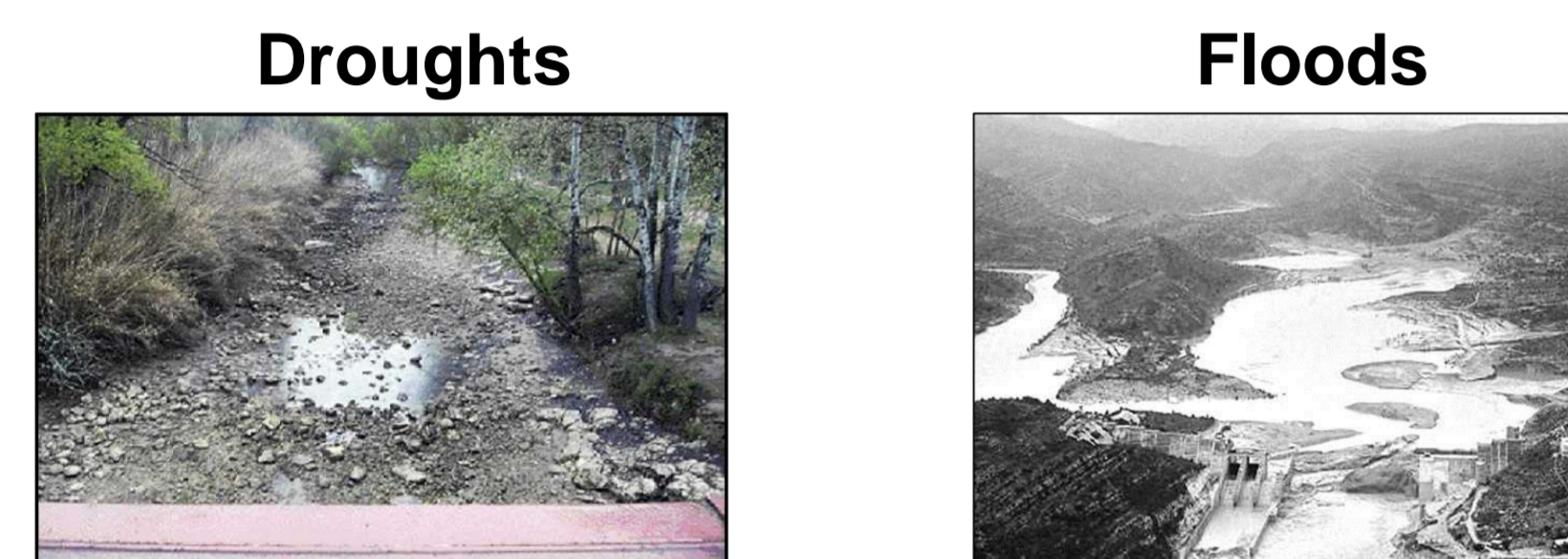


INTRODUCTION

How can we explore the co-evolution of coupled human-water systems to be able to make future socio-hydrological predictions? (Sivapalan et al, 2012):

- Learning from the past socio-hydrological changes (temporal analysis)
- Comparing the socio-hydrological patterns in different basins (spatial analysis)
- Studying in detail several basins (process socio-hydrology)

Hydro-social processes likely to be affected by climate change in the Mediterranean Europe, causing potential conflicts due to:



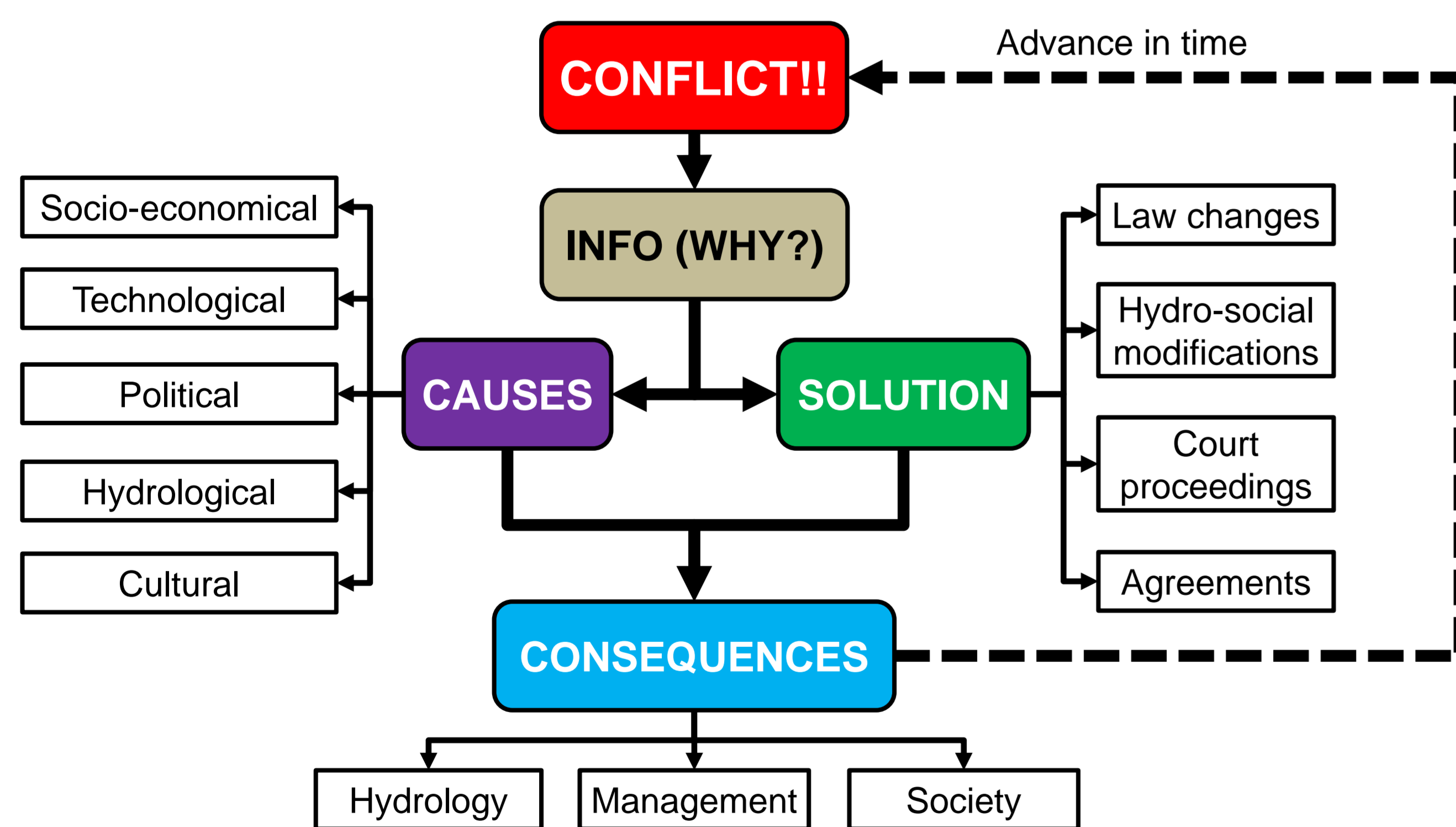
GOAL & APPROACH

GOAL: identify the past socio-hydrological processes co-evolution, conflicts and their resolution in the Mediterranean Spain.

APPROACH: comparative analysis of three river basins (spatiotemporal analysis)

METHOD & MATERIALS

METHOD: locate historical conflicts and analyse them in detail



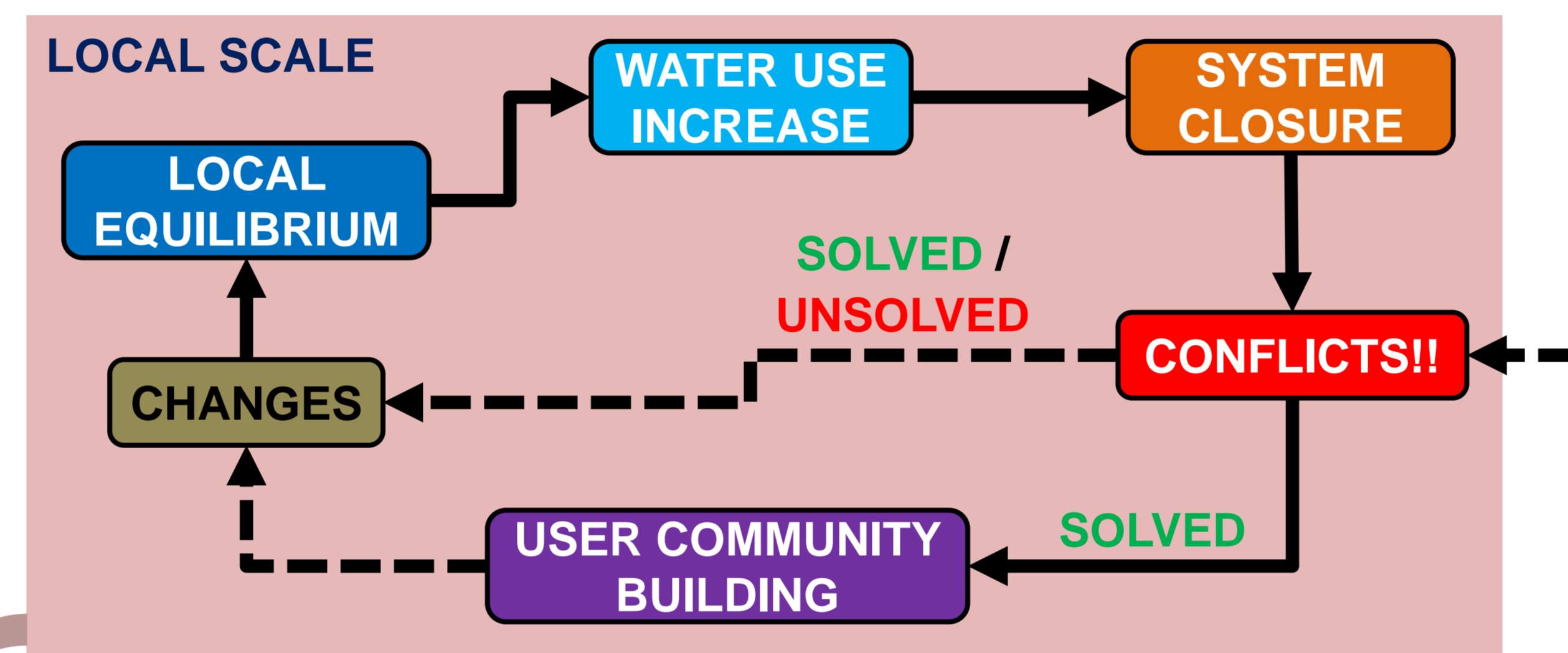
MATERIALS: some of them available since the Middle Age

- Royal archives
- Courts' archives
- Municipal archives
- Farmers' documents
- Social knowledge / traditions
- Field works

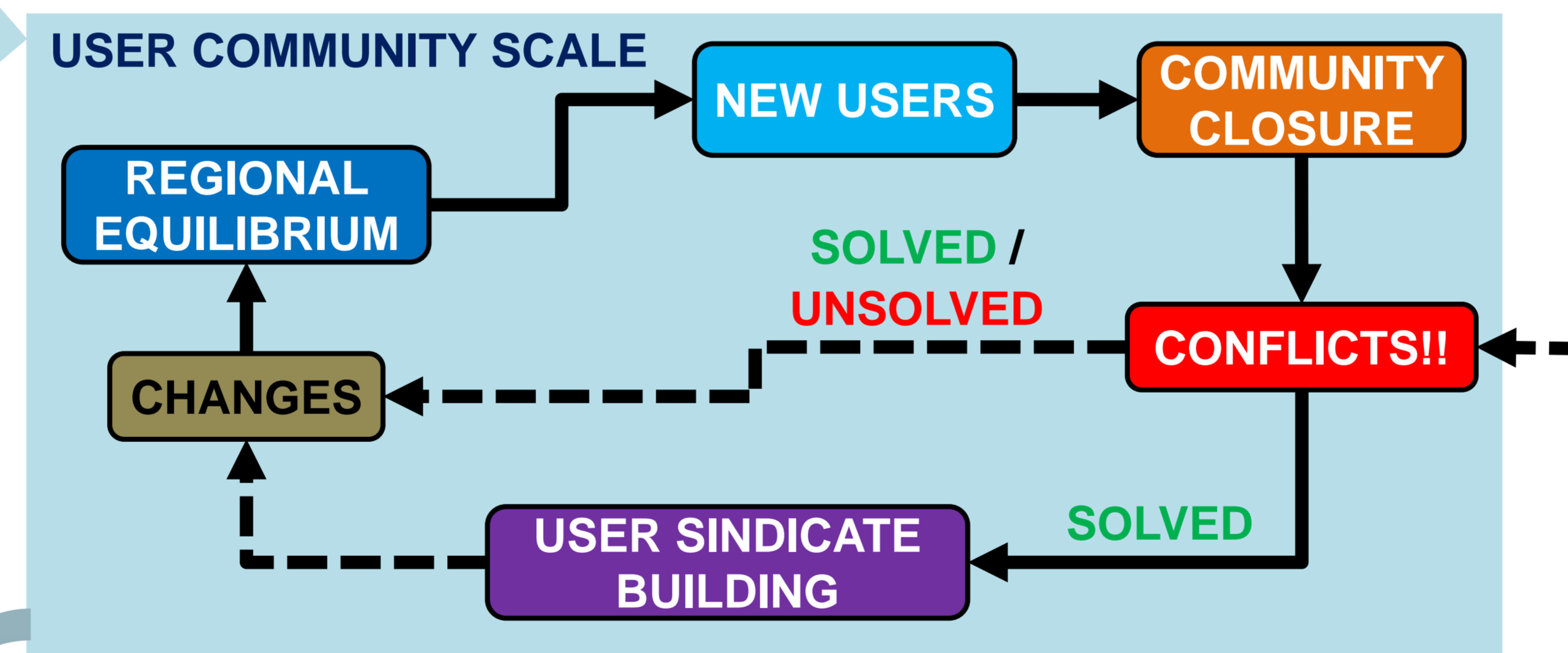
CONFLICT UPSCALING PATTERNS

System closure – system reopening cycle:

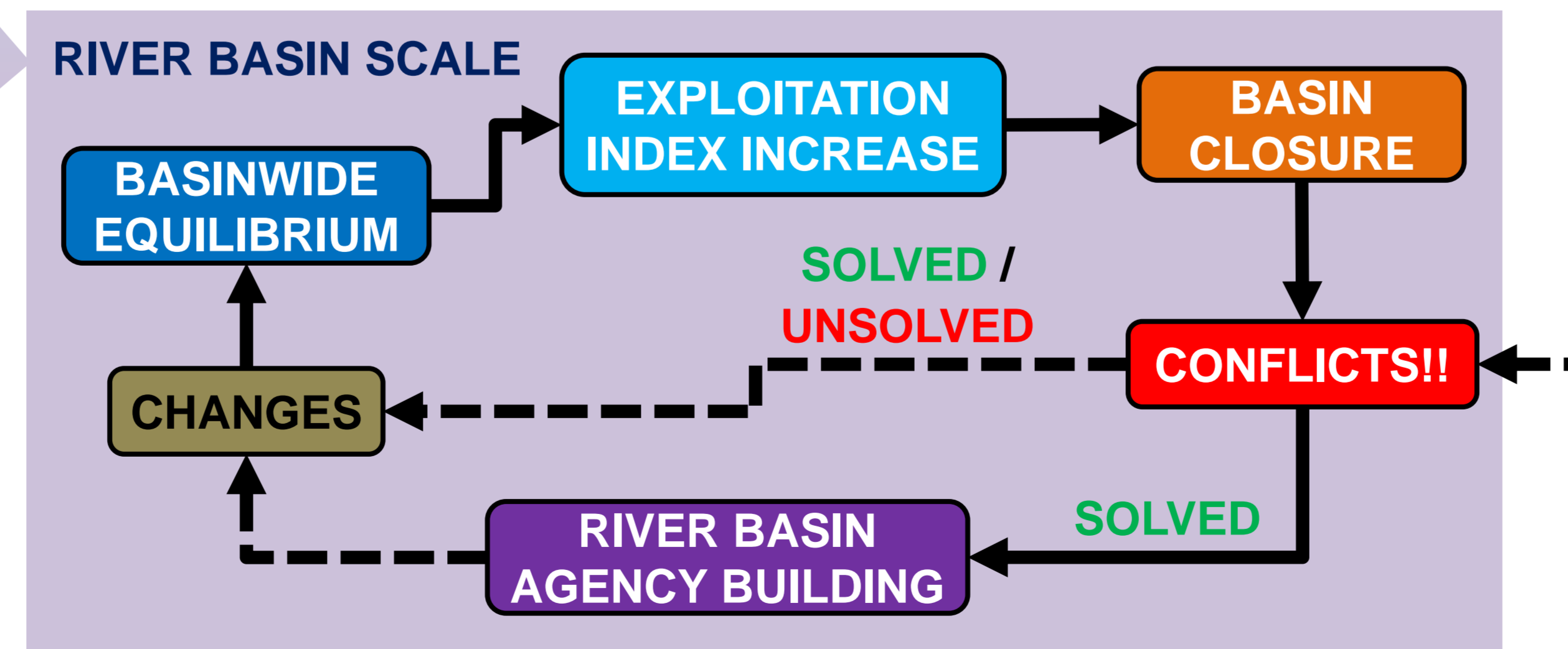
- When the system was open, neither conflicts nor significant institutional evolution noticed
- When the system was closed, conflicts boost evolution, establishing management rules, building institutions and developing collaborative frameworks
- Historical institutional upscaling (bottom-up) linked to increasing pressure on water resources, and parallel to social awareness of the hydrological cycle complexity (from the local system to the basin concept).



UPSCALING



UPSCALING



COMPARATIVE HISTORICAL ANALYSIS

	MIJARES	TURIA	JUCAR
MUSLIM PERIOD	<ul style="list-style-type: none"> • Weirs and canals construction or rehabilitation of old Roman ones • Development of a communal management framework 	<ul style="list-style-type: none"> • Weirs and canals construction • Development of communal management and inter-communitarian distribution procedures and Water Court 	<ul style="list-style-type: none"> • Canals construction from groundwater and tributaries sources • Development of communal management
CROWN OF ARAGON	<ul style="list-style-type: none"> • New settlers cause an irrigated lands enlargement • Basin closure • First 14th decades' droughts cause conflicts between users, provoked by the Count of Ribagorza sentence (1347) • Downstream users defend their rights against the upstream ones via legal actions in the Court • Fights between downstream users provoke the establishment of standard sharing water mechanisms 	<ul style="list-style-type: none"> • New settlers provoke an irrigated lands enlargement • Recurrent droughts cause conflicts between downstream and upstream water users • Downstream users send expeditions to control upstream users and to search for new water resources 	<ul style="list-style-type: none"> • Royal Canal of Alzira. Multi communal community • Argument between users • Institutional development. Ordinances • New weirs and canals (15th-16th): Cullera, Sueca, Escalona, Carcaixent and Corbera • Alzira district political fragmentation
19TH CENTURY	<ul style="list-style-type: none"> • Changes in crop patterns, being the majority of them replaced by oranges • Aquifer pumping possibilities create a large amount of new groundwater-irrigated areas • Private initiatives start to use groundwater to meet urban demands 	<ul style="list-style-type: none"> • Urban water demand increase • Conflicts between urban and farmers communities, resulting in regulation plans • Government approves the river regulation project presented by the irrigation users and hydropower private companies 	<ul style="list-style-type: none"> • Private hydropower initiatives for river regulation • The Royal Canal of the Jucar promotes the creation of a River Basin Authority (1934) and river regulation (1941)
20TH CENTURY	<ul style="list-style-type: none"> • All the urban demands in the area switch to groundwater • River regulation project for the Mijares • Groundwater users claim access to surface regulated water • Signature of the Mijares Agreement (1970) to share water between the historical and the groundwater users • Creation of the Central Mijares Water Syndicate 	<ul style="list-style-type: none"> • Creation of the Turia Central Syndicate with rank and functions of basin authority • Development of the public river regulation project. Limited irrigation expansion 	<ul style="list-style-type: none"> • New groundwater users in the upper basin that affect the stream-aquifer relationship. Increasing internal and external demand. • Basin closure. • New conflicts between the Royal Canal of the Jucar and the upper basin users • Unsolved hydro-social conflicts due to the Mancha Oriental aquifer and Vinalopó water transfer issues

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