Policy recommendations

Going beyond the crisis approach for drought management in mainland Portugal

The geographical situation of Portuguese mainland is favourable to the occurrence of regular drought episodes, often associated with weather conditions defined by the subtropical anticyclone of the North Atlantic, positioned in a way that prevents the polar front disturbances reach the Iberian Peninsula.

The Portuguese Institute of Sea and Atmosphere (IPMA) monitors the meteorological droughts occurring in mainland Portugal, using its national weather stations network. IPMA provides monthly reports about drought severity and forecasts based on precipitation probabilities in the medium term.

PSDI drought index is used to evaluate meteorological drought events at country level, whereas SPI is used to monitor drought at watershed level.

Future drought early warning will benefit from complementing those established rainfall indices with monitoring data from piezometric levels, streamflows and stored volume in reservoirs.

Drought management: Towards a risk-based approach

Nowadays the IPMA provides drought forecasts for the following month based on PDSI estimates, for three different precipitation scenarios: (1) normal (value corresponding to a probability of 50%), (2) lower, and (3) higher than normal (with values only achieved in 20% of years).

The analysis of past events along with the current projections for this century (MAMAOT, 2013) suggest an increase in regional duration and intensity of droughts, as well as of the severity of its impacts. So far, when such an event occurred, a drought commission, involving stakeholders from different sectors, was created to monitor the drought progress and assist in mitigating its effects. Measures have been taken according to increasing stages of drought evolution (MAMAOT, 2013a): pre-alert (measures such as sensitization, technical support, restriction to water caption), alert (water allocation and reserves) and emergency phase (water transport, supply reduction etc.). However, no post-monitoring was implemented as drought commissions ceased when drought ended.

A proactive approach based on drought preparedness and long-term risk reduction has received increasing attention, in particular after the 2005 drought, and for southern Portugal. For this region, a drought risk reduction plan was delineated, while water stress mitigation measures, particularly for agriculture were evaluated.

Key messages

⇒ Drought management in Portugal is still mainly oriented to agriculture and domestic supply sectors.
⇒ The drought events of 2003-2005 and 2012 were managed as crises, where Drought Commissions were created but their activities were discontinued after the end of these events.
⇒ Early warning is based on meteorological forecast managed by the national weather services: this system uses drought indices and it is available online.
⇒ Monitoring hydrological drought requires a better maintenance and new investments in the monitoring network.
⇒ Drought impacts on the urban water system supply are minimized by the implementation of measures for water loss reduction complemented by contingency plans.
⇒ Drought impacts on agriculture are mainly mitigated by water saving, increased use efficiency and conservation measures.
⇒ Construction of dams is the traditional response to mitigate drought impacts in agriculture.
⇒ New irrigation techniques allowing for a more efficient water use and reuse, while still not widespread, are becoming more available.
⇒ Implementation of green and blue infrastructures (EU COM 2013-249) for water conservation is not yet considered by most stakeholders as a well established option.

References

MAMAOT (2013). Drought 2012- Balance report (in portuguese)
MAMAOT (2013a). ENAAC - National Strategy for climate change adaptation of agriculture and forestry (in portuguese)
PNUEA (2005). National program for the efficient use of water. Presidency of the Council of Ministers
www.ipma.pt/pt/oclima/observatorio.secas/
Policy recommendations

Going beyond the crisis approach for drought management in mainland Portugal

The 3rd Mainland Portugal Drought - R&SPI Case Study Dialogue Fora meeting

8 October 2013, Lisbon

The 3rd Portuguese CSDF was dedicated to analyse options for long term drought risk mitigation. It was attended by stakeholders from Portuguese universities and from main public and private national institutions related to water use and drought management as the Regulatory Entity for Water and Waste services, the Portuguese Federation of Irrigation Farmers, the General Directorate of Agriculture and Rural Development, the Portuguese Sea and Atmosphere Institute, the Portugal Electric Energy Company, and the Portuguese Water Company.

Twelve options were evaluated and ranked according to five criteria. Options for drought risk mitigation viewed as most relevant by the stakeholders were: (i) More efficient use of water for irrigation; (ii) Reuse of irrigated water, and (iii) Construction of new dams.

Low cost and easy to implement measures such as awareness campaigns and water pricing, could be used supplementary to any other drought mitigation option.

Construction of new dams is highly demanding in terms of economic and environmental costs. Dams may be a “false mitigation measure” when reservoirs are depleted in case of hydrological droughts or when the saved water is used for an extension of the agricultural area, thus increasing dependency on irrigation.

Dams, as an option for drought mitigation, should be designed for multiple uses, with multi-year reservoir capacity.

Drought management: Towards a risk-based approach (continued)

Several national programs attest the need for an action plan to combat drought and list adaptation measures focusing on increasing water reservoir capacity and improvements in water use efficiency (PNUEA 2005, MAMAOT 2013). Furthermore, the balance of the last drought event (year 2012) done by the government, identified strengths and weaknesses of public performance and proposed the establishment of an action plan towards the prevention, monitoring and emergency to enhance drought preparedness (MAMAOT, 2013a). Most of the measures to be included in the plan are administrative and institutional (e.g. regulating financial support to agriculture), but in line with the needs discussed among DROUGHT R&SPI stakeholders.

According to stakeholders’ opinion, preparing for recurring droughts in mainland Portugal needs a strong investment in win-win options, adequate for non-drought situations although contributing significantly to mitigate drought impacts, particularly in agriculture. That is the case of measures towards increasing water use efficiency and reservoir capacity, for which a proper implementation depends on overcoming general economic constraints and specific technical limitations.

<table>
<thead>
<tr>
<th>Policy option</th>
<th>Contribution to impact mitigation</th>
<th>Economic viability</th>
<th>Social acceptance</th>
<th>Environmental implications</th>
<th>Technical feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Promotion of awareness</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>2. Improvement of irrigation systems</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>3. Building of new water reservoirs</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>4. Increase in water supply</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>5. Improvement of dams and water reservoir systems</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>6. Use of treated wastewater</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>7. Water pricing policies</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>8. Remote sensing of groundwater level</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
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<td>9. Water resource education in all key sectors</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>10. Water stress relief in urban distribution systems</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>11. Water use efficiency in agriculture</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>12. Water stress reduction in agricultural distribution systems</td>
<td>Increase</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
<td>Medium</td>
</tr>
</tbody>
</table>

Further requirements to improve operational drought management in Portugal include: (i) A complete and reliable information system on available water resources (superficial water and groundwater, quantity and quality) and quantity/temporal variation of water uses for each sector; (ii) Monitoring programs with well-structured information networks (namely for transboundary waters); (iii) Contingency plans for each public water management entity (with a harmonized approach) supervised by the Commission for Reservoir Management, to ensure a coordinated approach and common criteria among regions; (iv) Linking drought indices with drought impacts to develop a global drought indicator, useful in drought risk evaluation.

Science-Policy Interface

Until now, in Portugal, drought events have been treated as occasional crisis. However, facing predicted increases in recurrence and intensity of these phenomena dictates a different approach towards drought mitigation, namely aiming the adoption of adaptive management plans. So far, impact quantification of last drought events (2003-2005, 2012) and the measures taken, are mainly oriented for agricultural and urban supply sectors, and as such traditional and widespread response to drought events involves the construction of new water reservoirs.

Knowledge transfer about technical improvements in water saving and water efficiency should be promoted, particularly in the most affected regions and sectors. Policies towards the promotion of best farming practices and clean technologies within water-saving programmes must complement water conservation measures. The potential for drought mitigation of policies currently fomented by European Commission to protect and preserve “green and blue infrastructures” (COM 2013-249) are not yet internalized by most of the stakeholders. New research and policy responses now need to test long-term business models that, while enhancing water availability (e.g. strategic reserves), increasing soil infiltration and groundwater recharge, help to combat climate change and biodiversity losses.