

Healthiness of the Júcar River Basin MSP

The MSPs under consideration in the JRBD, CHJ and CPS, are considered successful regarding their governance capacity and their effective role for drought management in the JRBD. However, in order to ensure their effectiveness in future uncertain situations, it is important to further analyse their capacity to implement DRR measures under future scenarios.

Using the '**capital approach**' (Chapter 1; Mañez et al., 2014), recommendations for improving the MSPs' performance were derived. These include changes to strengthen existing control mechanisms, to improve the executive capacity of the MSPs (regulatory frameworks, institutional protocols, and financing options), and to increase the MSPs' autonomy, among others.

Improved risk assessment results

Some of the methodologies and tools included in the risk analysis are currently used by the MSPs in order to cope with droughts. For example, the deterministic and probabilistic simulation models of water allocation are already applied to test the validity of certain measures at the planning scale. The efficacy of these methodologies has been tested under average and extreme scenarios, and they seem to work properly. However, the optimisation of water allocation using **stochastic approaches** provides valuable information which is not currently used by the MSPs. The results show that the drought indicator calculated with OPTIRISK results in additional severe drought scenarios. Additionally, the OPTIRISK drought indicator reaches the emergency scenario more assiduously than

the others, which makes this enhanced indicator a much more extreme estimate.

Hydro-economic models can provide useful insights on optimal strategies for coping with droughts, as they simultaneously analyse engineering, hydrology and economic aspects of water resources management, while taking into account all users, at river basin scale. They allow testing the possible impact of **economic instruments**. The results show the potential of applying economic instruments to deal with drought risk management. Water pricing policies and water markets would have a positive impact on drought risk management, reducing the total scarcity cost. Both instruments would contribute to the reallocation of water resources to high-value uses during water scarcity periods.

The final recommendation regarding the risk analysis involves **Drinking Water Treatment Plants (DWTP)**. On the one hand, it is necessary to assess the risk of DWTP, which apply conventional treatments while operating. If the risk estimation gets to non-tolerable levels, investments must be done in the treatment and plant operation. On the other hand, given the relationship between the E.coli and cryptosporidium concentrations in the river, the effect of a DRR measure can be modelled with the water quality model at river basin scale GESCAL, consid-



ering coliforms, to identify potential risks for the DWTP.

Institutional improvements

The recommendations to improve MSPs in the JRBD, and specifically the CPS, are mostly inferred from the insights provided by the Capital Assessment and from the conclusions obtained from several seminars related to drought in the JRBD.

Regarding the composition and functioning of the CPS, one could ensure **a minimum technical education of members**. Then, it would be reasonable to extend the voting right to all members, which currently is not the case. In addition, for an effective transmission of information about the state of the water system and the agreements and measures developed by the CPS, feedback mechanisms between CPS members and their represented groups must be strengthened.

Public information as promoted by the EU Water Framework Directive for River Basin Management plans approval is not so vehemently applied to information about the evolution of drought and the measures adopted to reduce its effects. This information should be made available in a clear and easily accessible way by different means, such as the CHJ webpage and media. This would make people more aware of the situation and would enhance the adoption of DRR 'water saving' measures by society. Moreover, it would be easier to mobilise volunteer networks, which could help implementing information/awareness campaigns and environmental actions (control of illegal uses, accidental spills, river cleaning, etc.).

Several existing plans and protocols should be improved or updated for an efficient drought management. In relation to plans, the most relevant is the inclusion of **more drought management mechanisms** in the JRB management plan, and a **better anticipation capacity** against droughts without the need of activating the DSP. Also, significant importance should be given to the development and updating of **emergency plans for urban areas**: for example, microbiological risks in DWTPs, heat waves, fires and nuclear plant failures. In order to ensure a quick activation of the emergency protocols as well as to maintain the social and institutional awareness and to avoid the relaxation of cooperation between institutions in drought situations, some kind of drought emergency simulation should be periodically performed.

From an economic perspective, scarcity-based **water pricing policies** send a strong signal to water users (when the storage decreases, water price increases), and

so work as an incentive towards a more efficient water use. In turn, **water exchange in water markets** is voluntary and, therefore, represents a win-win situation for both buyers and sellers. Water markets are more easily acceptable for farmers, since they would increase their revenues, while scarcity-based water pricing would reduce them. However, the additional revenues generated by applying these economic instruments could be potentially used to compensate losses and increase water security. Other useful instruments for economic resilience would be **drought insurances** for irrigated agricultural uses; the creation of **strategic funds for drought episodes** to ensure that the necessary measures can be applied independent of the global economic situation of the country; and the creation of **a basic network of drought infrastructures** of which maintenance costs are shared between all the water users in order to distribute the costs along time and among the beneficiaries and to avoid disproportionate costs in drought episodes.

Regarding institutional hierarchy, CHJ and CPS are in charge of managing drought, proposing the emergency drought stage declaration, and updating the DSP. The Spanish Ministry of Agriculture, Food and the Environment is responsible for the legal declaration of an emergency drought stage and the legal approval of the updates of DSP. While this declaration and approval depend on the socio-political situation, delays can be expected. Hence, **it would be highly recommendable to ensure an immediate response**, for the sake of a quick and effective activation of DRR measures.

Finally, more technical recommendations, even though they have policy implications, include **the revision, and if necessary, reform of water allocation regimes**. This issue is addressed by the OECD (2015) which proposes a 'health check' to identify areas for potential improvement in water resources allocation. The results for the CHJ and CPS in this check are presented in Table 15.2.

Table 15.2.

OECD Health check for the water allocation regime in the JRBD.

Check 1. Are there accountability mechanisms in place for the management of water allocation that are effective at a catchment or basin scale?

Yes, there are. CHJ publishes annual Water Exploitation Reports providing relevant information on water availability and use at river basin scale (Andreu et al. 2012).

Check 2. Is there a clear legal status for all water resources (surface and ground water and alternative sources of supply)?

Yes, there is. At least for most of them, since there are always illegal uses which are not controlled.

Check 3. Is the availability of water resources (surface water, groundwater and alternative sources of supply) and possible scarcity well-understood?

Yes, it is. RBMPs include a full section about the assessment of available water resources.

Check 4. Is there an abstraction limit ('cap') that reflects in situ requirements and sustainable use?

Yes, there is. Water rights have a limit of water abstracted and water allocations are in line with it.

Check 5. Is there an effective approach to enable efficient and fair management of the risk of shortage that ensures water for essential uses?

Yes, there is. The Spanish Water Law together with the RBMPs define the different priority uses.

Check 6. Are adequate arrangements in place for dealing with exceptional circumstances (such as drought or severe pollution events)?

Yes, there are. The CPS and the Drought Special Plan establish and apply these arrangements, although they implemented some improvements.

Check 7. Is there a process for dealing with new entrants and for increasing or varying existing entitlements?

Yes, there is. In all cases, people must apply for a (new or modified) concession which is informed by the CHJ planning office to ensure that the concession is in line with the RBMP.

Check 8. Are there effective mechanisms for monitoring and enforcement, with clear and legally robust sanctions?

Yes, there are. There are water meters which gauge the surface water delivered and the main groundwater abstractions are also directly measured or inferred from satellite images; however, there is room for improvement. If abstraction limits are surpassed, sanctions are applied.

Check 9. Are water infrastructures in place to store, treat and deliver water in order for the allocation regime to function effectively?

Yes there are, although some improvements could be made to increase storage.

Check 10. Is there policy coherence across sectors that affect water resources allocation?

Not always. For example, subsidies from the Common Agricultural Policy are promoting water abstractions. Regional Statutes claim for the use of more water than the established in the RBMPs. Land use planning developments in the JRBD territory require a report from CHJ regarding the capacity to supply water, however it is not binding.

Check 11. Is there a clear legal definition of water entitlements?

Yes, there is.

Check 12. Are appropriate abstraction charges in place for all users that reflect the impact of the abstraction on resource availability for other users and the environment?

No, they are not. They should be in accordance to the recovery cost principle of the Water Framework Directive, which they are not.

Check 13. Are obligations related to return flows and discharges properly specified and enforced?

Not for all uses. They are for urban uses in terms of water quantity and quality, but not for irrigation uses.

Check 14. Does the system allow water users to reallocate water among themselves to improve the allocative efficiency of the regime?

Yes, it does. There are different ways in which this can be done: Inside irrigation districts, farmers are free to re-distribute the resources allocated to the district; water markets are considered by Spanish Water Law as the Centres for Water Rights Exchange, but they are not frequently applied; the Alarcón treaty for conjunctive use allows traditional irrigated areas of the lower basin to start to use the drought wells in order to 'release' surface water which is used by the junior rights users and by urban water users, who assume the maintenance and energy consumption costs of drought wells.

Policy recommendations

From previous considerations, and from the experience gained with the JRBD case study, some general policy recommendations can be given for a successful and effective drought management in other cases:

- The creation of River Basin Partnerships with governance capability is very important for an adequate integrated basin management and drought resilience building.
- River Basin Partnerships should define proactive measures against drought in the RBMPs, and apply them.
- An operative MSP, which applies reactive measures, is needed, since drought is a long-lasting hazard, compared to floods and fires. These reactive measures should be defined in a DSP.
- Effective and quick mechanisms should exist for a legal emergency drought stage declaration and DSPs legal update.
- MSPs should include representatives of all stakeholders related to water and drought, with a minimum technical profile, which ensures an effective participation. The representation must be real in the sense that there has to be feedback between the MSPs and the different stakeholder groups through the representatives.
- A system of drought indicators should be defined for the early identification of drought risk and for drought monitoring. The DSP should include these definitions.
- Definition and update of action protocols for hazards potentially triggered by drought (microbiological DWTP risk, fire, heat waves, etc.) should be included in the DSP.
- The use of economic instruments (e.g. water pricing policies, water markets, and insurances) to derive a more efficient use of water, and to lower vulnerability, should be considered. Nevertheless, their compatibility with environmental and socio-political issues should also be assured.



Pier and canal in the Albufera wetland. Photo by David Haro.

