

# DROUGHTS MANAGEMENT PLAN in MADRID AUTONOMOUS REGION (SPAIN)

*Francisco Cubillo*  
*Head of Applied Technologies Department*



Canal de  
Isabel II

DROUGHT AND WATER DEFICIENCY FROM RESEARCH TO POLICY  
MAKING (SICILY 8-9 OCTOBER 2004)

# DROUGHTS MANAGEMENT MAIN ROLES

1. REFERENCE FOR A RELIABLE WATER SUPPLY
2. CONSTITUENT OF PREVENTIVE PLANNING & OPERATION PROCEDURES
3. CONTINGENCY MITIGATION PROCEDURE

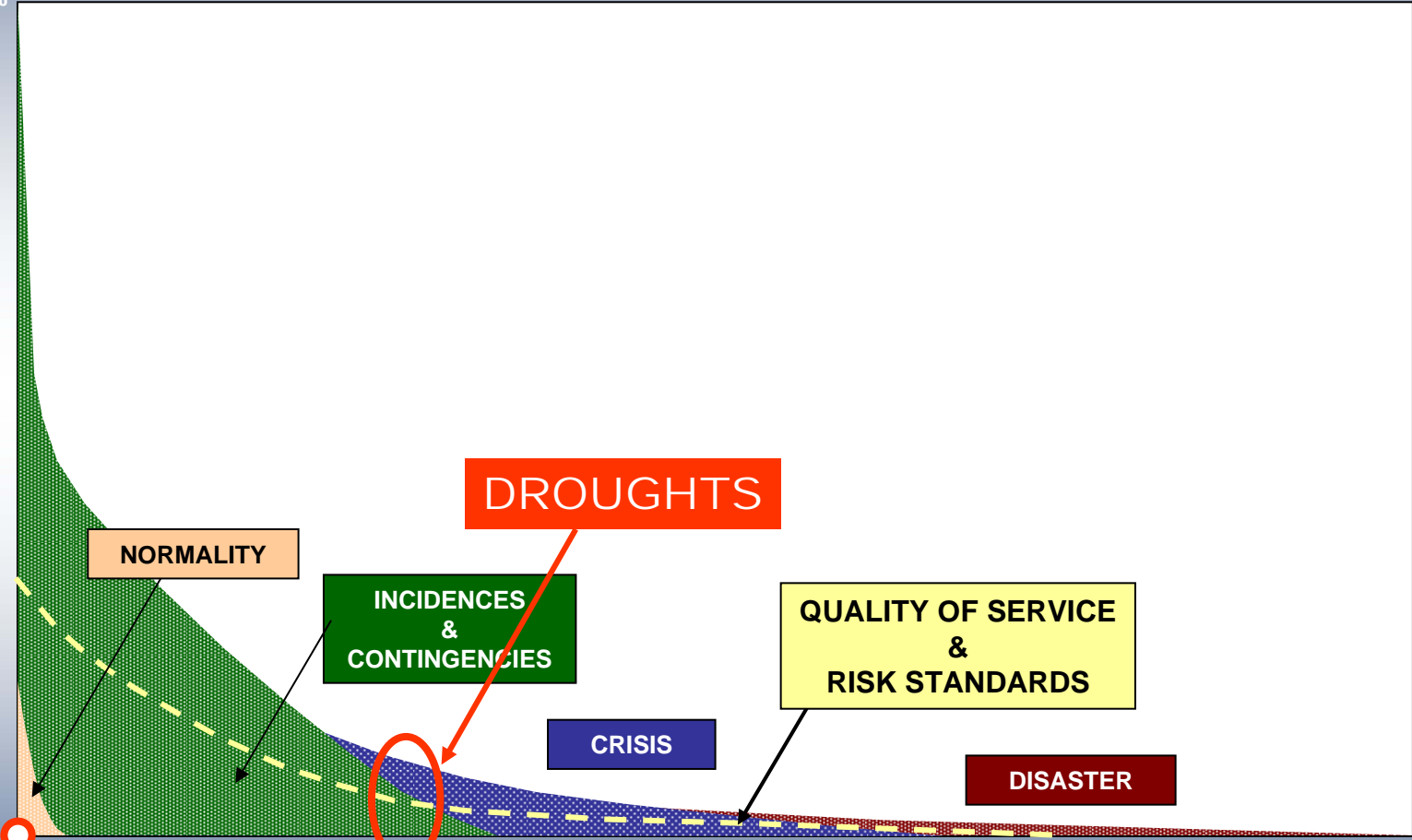
# DROUGHTS MANAGEMENT PRINCIPLES

1. RISK ASSESSMENT & MANAGEMENT
2. QUALITY OF SERVICE
3. INTEGRATED RESOURCES MANAGEMENT
4. DEMAND MANAGEMENT
5. ENVIRONMENTAL MANAGEMENT

# DROUGHTS AND RISKS

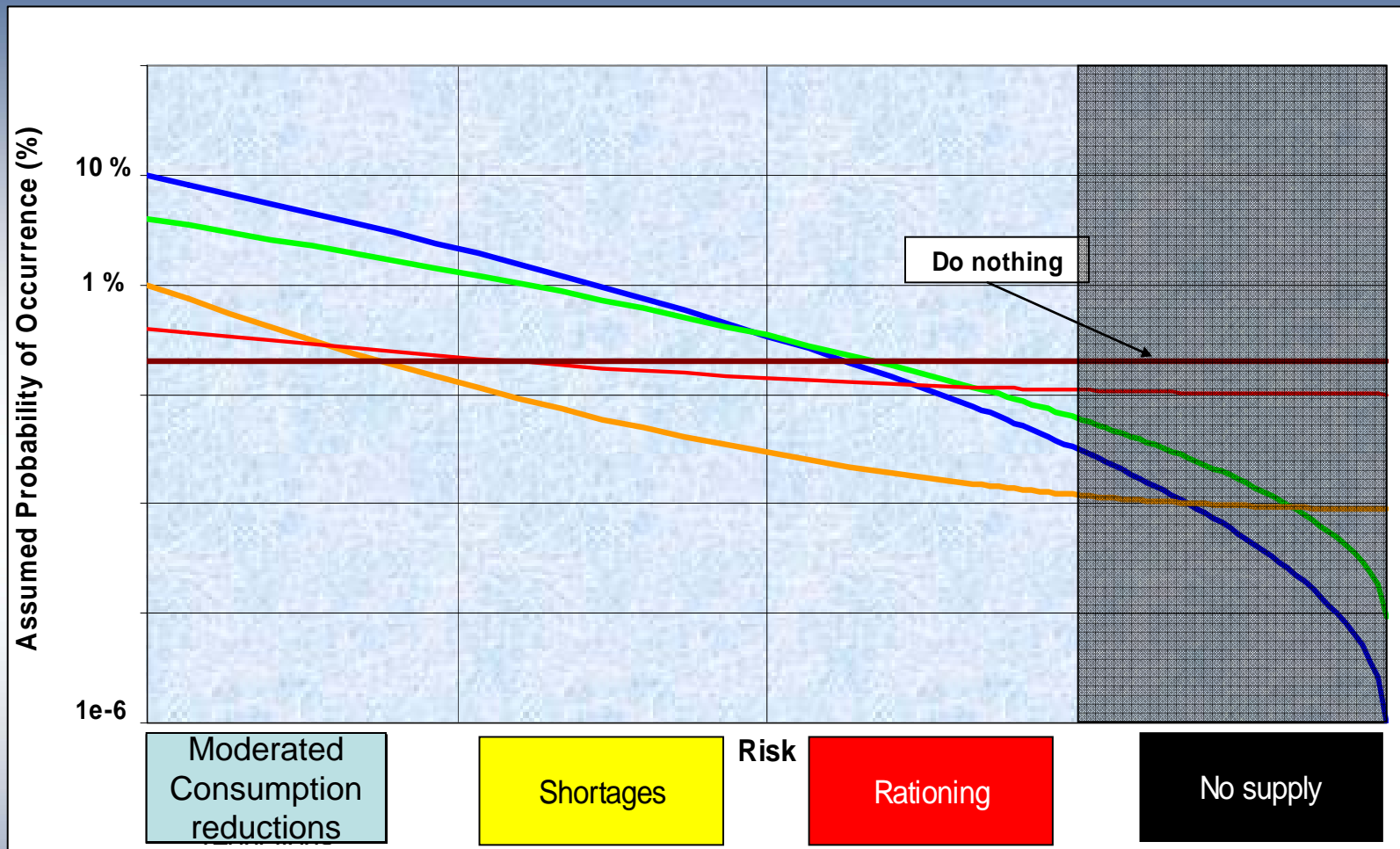
PROBABILITY

100%

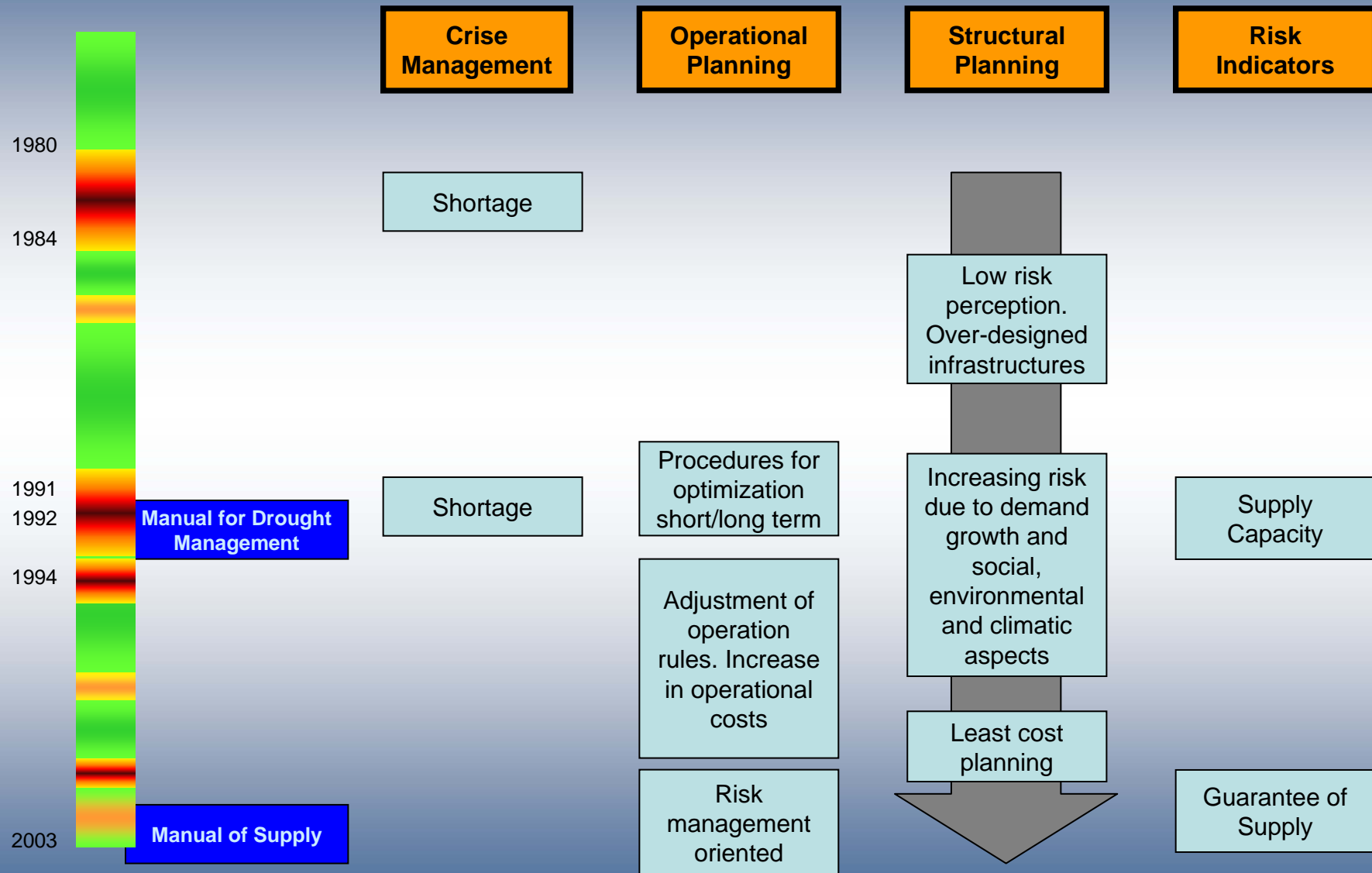


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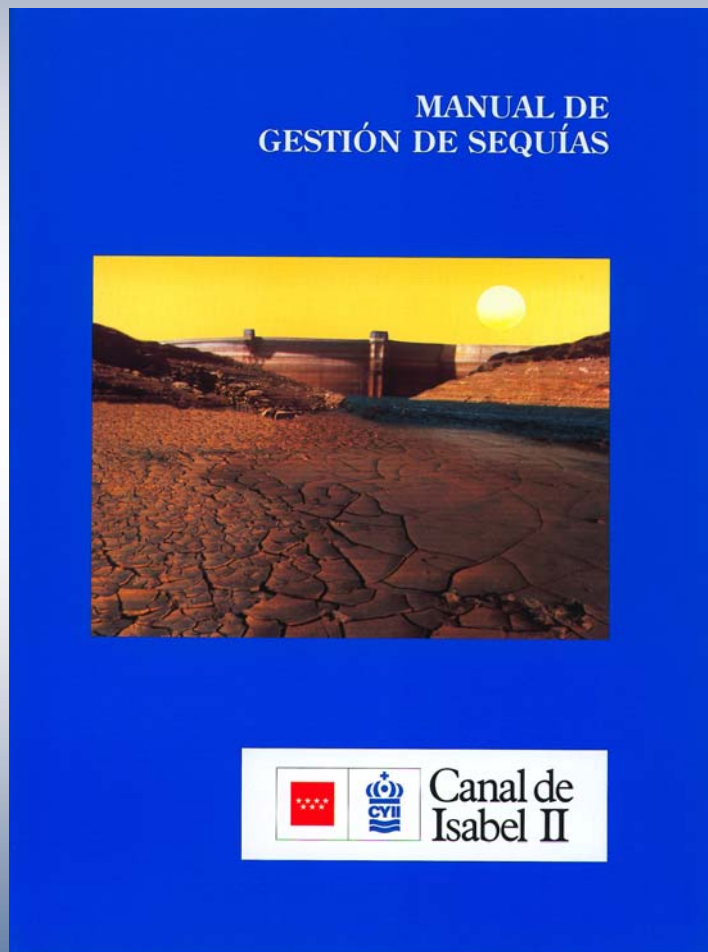
AFFECTIONS



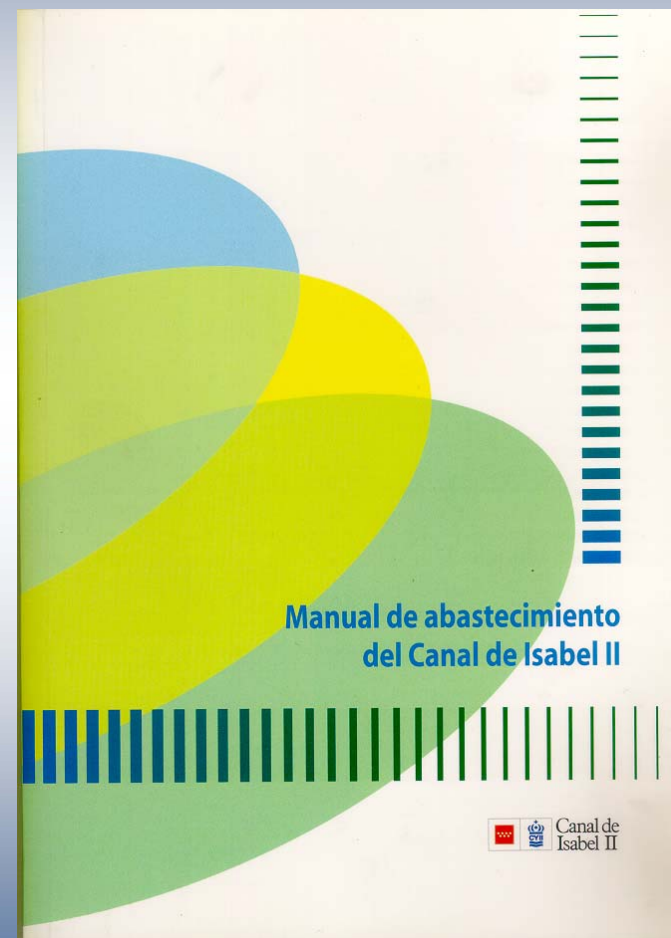
# Historical Risk Management in Madrid Region



## Drought Management Manual 1992



## Water Supply Manual 2003



# PERCEPTION

- Willingness for citizens  
*Quality of service*
- Willingness for stakeholders & decision makers  
*How much risk?*

# TECHNIQUES

- How to calculate
- How to define

# OPERATION

- How to manage
- There is an ability to decide in planning and operating procedures

A MANUAL FIXES THESE PROCEDURES



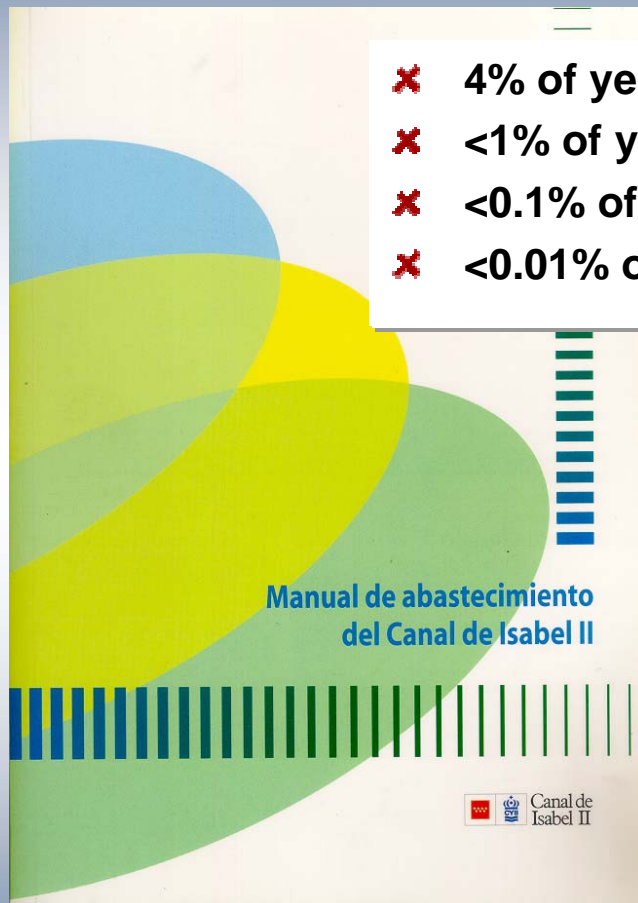
# PERCEPTION

- ▶ LACK OF REGULATORY FRAMEWORK
- ▶ FUZZY CRITERIA FOR INTEGRATION OF
  - ▶ DROUGHT IN WATER SUPPLY PLANNING RELIABILITY
  - ▶ GOOD CURRENT STRATEGY (ART.27 PHN)
- ▶ LACK OF CULTURE FOR PUBLIC INVOLVEMENT
- ▶ LACK OF DEFINITION FOR STANDARDS OF SERVICE AND DROUGHTS



AGREED OR ESTABLISHED CRITERIA

# RISK OF SCARCITY & SHORTAGES



- ✘ 4% of years
- ✘ <1% of years
- ✘ <0.1% of years
- ✘ <0.01% of years

9% Consumption Reduction  
25% (Shortages)  
(Rationing)  
Essential Uses

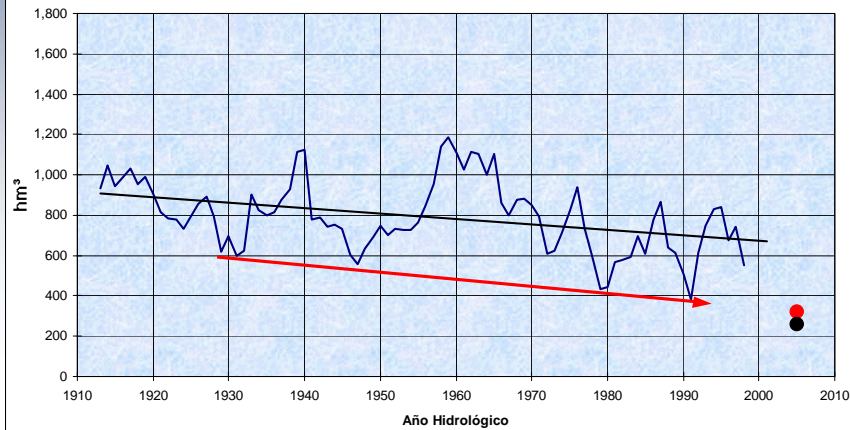
# TECHNICS

- ▶ RUNOFF TIME SERIES ANALYSIS
- ▶ INTEGRATED ASSESSMENT & USE OF RESOURCES
- ▶ RELIABLE DEMAND ELASTICITY ASSESSMENT

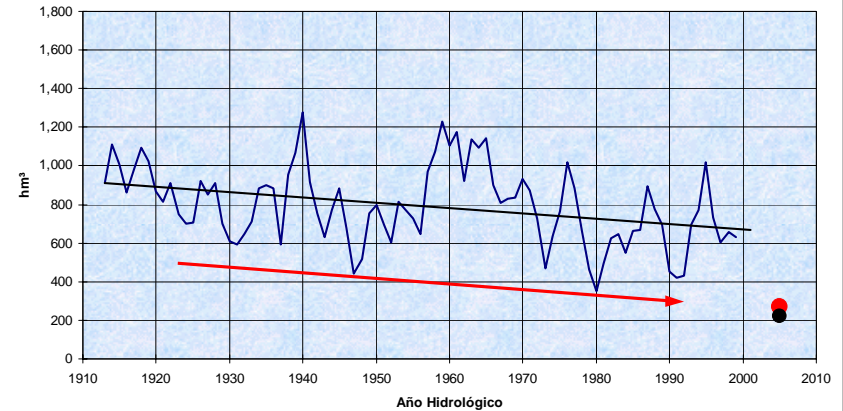


# RUNOFF TIME SERIES

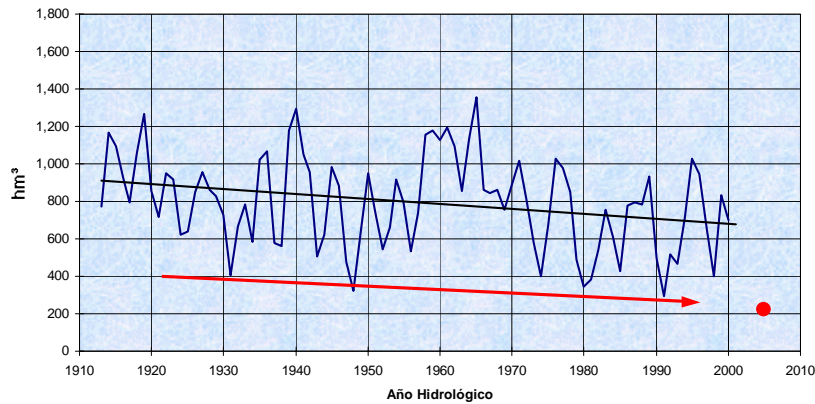
SERIE HISTÓRICA DE APORTACIONES EN LA TOTALIDAD DE LOS EMBALSES DEL CYII  
Medias Móviles 4 Años



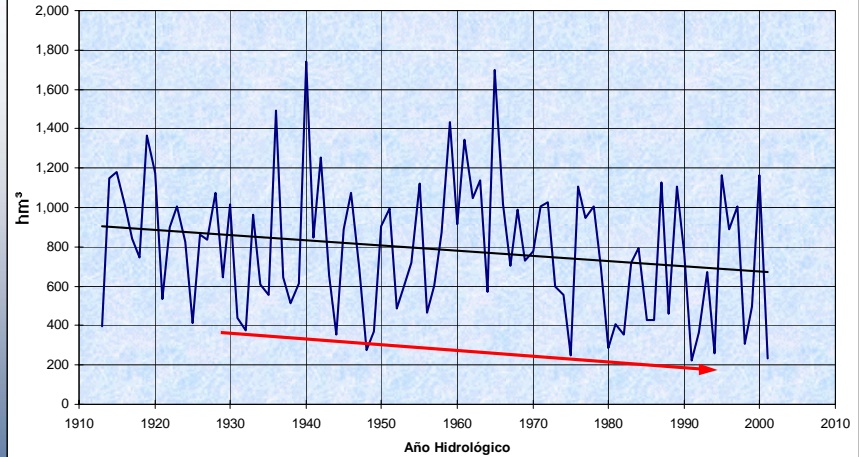
SERIE HISTÓRICA DE APORTACIONES EN LA TOTALIDAD DE LOS EMBALSES DEL CYII  
Medias Móviles 3 Años



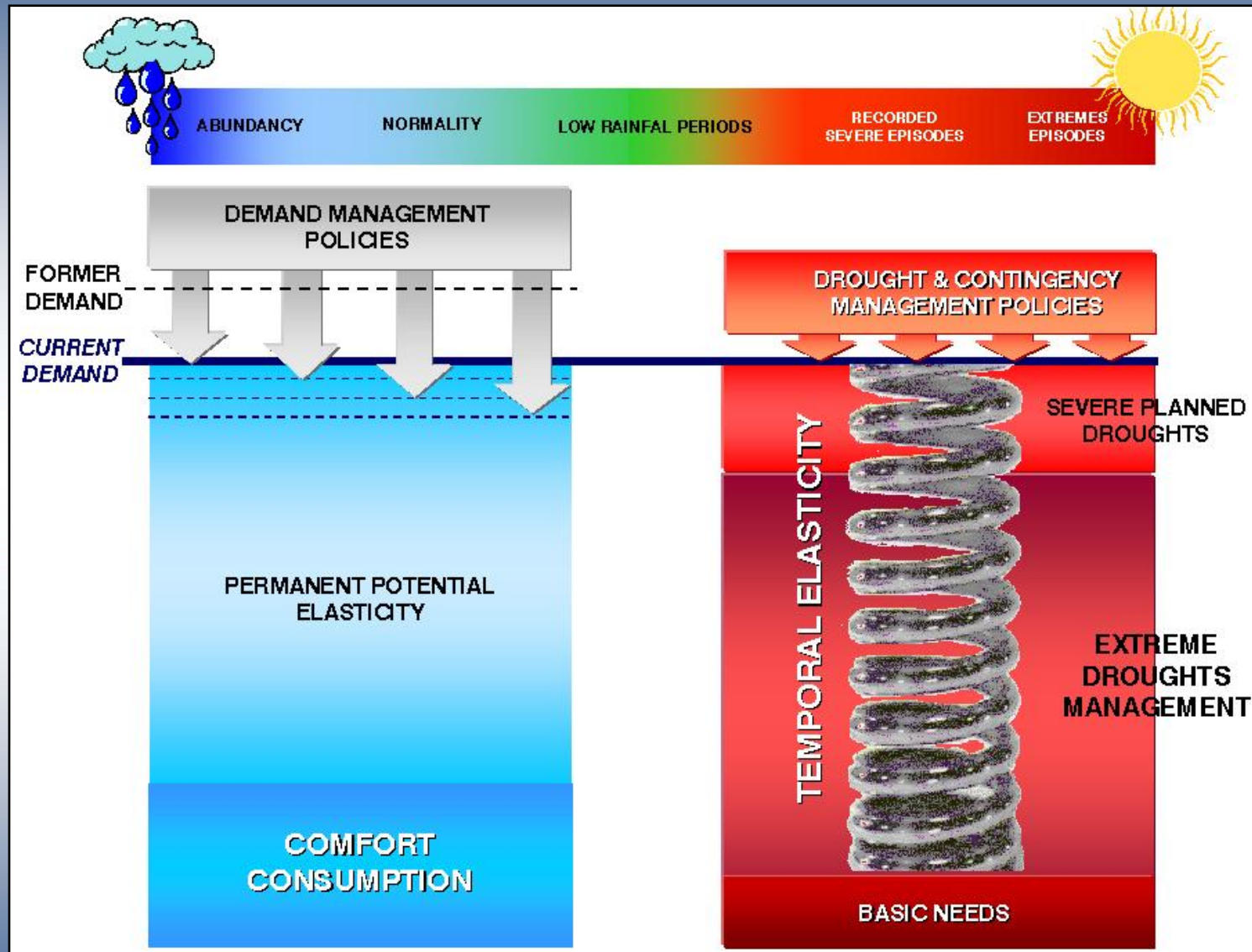
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Medias Móviles 2 Años

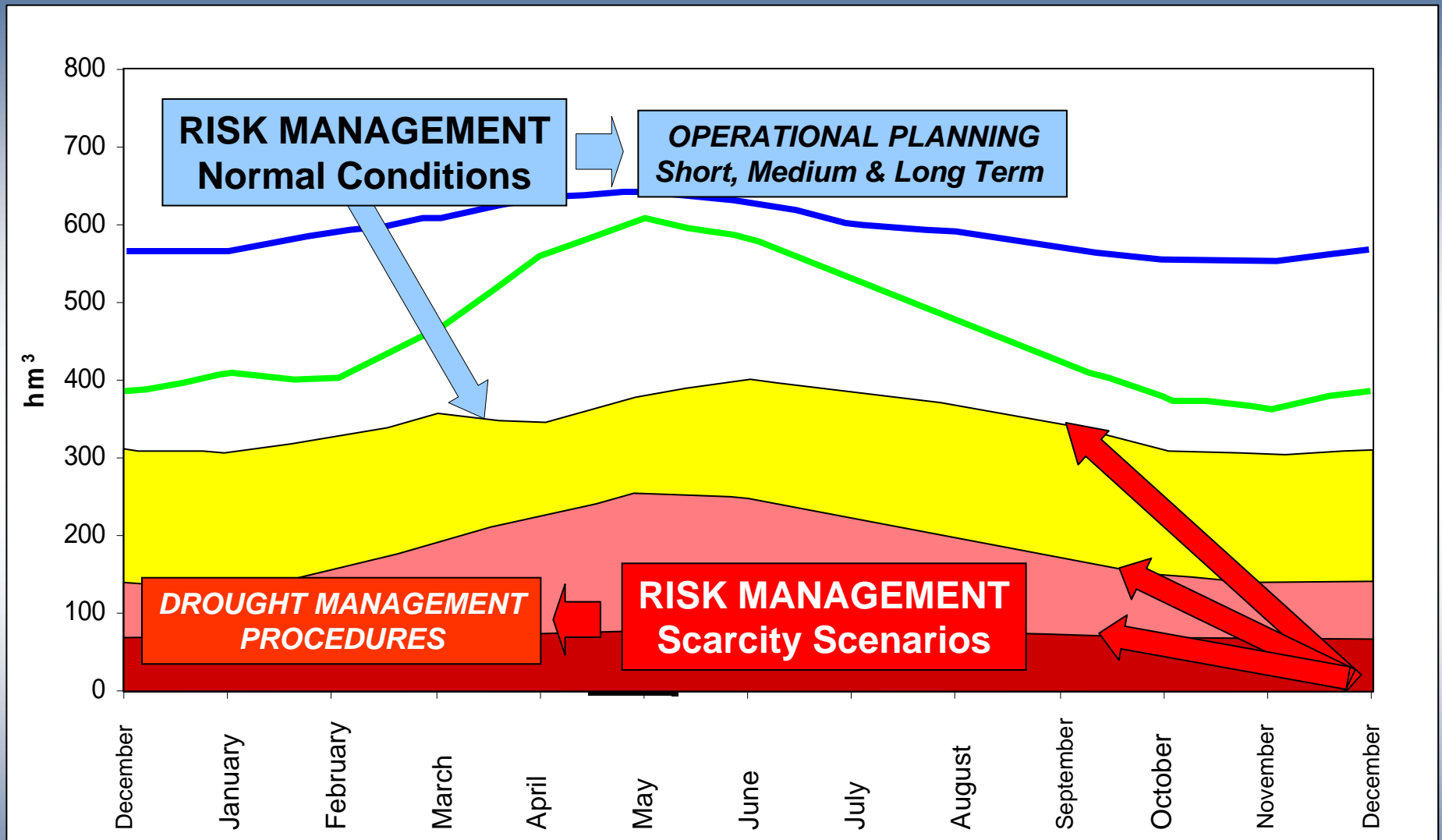


SERIE HISTÓRICA DE APORTACIONES ANUALES EN LA TOTALIDAD DE LOS EMBALSES DEL CYII

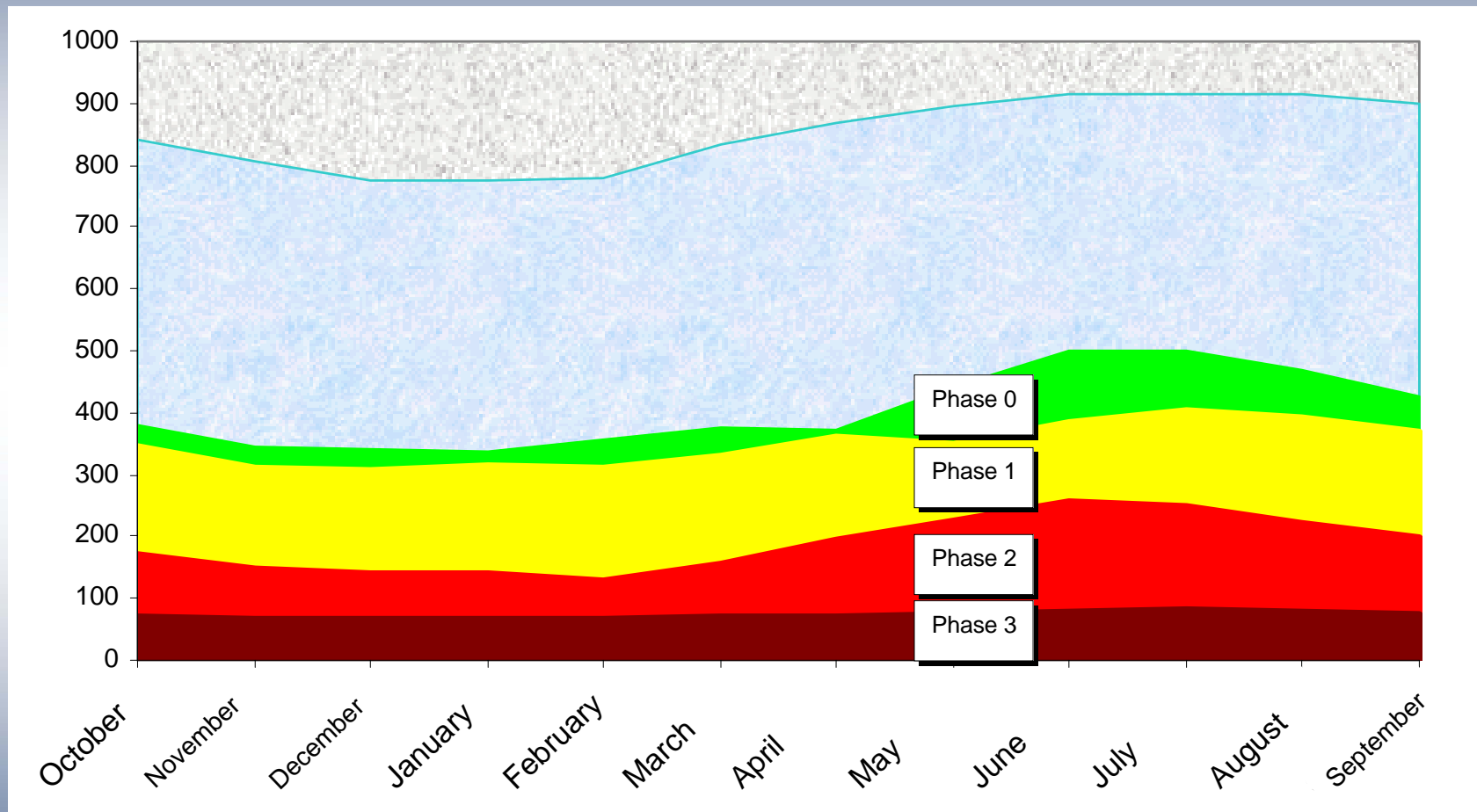


# RELIABLE DEMAND ELASTICITY





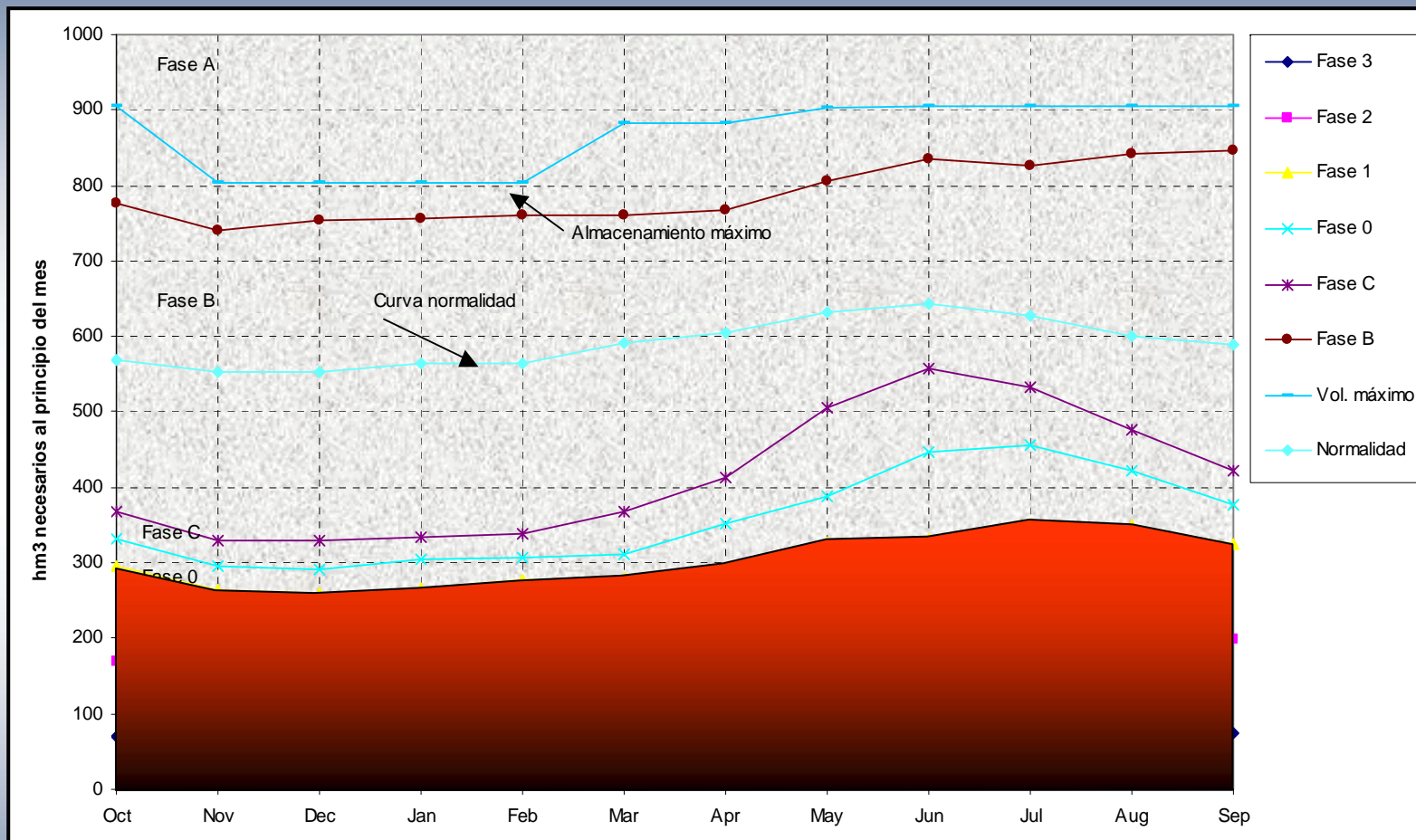
# STORAGE MONTHLY TRIGGERING LEVELS



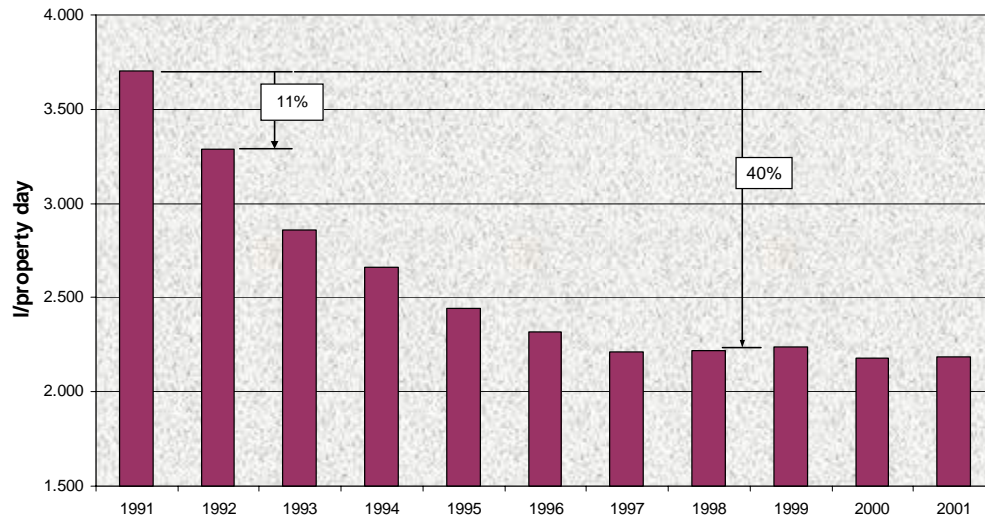
## Resources Clasification

	Ordinary	Complementary	Reserves	Interchange	Recycled
Gravity Sistem CYII					
Almoguera - Mondéjar					
Sorbe					
Interbasin Transfer					
Groundwater Type1					
Groundwater Type2					
Watermarket					
Reuse Infrastructures					
		Exclusives			
		Institutional Constraints			
		Shared			





Unitary consumption in commercial uses



### Demand reduction during drought

	Apartments	Houses	Commercial	Industrial	Others	Municipal indoor	Municipal outdoor	Global save
Phase 1	6,4%	11,2%	3,8%	2,0%	11,0%	5,0%	40,0%	<b>8,3%</b>
Phase 2	20,0%	35,0%	20,0%	20,0%	40,0%	20,0%	50,0%	<b>26,0%</b>
Phase 3	<b>80 l/h/d</b>		50,0%	50,0%	50,0%	50,0%	60,0%	<b>51,4%</b>

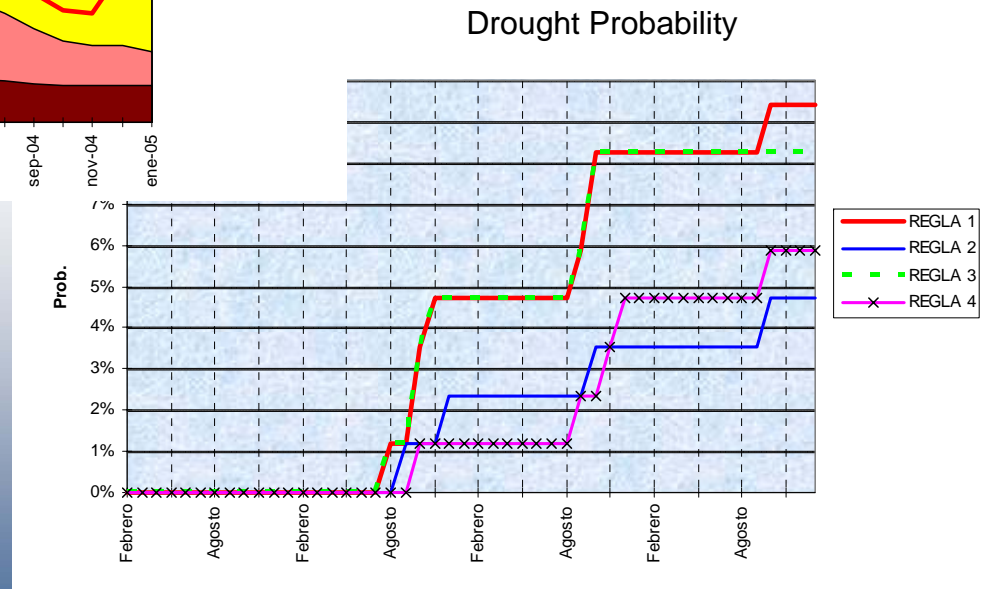
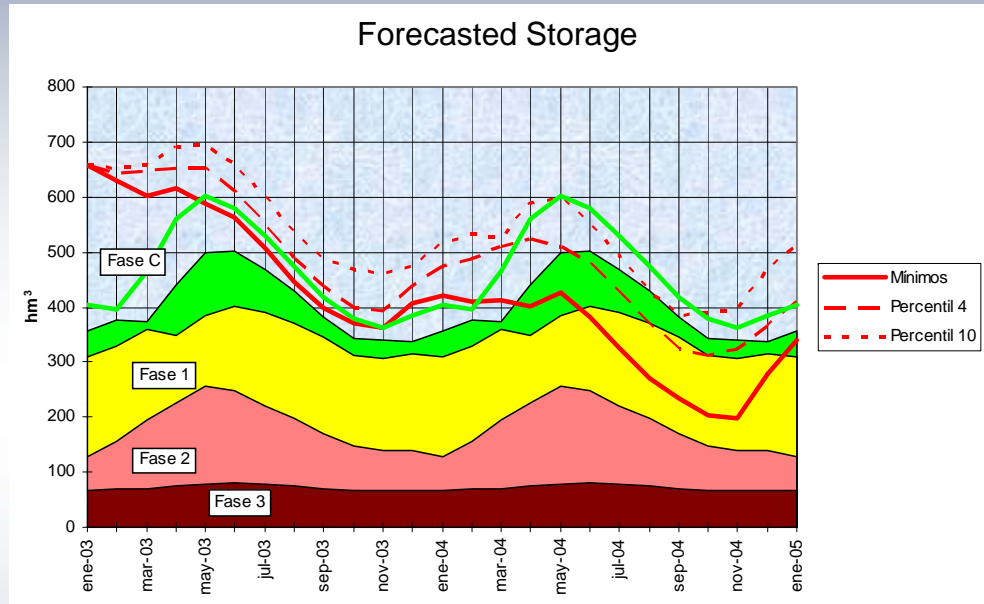
**Essential uses**

# OPERATION



- ▶ COMPULSORY & PUBLIC DOMAIN PROCEDURE
- ▶ WELL DEFINED OPERATIONAL CRITERIA  
(Preventive & Reactive)
- ▶ YEARLY UPDATED

# MEDIUM TERM OPERATIONAL PLANNING



# CONCLUSION

- ▶ FIRST SPANISH WATER SUPPLY SYSTEM WITH AN APPLIED DROUGHT MANUAL
- ▶ EFFICIENT USE OF WATER RESOURCES
- ▶ ACCURATE DEMAND MANAGEMENT POLICY
- ▶ EFFICIENT APPROACH TO A RELIABLE WATER SUPPLY & ENVIRONMENTAL MANAGEMENT