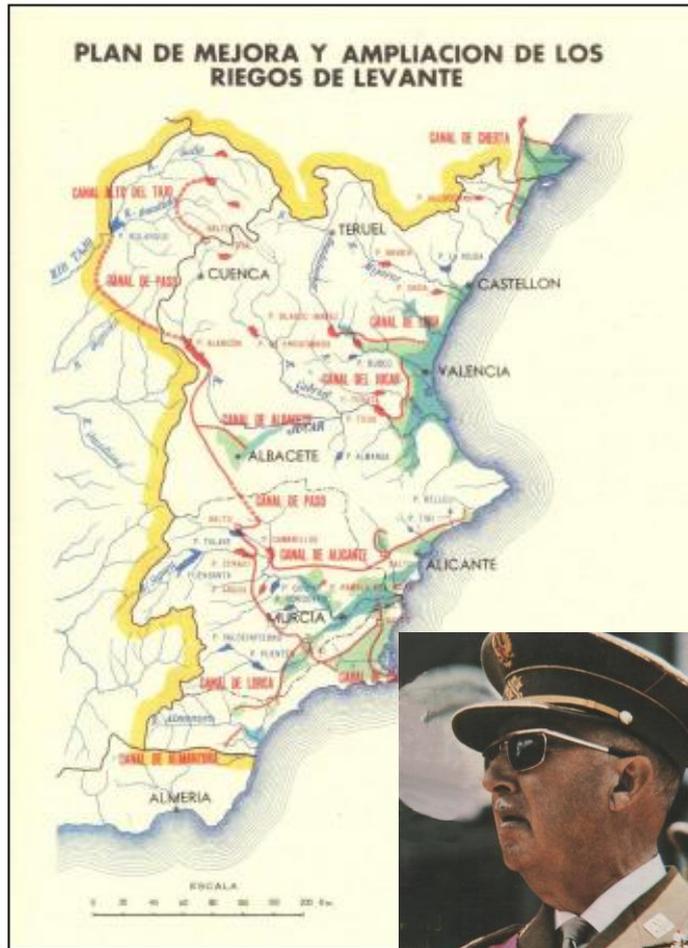


# NHP 2001 in a nutshell



- 484 Hm<sup>3</sup> transfer from Ebro (north) to the « Levante » (south)
- 845 km
- 100 new dams
  
- Basis = national hydrosolidarity
- Protest ~ end of a hydraulic paradigm that lasted for almost a century

# History



- Start = Irrigation Plan 1930
- Implemented by Dictator Franco (1939 - 1975) with the « Regeneracionista » movement
- State led modernisation project - Massive state funded water infrastructure renamed as public works



## Hydraulic paradigm

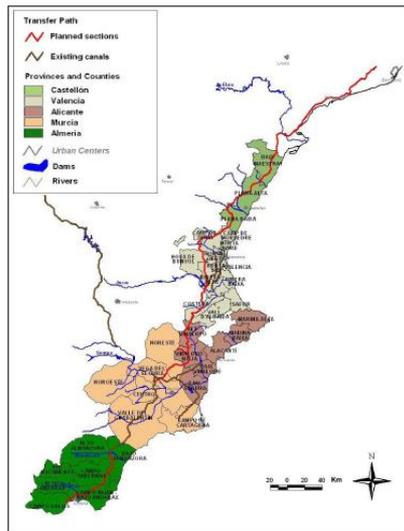
- modernist discourse, technocratic approaches through infrastructure supply water to privileged uses (agriculture, hydropower)
- Positivist-scientific rationale, technology could re-design nature
- Dams, dams and more dams (« Paco Rana » or « Frankie the Frog » [Franco opens “Yesa” dam](#))
  - by 90s
    - 40% of renewable resources regulated
    - country with largest proportion of land under dams + highest number of dams per capita (29 per million)
    - Succeeded in mastering nature
- General Direction of Hydraulic Works populated with mainly civil engineers « Club of concrete » Steel and concrete Brotherhood
- Continued during early democracy in the 70s until the 90s (leading to NHP 1993)







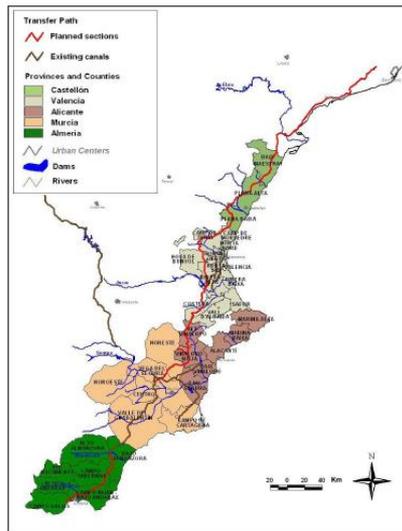
# National Hydrological Plan 2001



- Public protest started by association of Professors of different Universities
- Moved from Catalunya (north, active participative society) over Brussels to other parts of the country
- Publications of economic analysis revealing highly questionable cost-efficiency



# National Hydrological Plan 2001



Source: Abilac et al., 2006, 2007.

- Hydrosolidarity on the rebound
  - « Agua para todos si, pero NO Agua para todo»
  - ~uncontrolled urban development in the Mediterranean provinces
  - Highly intensive irrigation based agriculture in a natural semi-arid
- Public evidence of closed, nepotistic relationships between the GDHW and the big construction companies, intersecting the interests of politicians in the electoral value of water projects.
- EU WFD and Brussels as external help



## A changing water paradigm

- Protest against the national grid as sign of a changing hydraulic paradigm
- At the basis, 3 streams:
  - Stream 1 ~ **Waterscapes** : water as a key element in the landscape, fundamental in the maintenance of healthy ecosystems
  - Stream 2 ~ **Water as an economic good** : old paradigm of state intervention vs neoliberal discourse of state failure
  - Stream 3 ~ **Deepening of democracy** : nationalists and regionalist claims recognized through water, territory, identity

# Decentralization - Democratization

## •River Basin Organisations



## •Autonomous regions



- Regionalisation = Fragmentation of
- Dirección General De Obras Hidraulicas*
- (General Direction of Hydraulic Works)
- Increased political and financial autonomy



# NHP 2001 – Start of decentralization

Economic decentralisation	Horizontal decentralisation	State Societies or <i>Sociedades Estatales</i>	<ol style="list-style-type: none"> <li>1. Aquatajo (aguas de la cuenca del Tajo)</li> <li>2. Aguas del Duero</li> <li>3. Aguas de la Cuenca del Ebro</li> <li>4. Aguas de la Cuenca del Guadalquivir</li> <li>5. Aguas del Júcar</li> <li>6. Aguas de las Cuencas Mediterráneas</li> <li>7. Aguas de la Cuenca del Norte</li> <li>8. Aguas de la Cuenca del segura</li> <li>9. Hidroguadiana s.a.</li> </ol>
Public-private partnerships			
State	River Basin Authorities or <i>Organismos de Cuenca</i>	<ol style="list-style-type: none"> <li>1. Confederación Hidrográfica del Cantábrico</li> <li>2. Confederación Hidrográfica del Duero</li> <li>3. Confederación Hidrográfica del Ebro</li> <li>4. Confederación Hidrográfica del Guadiana</li> <li>5. Confederación Hidrográfica del Guadalquivir (planificación)</li> <li>6. Confederación Hidrográfica del Júcar</li> <li>7. Confederación Hidrográfica del Miño-Sil</li> <li>8. Confederación Hidrográfica del Segura</li> <li>9. Confederación Hidrográfica del Tajo</li> </ol>	
Political decentralisation	Vertical decentralisation	Regional Water Agencies or <i>Agencias Autonómicas del Agua</i>	<ol style="list-style-type: none"> <li>1. Agencia Andaluza del Agua</li> <li>2. Agencia Catalana del Agua</li> <li>3. Aguas de Galicia</li> <li>4. Agencia Vasca del Agua</li> <li>5. Baleares</li> <li>6. Islas Canarias</li> </ol>
Regional decentralisation			

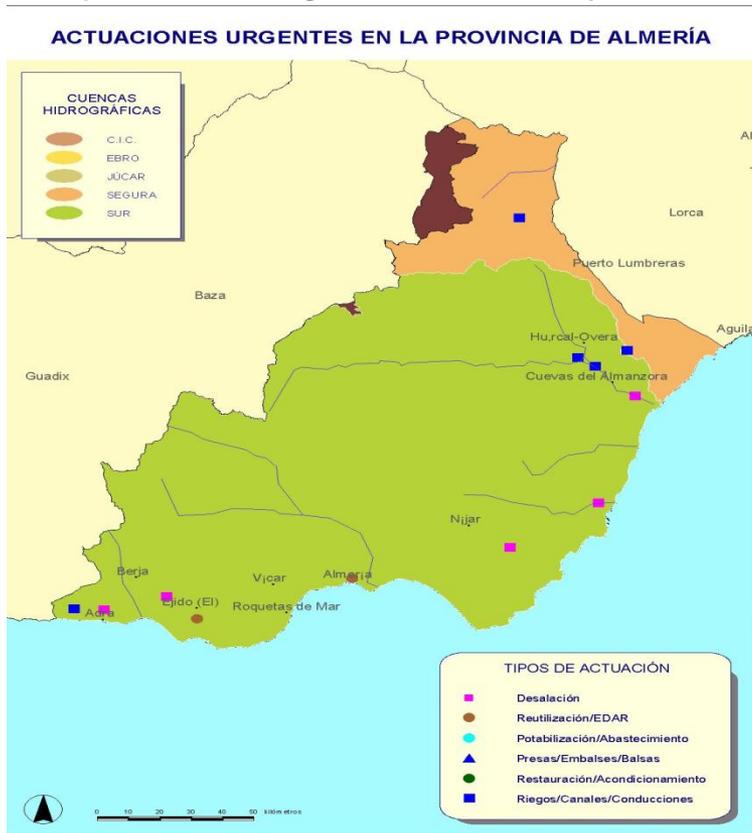


## 2005 AGUA Programme

- Introduced by PSOE (socialist party) in 2004 after canceling NHP 2001
- “Actuaciones para la Gestión y Utilización del Agua”
- Change in Hydraulic Paradigm
- OUT: Ebro transfer
- IN: Investment programme of €8 billion that included establishing a desalination capacity of 600 Hm<sup>3</sup>.
  - 34 new desalination plants over the period 2004-2008
  - increase in wastewater reuse from 450,000 m<sup>3</sup>/yr to 1.1 Hm<sup>3</sup>/yr by 2011 (Madrid and Barcelona)
- States compliance with EU environmental legislation, specific reference to WFD ~ aim of promoting water savings through full-cost recovery by 2010 ↔ emphasis on desalination as the means to ‘better guarantee its availability and its quality’ (water savings not sufficient to meet changing demands in the Mediterranean regions)

# A.G.U.A. examples

- ALMERIA
- Desalination: 165 Hm<sup>3</sup>/y 226 billion €
- Improved management: 24 Hm<sup>3</sup>/y 126 billion €



- VALENCIA
- Dam: 3 Hm<sup>3</sup>/y 6 million €
- Improved management: 107 Hm<sup>3</sup>/y 216 million €



- MURCIA
- Desalination: 140 Hm<sup>3</sup>/y 402 million €
- Improved management: 64 Hm<sup>3</sup>/y 449 million €
- Flood management: 25 million €

# OVERVIEW

## Water planning in Spain 1933 - 2010

Date	Name	Political regime	Main strategy	Outcome	
1933	Plan de Lorenzo Pardo	Republic Second Republic	Water transfer (including Tajo-Segura water transfer and Ebro transfer)	Never implemented due to the break out of the Spanish Civil War	
1939-1975		Dictatorship Franco regime	Tajo-Segura water transfer	Started in 1968, completed in 1975. From the planned 600 Mm <sup>3</sup> , an average of 300 Mm <sup>3</sup> has been transferred	
1993	1993 National Hydrological Plan	Socialist Government	System of National Water Transfer	4000 Mm <sup>3</sup> 600,000 ha new irrigation	Never implemented due to delay tactics and eventual rejection
2001	2001 National Hydrological Plan	Democracy Conservative Government	Ebro water transfer	420 Mm <sup>3</sup>	Demonstrations for and against depending on the region. Became law but never implemented due to change in government and public opposition
2005	AGUA Programme	Socialist Government	Desalination, reuse and modernisation	34 desalination plants; reuse in big cities	Currently underway. At present, only 214 Mm <sup>3</sup> are desalinated out of the 600 planned for 2008

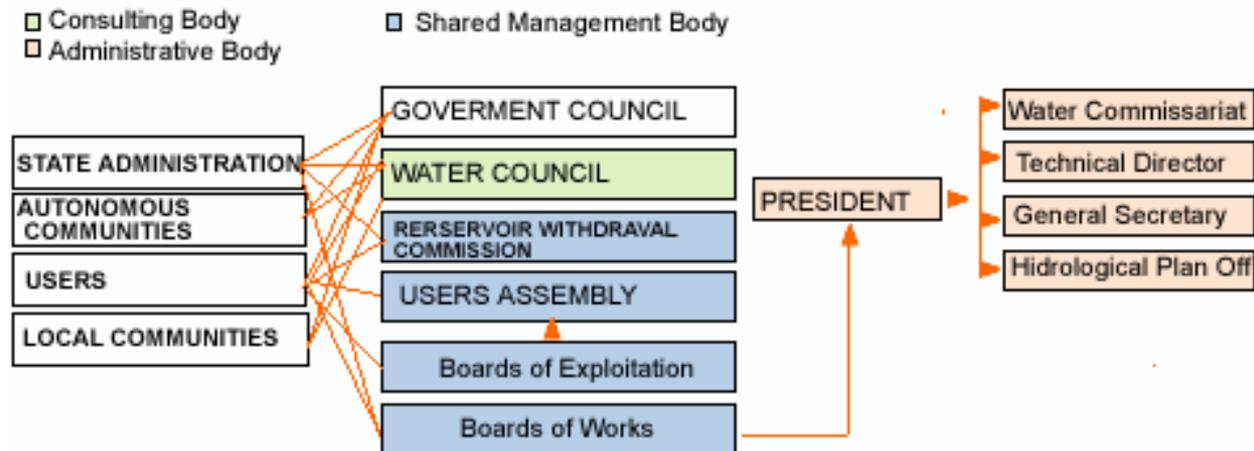
# Water policy and planning

- WFD and changing hydraulic paradigm
- Changing planning strategies
- Changing institutions
- Succes / Pitfalls and Issues of scale



# Spanish hydrological planning before

- Demand based
- Infrastructure based
- Quantity oriented
- Board of Works central function



# Changing planning strategies and institutions

- Internal changes (part I) + EU WFD
  - Environmental uses and good status of water bodies
  - Public participation (article 14)
  - Principle of Cost recovery
- Changes in planning process
- Changing institutions and tasks
  - Water council now integrates different voices
  - Organization of « Jornadas de participación » - Different publications and sensibilization campaigns
  - Environmental Impact Assessment, Economic Analysis, Action Plans

## Changes in planning process (1/2)

- Territory now includes coastal and transition waters (before a competence of national ministry of “Costas” Coasts)
- Broader content of plans, including:
  - Eco-regions, types and reference conditions
  - Pressures and anthropogenic incidences
  - Environmental flows
  - Natural fluvial reserves
  - Unique exploitation system
  - Protected areas
  - Control networks
  - Environmental objectives

## Changes in planning process (2/2)

- Broader content of plans, including (continued):
  - Economic analysis
  - Action Plans
  - Detailed plans and programmes for sub-basins
  - Public information campaigns
  - Designation of competent authorities
  - Contact points and procedures for public consultation
  - Drought emergency plans
  - Flood protection plans
  - Short content of detailed plans from competent administrations
  
- As a result:
  - Effective integration of terrestrial and marine area in the basin
  - Competent Administrations elaborate Action Plans
  - Strategic Environmental Assessment
  - Public Participation

# Scheme of important themes

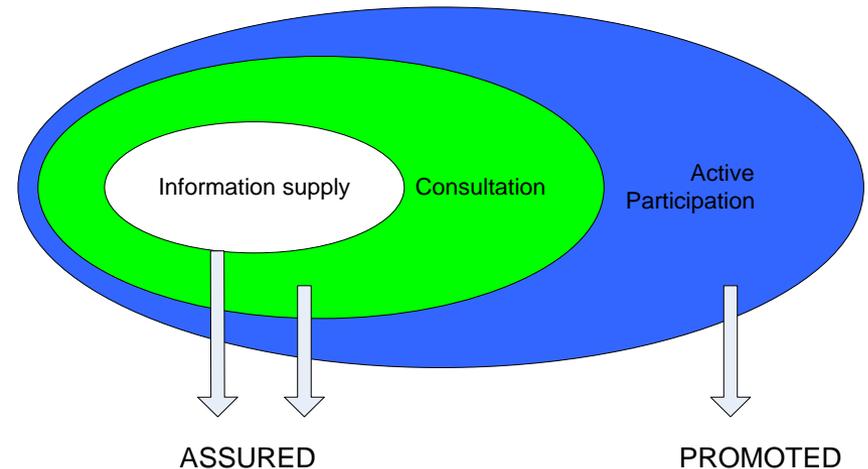
## Basis new hydrological planning

- Start of elaboration Hydrological Plan
- Structuring of diagnostics in themes
- Linked to strategies for actions (measures to mitigate problems)
- Public consultation per sector + experts + web consult
- Once approved on this plan is translated into action plan + hydrological plan project + environmental assessment
- After next round of consultation approval of hydrological basin plan and inclusion in national hydrological plan

DEMAND SUPPLY AND RACIONALITY OF USE	
Problems of satisfying present and future demands	
NON-COMPLIANCE OF ENVIRONMENTAL OBJECTIVES	
Unsuufficient superficial flows	
Agricultural nitrate pollution	
Pollution by phytosanitary products	
Pollution caused by urban waste water discharge	
Industrial or other pollution	
Degradation of biotic environment	
Morfological changes and riverbed instability	
Desertification processes and sediment deposition in the river network	
Overexploitation of aquifers, marine intrusion and other salinization processes	
Damage to habitats and species of interest	
EXTREME METEOROLOGICAL PHENOMENA	
Flood risk	
Vulnerability to drought	
KNOWLEDGE AND GOVERNANCE	
Administrative, organizational and management problems	

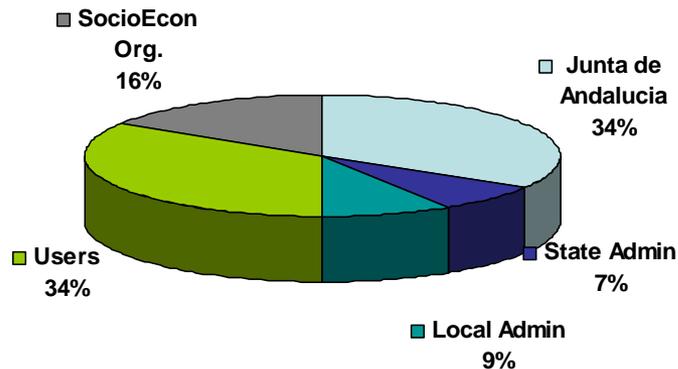
# Public Participation

- Public participation in planning processes aims to help the administration in designing a basin management plan that allows to comply with WFD objectives
- Public participation in the planning process according to Spanish Government



# Water council including non-consumptive uses

## Members of Water Comissions



- Users
  - Agricultural
  - Urban
  - Other uses
  - Irrigation Associations and Farmers
  - Urban supply organizations
  - Consumer organizations
- Representants of socioeconomic interests
  - Syndicates
  - Enterprises
  - Neighbourhood organizations
  - Ecologist
  - Universities

## Effect of changes on planning objectives and process

- Hydraulic paradigm: National → Regional
- Power fragmentation towards regions
  - Weakening concept of national solidarity
  - Construction interest moved to provincial level
  - Capital intensive projects remain (desalination, water treatment)
  - Neo-corporatism revival
- Water strategic importance in single-issue politics and territorial identity, 'political returns' on water (or 'political rent-seeking')
- BUT State remains main funding source for large infrastructural projects (water transfers / desalination plants) : subsidies vs full-cost recovery and Environmental Impact Assessments



## Discussion – what does this mean for planning??

- How are planning objectives defined?
- Can this be done in a participatory way? Representative or deliberative democracy?
- How are institutions evolving? What does that mean for planning?
- → What is the influence of changing policies and changing planning objectives for the planning process and outcomes

# PART – PARTICIPATORY INDICATOR DEFINITION

3



•Sierra de Filabres

•Sierra Nevada

•Desierto de Tabernas

•Sierra Alhamilla

•Andarax  
river

•Sierra de Gádor

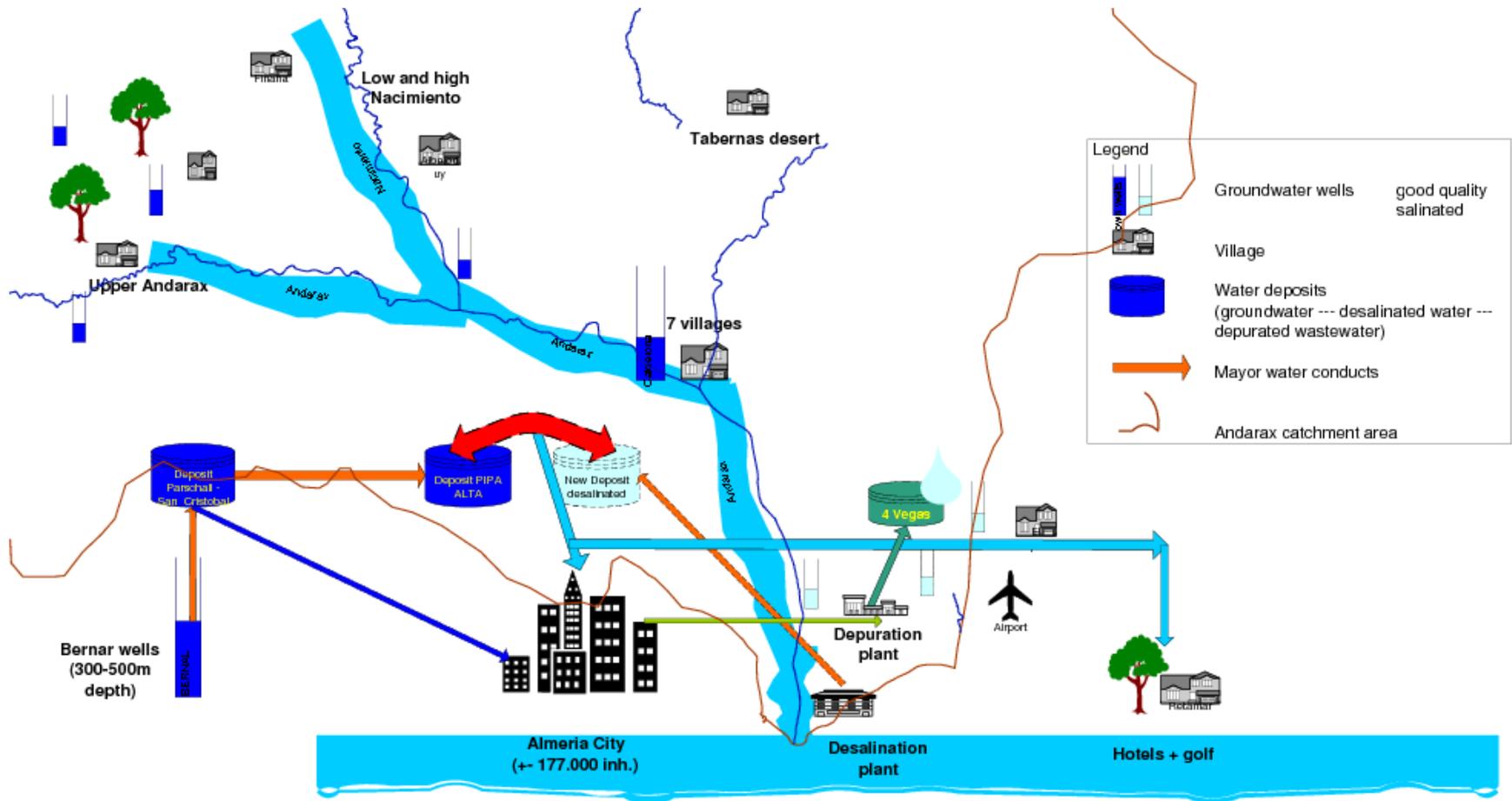
•Campo de  
Níjar

•Almería

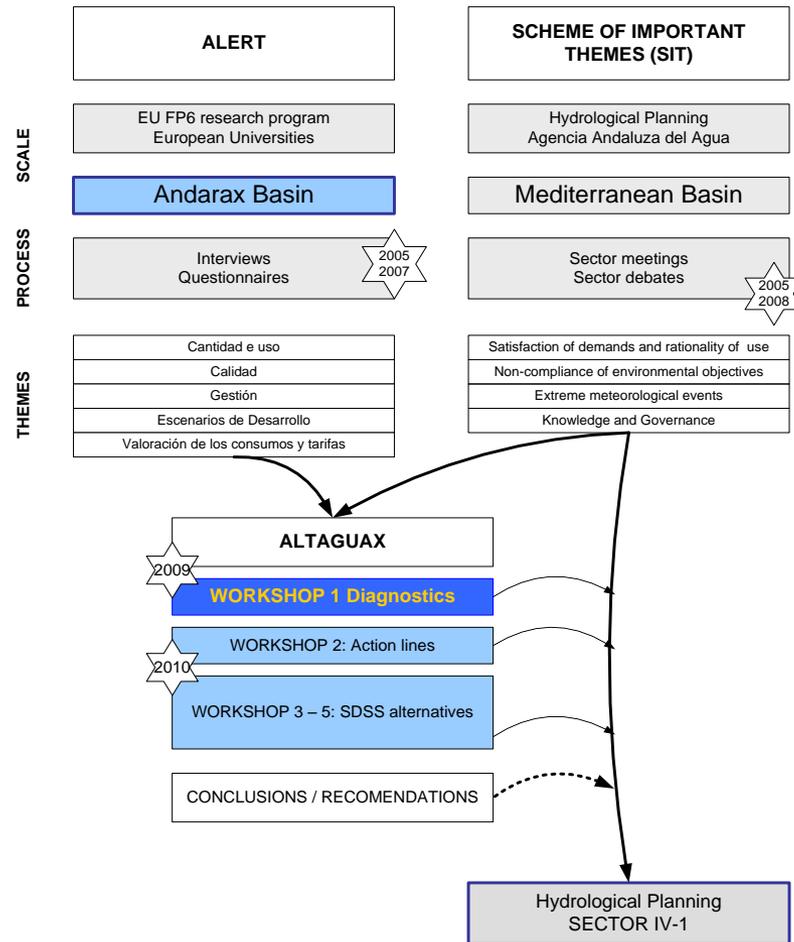
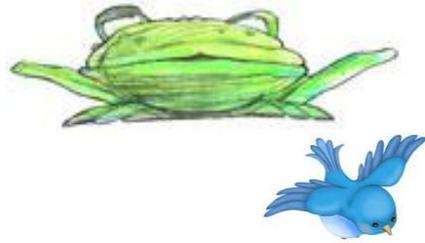
•Cabo  
• de  
•Gata

•Campo de  
Dalias

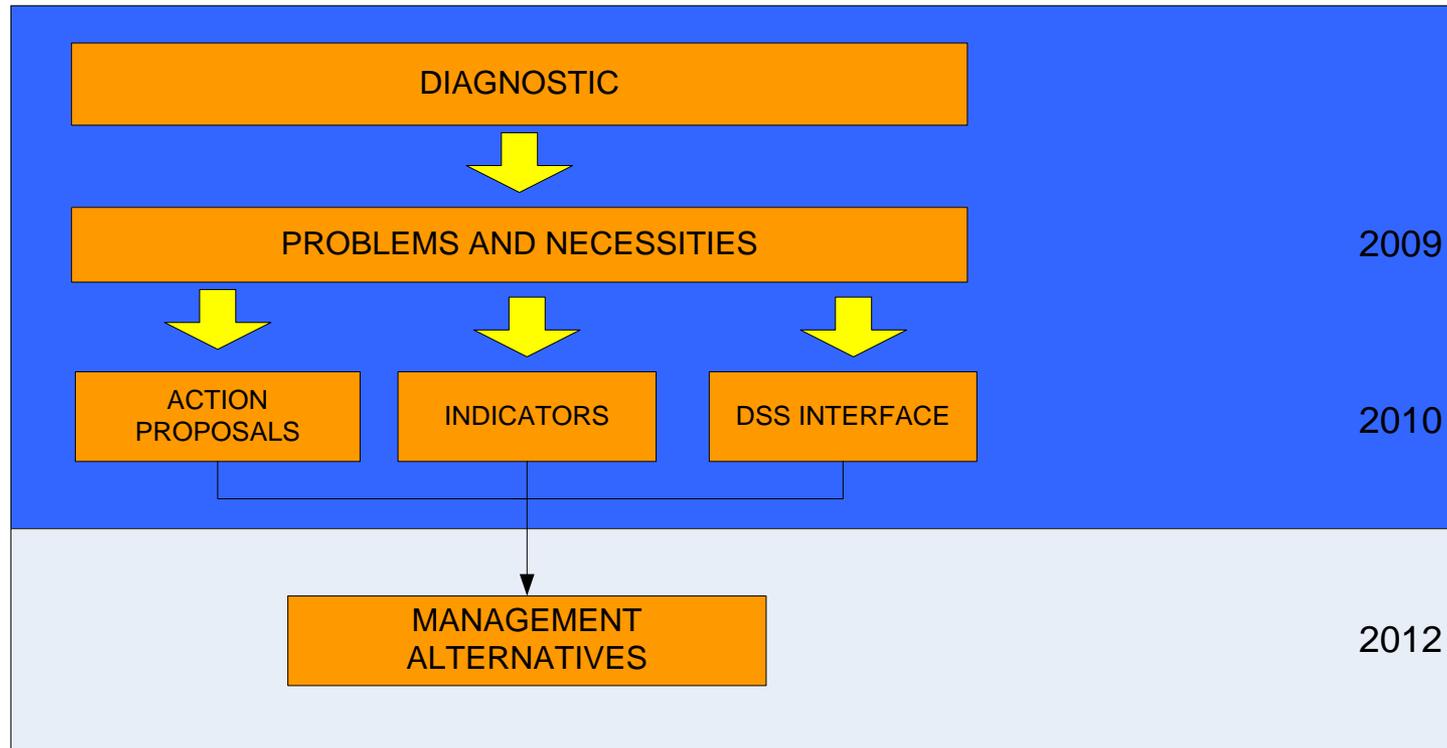
# Case study – Water scheme in the Andarax



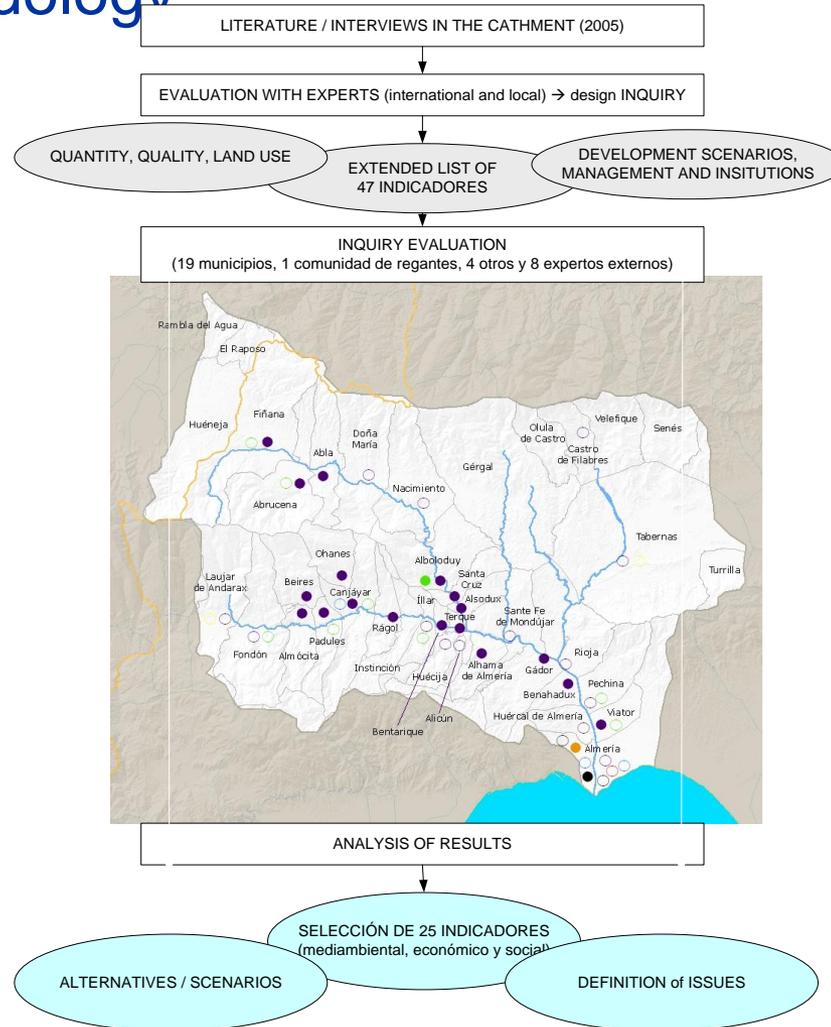
# Developing a common ground by matching top-down and bottom up approaches



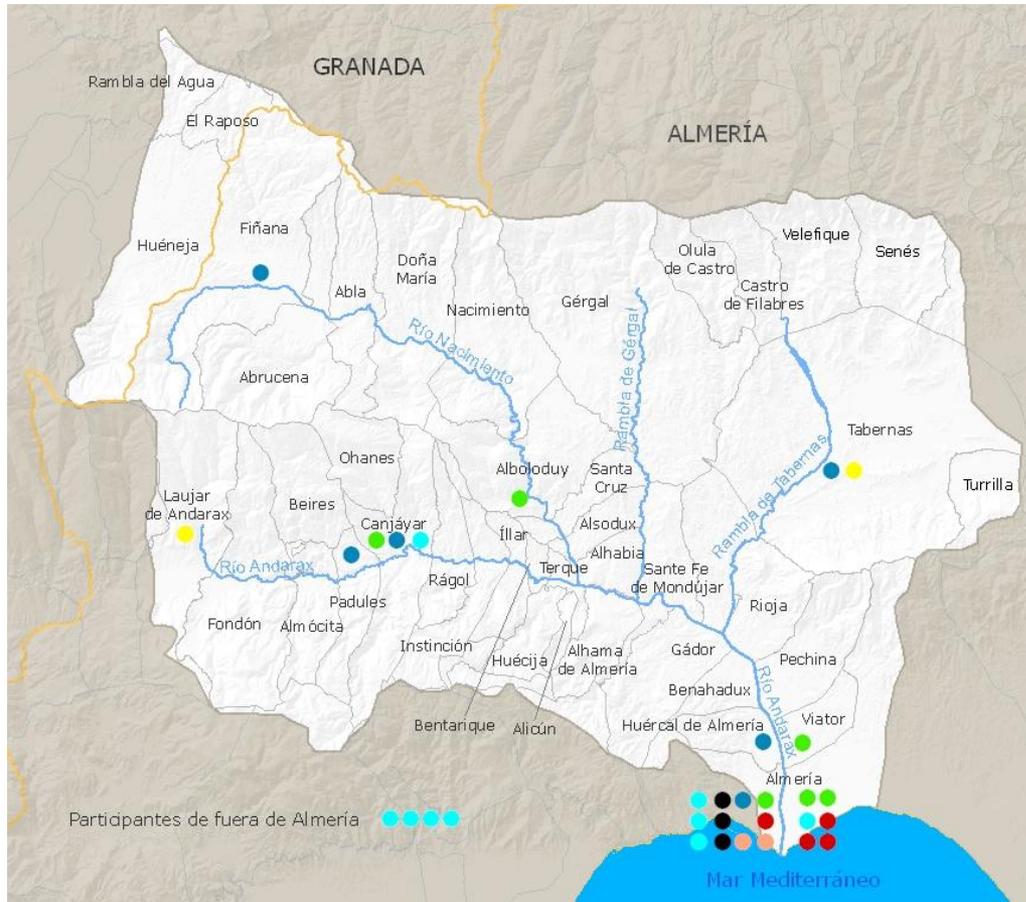
# Case study - Multi-stakeholder platform at basin scale



# Starting to define criteria and indicators – Field methodology



# Who participates?: multi stakeholder platform

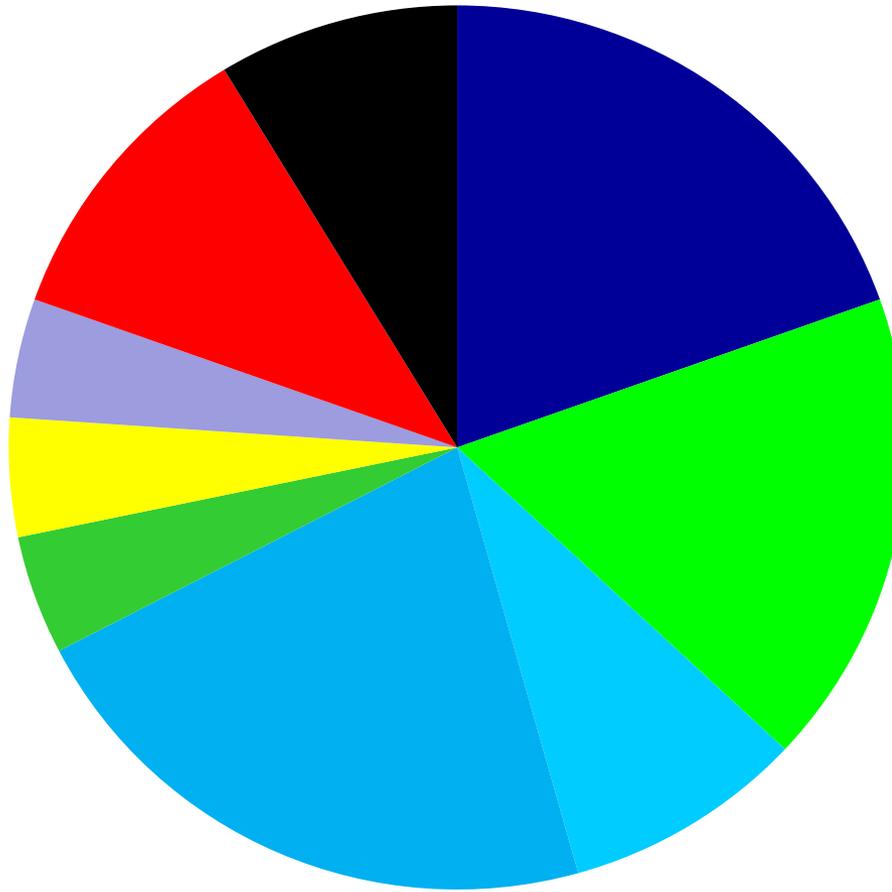


- Irrigation associations / Farmer organizations
- Municipalities
- Rural development agents
- Administration
- Other (private, neighbourhood)
- Experts (scientific, technical)
- Ecologists

→ covering different  
interests  
sectors  
locations



## Who participates?: multi stakeholder platform



- Selected municipalities (9)
- Irrigation Associations (8)
- Regional Administration (4)
- Local Administration (10)
- Farmers' Unions (2)
- Rural Development Groups (2)
- Ecologists (2)
- Scientific Experts (5)
- Others (4)



# Who participates?:

interest groups → regional water council



- Irrigators, urban water supply and consumers
- Local Administration
- National Administration
- Regional Administration (different departments)
- Ecologists, experts, unions, companies



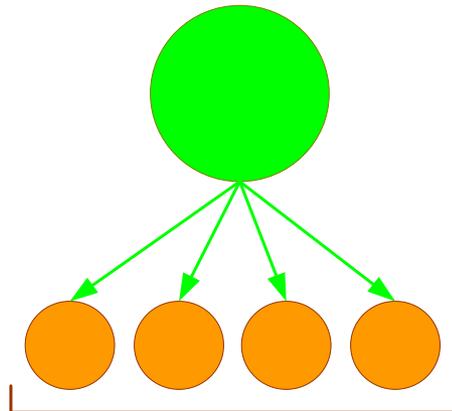
# Workshop 1: Diagnostics debate

Debate on diagnostics

PLENARY: Debate on diagnostic (document contrasting ETI and ALERT project)  
Principle problems in the Andarad River Basin

60'

Proposition of actions (measures)



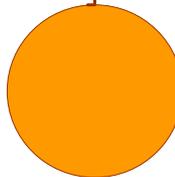
*Explain scenarios and actions defined in the ALERT project*

20'

WORK GROUP. Proposals on actions that allow to construct different water management alternatives

40'

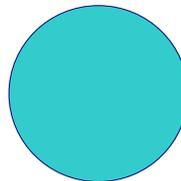
Joining the propositions



PLENARY: Joining the proposals and identification of action blocks (can relate to different thematic areas: quality, efficiency, quantity, etc.).

75'

Debate on indicators and DSS



PLENARY: Explication and debate on indicators and SDSS

1h

45'



# Objectives and criteria ~ important themes

DEMAND SUPPLY AND RACIONALITY OF USE	
Problems of satisfying present and future demands	
NON-COMPLIANCE WITH ENVIRONMENTAL OBJECTIVES	
Insufficient superficial flows	
Agricultural nitrate pollution	
Pollution by phytosanitary products	
Pollution caused by urban waste water discharge	
Industrial or other pollution	
Degradation of biotic environment	
Morfological changes and riverbed instability	
Desertification processes and sediment deposition in the river network	
Overexploitation of aquifers, marine intrusion and other salinization processes	
Damage to habitats and species of interest	
EXTREME METEOROLOGICAL PHENOMENA	
Flood risk	
Vulnerability to drought	
KNOWLEDGE AND GOVERNANCE	
Administrative, organisational and management problems	



# Extended indicator list

ENVIRONMENTAL
Groundwater quality (GQ)
Salinization of aquifer
Relative quantity of deputed wastewater
Treatment need for consumption of groundwater
Reuse of deputed wastewater (WR)
Groundwater depletion (GD)
Total extraction of aquifer in function of estimated recharge (TAR)
Quantity of groundwater resources available per user
Total exploitation of groundwater resources
Variation in surface water fluxes
Terrain value
Evolution of protected natural areas (%increase/decrease)
Urban development increase
Quantity of internal renewable resources* in relation to groundwater
Volumen of groundwater pumped in relation to non-conventional resources*
Dependency of agricultural population on groundwater (DAG)
Dependency of tourism on groundwater
Groundwater pumped in function of total amount of water for human consumption

ECONOMIC
Distribution efficiency (DE)
Irrigation efficiency (IE)
Pumping costs (Kwh or /m <sup>3</sup> )
Transfer costs (Kwh or /m <sup>3</sup> ) (CC)
Decontamination costs
Recharge costs for recuperaton of aquifer (Kwh/m <sup>3</sup> )
Total energy consumption (Kwh/m <sup>3</sup> ) (TEC)
Percentage of subsidies on water price
Price of water in relation to operation and maintenance costs (WPC)
Water productivity ( /m <sup>3</sup> )
Water productivity (EAJ/m <sup>3</sup> )

\* desalinated and deputed wastewater /  
EAJ = Equivalent of 1 person labor day

SOCIAL
Income per capita
Income per sector
Consumption power in relation to water price
Risk of not being able to supply water for human consumption (RU)
Risk of not being able to supply water for irrigation (RA)
Rate of accesability to drinking water (AC)
Rate of human migration
Percentage of tourists
Employment created (EAJ/m <sup>3</sup> )
Employment rate
Implication of stakeholders (IS)
Private water uses in relation to uses with a public concession
Institutional transparency
Possibility to influence decision making
Information distributed by the administration competent in water issues
% private water enterprises in relation to public enterprises
Control performed by competent administration (quality and quantity) (IC)

# Selected indicators

## ECONÓMICO

Eficiencia en la distribución (DE)

Eficiencia en el riego(IE)

Costes de producción (Kwh or €/m<sup>3</sup>) (CC)

Precio en función de los costes de operación y mantenimiento (WPC)

Coste energético total (Kwh/m<sup>3</sup>) (TEC)

## MEDIO AMBIENTAL

Descenso de niveles piezométricos (GD)

Calidad del agua subterránea (GQ)

Dependencia de agua subterránea de la población (DAG)

Reutilización de agua residual tratado (% de uso total) (WR)

Extracción total en relación con la recarga estimada (TAR)

## SOCIAL

Riesgo de no poder satisfacer la demanda urbana (RU)

Riesgo de no poder satisfacer la demanda agrícola(RA)

Accesibilidad (AC)

Control (cantidad y calidad) (IS)

Transparencia y involucración de los grupos de interés) (IC)

# Observations on preparatory field survey

- **Response rate 45,6%**
  - $N_{tot} = 115 = 39_{aytos} + 60_{CDR} + 3_{RD} + 6_{inst} + 2_{Priv\ S} + 6_{other}$
  - $N_{pref} = 55 = 39_{aytos} + 4_{CDR} + 3_{RD} + 3_{inst} + 2_{Priv\ S} + 4_{other}$
  - Good response rate given lack of transparency, institutional transition and fundamental “water anarchy”
- **Problems and lacks**
  - No support from local administration (no contact addresses, no updated list of irrigation groups)
  - Time consuming process (difficult to get response, one to one strategy)
  - Training needed
  - Stakeholders feel they don't have expertise to answer
  - No complete data available
  - Reluctance to give “unwanted” answers
  - Difficult to get agricultural sector to participate
  - Private sector is not sufficiently represented
- **Reasons and lessons learned**
  - Bad contact data
  - No real interest in collaboration (need for administration to collaborate)
  - Uninsufficient training and diffusion (better to organize workshops)
  - Feed-back needed

# PART – PROBLEM TREE AND PRIORITIZATION

4



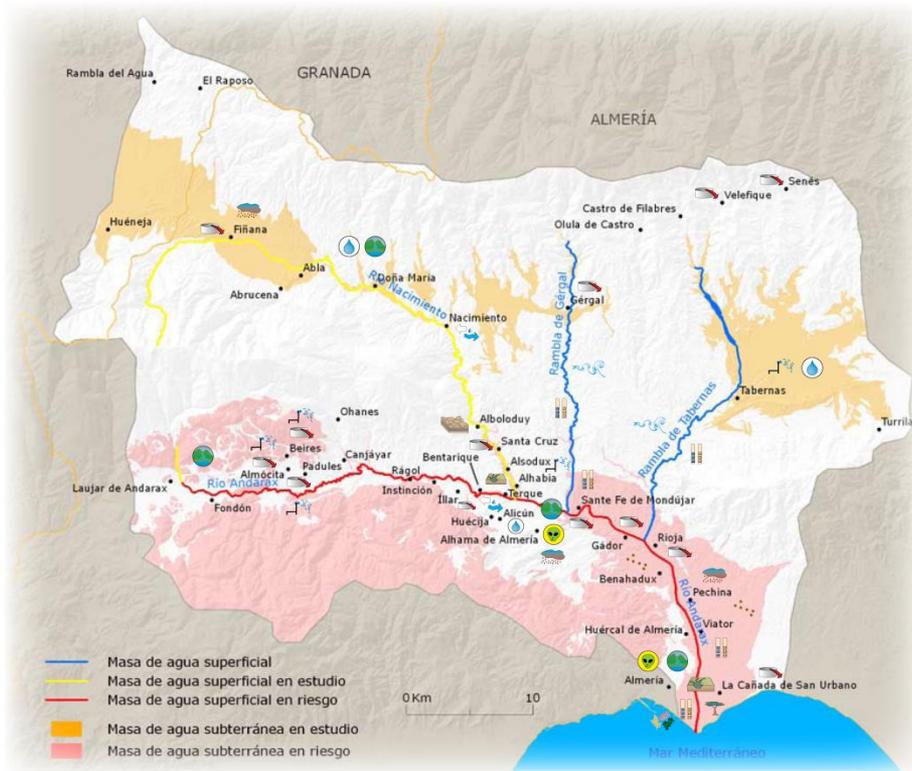
# Workshop 1: 3/07/09



# Structuring of problems



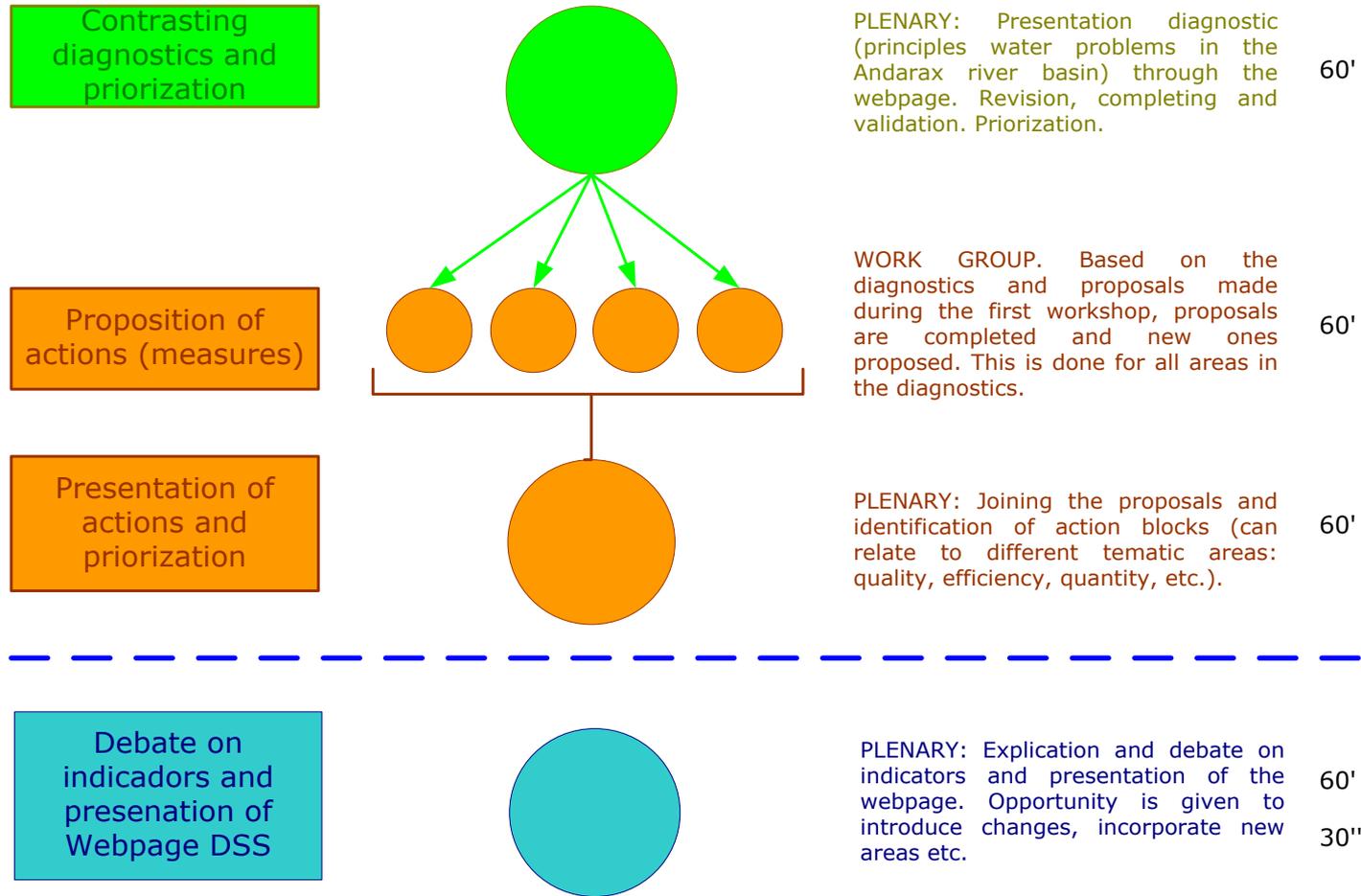
# Workshop 1: Validation of problem assessment



DEMAND SUPPLY AND RACIONALITY OF USE	
Problems of satisfying present and future demands	
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Overexploitation of aquifers, marine intrusion and other salinization processes	
Damage to habitats and species of interest	
EXTREME METEOROLOGICAL PHENOMENA	
Flood risk	
Vulnerability to drought	
KNOWLEDGE AND GOVERNANCE	
Administrative, organisational and management problems	



# Workshop 2: Priorities and action



## Priorization of problems - method

After discussion about the diagnosis, the identified problems are prioritized.

Participants assess the importance of the categories low, medium to high in terms of different criteria.

For problems 1 - 13 (quantitative deterioration, pollution and biological and hydromorphological quality) the following criteria are evaluated:

- Environmental Condition
- Social-Economic Condition
- Future trend
- Territorial scope of the problem

Problems related to governance and information are evaluated based on:

- Magnitude of problem
- Difficulty in meeting objectives

# Priorization of problems - method

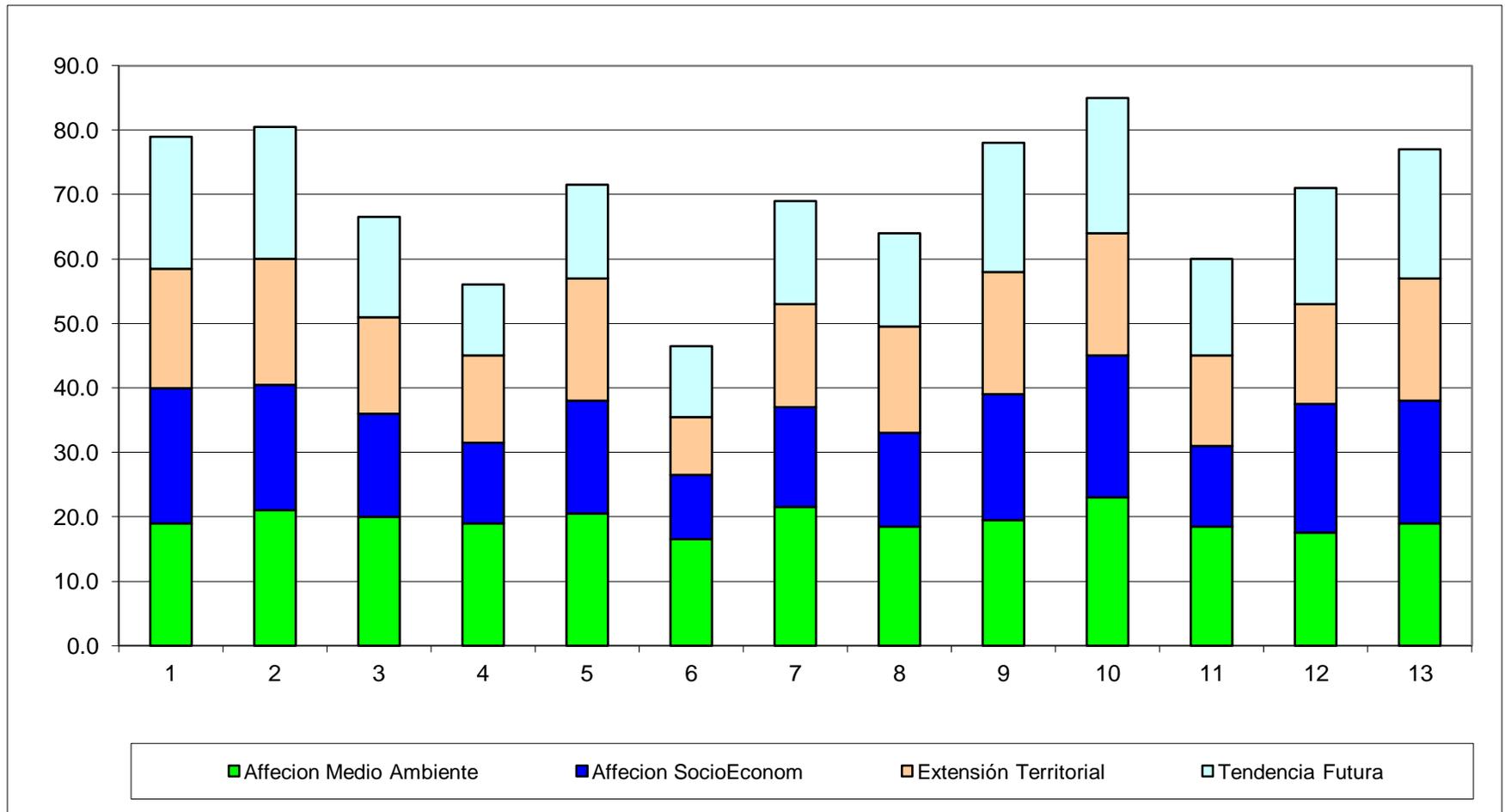
Tabla de jerarquización:

TEMAS IMPORTANTES IDENTIFICADOS (I)	CRITERIOS DE JERARQUIZACIÓN					VALORACIÓN
	Afectación ambiental	Afectación socio-económica	Extensión territorial del problema	Tendencia futura	Otros criterios no identificados	
1. Problemas de satisfacción de las demandas actuales y previstas	Alto	A	A	A		
2. Insuficiencia de los recursos hídricos	Alto	A	A	A		
3. Contaminación por nitratos de origen agrícola	Medio	H	B	H		
4. Contaminación por fitosanitarios	Medio	H	B	H		
5. Contaminación por vertidos de aguas residuales urbanas	Medio	H	H	H		
6. Contaminación de origen industrial y otros	Bajo	B	B	B		
7. Degradación del suelo fértil	Medio	H	H	H		
8. Alteraciones morfológicas e inestabilidad de cauces	Bajo	B	H	H		
9. Proceso de desertificación y aporte de sedimentos a la red fluvial	Alto	A	H	A		
10. Sobreexplotación de acuíferos, intrusiones marinas y otros procesos de salinización	Alto	A	H	A		
11. Afectaciones a hábitats y especies de interés	Medio	H	H	H		
12. Riesgo de sequías e inundaciones	H	A	H	H		
13. Vulnerabilidad frente a la sequía	A	A	A	A		
TEMAS IMPORTANTES IDENTIFICADOS (II)	CRITERIOS DE JERARQUIZACIÓN			VALORACIÓN		
	Magnitud del problema	Dificultad para conseguir soluciones	Otros criterios no identificados			
14. Problemas administrativos, organizativos y de gestión	A	A				
15. Falta de información, sensibilización y educación	H	H				

## Priorization of problems - results

		AFFECION MEDIO AMBIENT (AM)	AFFECION SOCIOECON (ASE)	EXTENSION TERRITORIAL (EP)	TENDENCIA FUTURA (TF)
1		19	21	18,5	20
2		21	19,5	<b>19,5</b>	20,5
3		20	16	15	15,5
4		19	12,5	13,5	<b>11</b>
5		20,5	17,5	19	14,5
6		<b>16,5</b>	<b>10</b>	<b>9</b>	<b>11</b>
7		21,5	15,5	16	16
8		18,5	14,5	16,5	14,5
9		19,5	19,5	19	20
10		<b>23</b>	<b>22</b>	19	<b>21</b>
11		18,5	12,5	14	15
12		17,5	20	15,5	18
13		19	19	19	20
		MAGNITUD PROBLEMA		DIFICULTAD PARA CONSEGUIR OBJETIVOS	
14			20		20
15			19		19

# Priorization of problems ifo impact - results



# Priorization of actions

PROPOSED MEASURES	SCORE
6. Improve management and awareness of the over abstraction of aquifers	15
12. Improve treatment and reclamation infrastructure	8
21. Non politicization of water 🌱	7
1. Adapt water demand to real availability 🌱	6
7. Carry out investment plans for the modernization of irrigation systems and of the water supply networks	6
4. Encourage natural recharge 🌱	5
17. Recover traditional activities 🌱	5
20. Recover full costs 🌱	5
25. Contribute economically to social groups for the efficient use of water 🌱	5
16. Carry out an agro-forestral restoration in Middle-Lower Andarax	4
5. Implement measures of control, improvement of infrastructure, maintenance and management	3
8. Diversify supply sources 🌱	3
22. Expedite the processing of water related management 🌱	3
9. Integrate resources and alternatives for integral use of the resource	2
10. Take into account vulnerability maps, eco-conditioning of agricultural aid, and promote natural fertilizers 🌱	2
14. Create instruments to safeguard areas of high ecological value and establish measures that take into account protected areas linked to aquatic ecosystems	2
18. Manage the river basin in an integral manner and unite public and private efforts	2
19. Enforce existing legislation on water	2
15. Adjust channels, revegetate, and demarcate the Public Water Dominion	1
2. Avoid inter-basin transfers 🌱	-
3. Set Almeria desalination plant to 100% output	-
11. Promote integrated and organic agriculture and create codes of good practice and monitoring actions 🌱	-
13. Track current installations and their functioning	-
23. Include all aspects influencing the water cycle in the educative programme of schools 🌱	-
24. Incorporate training-educational dynamics in the public participation process of the Mediterranean Andalusia River Basin 🌱	-

# Priorization of actions

**1. Problemas de satisfacción de las demandas actuales y previstas**

**1.1**  
Realizar planes de inversión para la modernización de los sistemas de riego y de las redes de abastecimiento a las poblaciones.

**1.2**  
Adaptar la demanda de agua a la disponibilidad real

**1.3.**  
Integrar recursos y alternativas para poder hacer un aprovechamiento integral del recurso

**1.4.**  
Evitar los trasvases entre cuencas (disenso)

**2. Insuficiencia de los caudales fluyentes**

**2.1**  
Poner en funcionamiento el 100% de la desaladora de Almería (disenso)  
*(relacionado con problema 1 y 10)*

**2.2.**  
Fomentar la recarga natural y la regeneración de cauces y riberas.

**3. Contaminación por nitratos de origen agrario**

**TÍTULO DE LA PROPUESTA:**  
"CONTAMINACIÓN POR NITRATO DE ORIGEN AGRARIO"

**OBJETIVOS:** REDUCIR EL USO DE FERTILIZANTES Y PESTICIDAS EN LOS SISTEMAS DE REGADÍO Y AUMENTAR LA EFICIENCIA Y SOSTENIBILIDAD

**PROBLEMAS RELACIONADOS:**  
"FERTILIZACIÓN EXCESIVA EN LOS REGADÍOS DE ALMERÍA"

**DESCRIPCIÓN:**  
1. SENSIBILIZACIÓN A LOS AGRICULTORES SOBRE EL USO DE FERTILIZANTES Y PESTICIDAS.  
2. PROMOVER EL USO DE FERTILIZANTES Y PESTICIDAS DE ORIGEN NATURAL.  
3. APLICAR TÉCNICAS DE REGADÍO DE BAJA EFICIENCIA Y SOSTENIBILIDAD.

*firmado uno de Almería natural / IISD natural*

**TÍTULO DE LA PROPUESTA:**  
"2. Diversificación de los caudales fluyentes"

**OBJETIVOS:** Aumentar los caudales de agua en los cauces de agua de Almería.

**PROBLEMAS RELACIONADOS:**

**DESCRIPCIÓN:**  
- Bajar los niveles de explotación de Almería (Relacionado con problema 1 y 10)  
- Ayuda de la desaladora de Almería  
- Uso de la desaladora de Almería  
- Uso de la desaladora de Almería  
- Ayuda y regulación de la explotación de Almería  
- Ayuda al uso de agua para riego, agricultura y ganadería  
- Ayuda al uso de agua para riego, agricultura y ganadería  
- Ayuda al uso de agua para riego, agricultura y ganadería

# Prioritization of actions



## Checking the learning objectives

?? Did the lecture help you to:

- Identify objectives and criteria for the planning exercise linking to existing policies and issues raised in the situation analysis
- Understand the importance of indicators, the different types and their selection?
- Familiarize with the participatory definition of indicators, alternatives and scenario building?
- Understand the process of prioritization in problems and action plans through repetitive rounds of analysis?



**Thank you!**

**UNESCO-IHE** INSTITUTE FOR WATER EDUCATION