

Report of the IDMP Expert Group Meeting – Benefits of Action/ Cost of Inaction for Drought Preparedness

Geneva, 16 September 2016

Background information and introductory session:

Based on discussions at the High-Level Meeting on National Drought Policy (HMNDP) in March 2013, this meeting had the objective to kick-start the involvement of experts for a global reflection on: the current state of knowledge on the socio-economic costs and benefits of action and inaction for drought preparedness and drought risk management; the immediate needs or constraints preventing actors to take action; and on the way forward to improve people's and systems' resilience to drought events.

Established at the HMNDP, the WMO/GWP Integrated Drought Management Programme (IDMP) organizes its work around the 3 pillars which were emphasized at the HMNDP. They are:

1. Monitoring and early warning systems
2. Risk mitigation and preparedness plans
3. Vulnerability and impact assessments

There has been an emphasis on pillar 1 on monitoring and early warning system, which is an important part of drought preparedness. Many actors are active in this field. A handbook of drought indicators and indices has been recently released to provide an overview of the biophysical indicators and indices currently used to monitor droughts.

The second pillar on risk mitigation and preparedness plans has been developed further with: the release of the IDMP's National Drought Management Policy Guidelines; a series of regional workshops by the UN-Water Decade Programme for Capacity Development, FAO, WMO, UNCCD and CBD; as well as through the work done by IDMP regional programmes. This pillar seems to benefit greatly by the identification of the benefits of drought preparedness which are not associated with avoided losses of production, assets, lives, etc.

The third pillar on vulnerability assessments and drought impact assessments and their indicators are not as developed as the other pillars and there is more work to do in order to capture the wide range of socio-economic impacts of drought events. It is believed that this evidence gap is one of the main reasons for the slow transition from reactive drought crisis management strategies, processes, infrastructures and capacities (understood at large, and including human and institutional capacities) to pro-active drought risk management strategies. This evidence gap has to be tackled in the future, and this meeting is one of the first concrete steps in that direction.

Summary of Session 1 Discussions: Definitions and framework

This session discussed a key issue with regard to definitions: water scarcity vs drought.

IWRM exists, and addresses the "too much" and the "too little" in water issues – drought covers part of the "too little" situation. In particular, in LDCs the first priority is to have enough water for agriculture, hence there is attention to drought, but also more broadly to water scarcity.

Indeed, the IDMP has been looking for drought plans in partner countries and has through the network of GWP actively involved stakeholders from the IWRM sphere. Given that in IWRM the aim is to avoid losses in water services which translate into socio-economic losses (e.g. loss of agricultural, energy, or fisheries production), IWRM planning encompasses drought – i.e. a temporal event in which water scarcity heightens to a specific point (also conveys the notion of volatile water scarcity). IWRM implementation would thus need to address drought in order to succeed. In the extreme, water scarcity can be seen as lying along a continuum of decreasing water supply and increased water prices (either market or shadow prices) and ends at the point where water supply stops (i.e.: in the most extreme drought, there is simply no water available at any price).

This relationship is well recognized in standard economic analysis, and is an area in which the current draft of the literature review could potentially be pushed further in order to get at the water scarcity vs drought issue. It is however also advised that it cannot be only assumed that drought is a shorter term issue (variability of water supply), and scarcity is more of a permanent issue. In the past it has been a big issue to define drought/water scarcity, and it is recommended not to dwell on this debate in the literature review

Suggestion to resolving the drought/water scarcity fragmentation of debate in the next steps toward an assessment of drought preparedness: as during drought, aspects are linked to water scarcity - demand is a curve, and choices differ according to available water, we must stop considering supply-demand balances as fixed. **Heightened scarcity** due to a drought event, is what we want to look at, with clear socio-economic consequences.

It seems the group reached a consensus on this. Drought, as best defined as it can be biophysically, will not have linkages to socio-economic effects, and thus will not link to appropriate reflections or actions. It is the scarcity of water within drought that matters, which for now we suggest to name “heightened scarcity”, or “**water scarcity during drought events**”.

Given that water is managed by groups of actors often with conflicting interests, the choice of indicators water scarcity in drought events and of its costs can become very contentious. In particular, aspects of **private vs public good perspectives** on these monetized values, as are the time scales different actors work with in optimizing their streams of costs and benefits from water services.

Furthermore, a distinction needs to be made on the context when considering drought impacts – especially developed versus LDC contexts.

Another issue lies in the distinction between **drought preparedness and drought risk mitigation**. Though definitions are offered, and indeed we agree that preparedness is part of mitigation (building institutional capacity), whereas mitigation is more the undertaking of actual measures (like building a reservoir), the limit is not always clear in the literature or in the practice – both often takes place in parallel or in complement. Participants pointed to the different sensitivities of different stakeholders regarding preparedness and mitigation. From IDMP’s perspective, preparedness highlights the need to make sure that actions are taken at some points in the cycle of evolution of the drought, or ensures that a mitigation action is not something that becomes detrimental in the future.

Action items / Next steps: the group identified the value of producing a handbook on performance metrics (ref.: disaster risk management literature) for impact studies that address specifically the socio-economic manifestations of “water scarcity during droughts”, but also cover environmental issues/impacts – monetized or not. The idea is to assist in providing a guide for assessments which seeks to quantify the impacts of drought on different sectors (e.g. energy, tourism, industry, health, etc.) and services (e.g. ecosystem services, land subsistence, wildfires). Such a handbook would not need to come up with new metrics, just point to existing approaches/metrics in different disciplines on quantifying impacts.

Summary of Session 2 Discussions: Measuring the costs and benefits of drought preparedness

Agreed among experts present at the meeting is that costs and benefits of drought preparedness are best illustrated through case studies in different socio-economic contexts, for which a catalogue would be beneficial. The catalogue should cover a very wide range of direct and indirect impacts, on various economic sectors and on the environment, as well as social impacts, which may be difficult to quantify, including in financial terms.

Costs of action: should cover the costs of the intervention, as well as potential institutional costs - e.g. the system of licenses for water allocation in the UK, which come with large costs for the government (implementing new laws) and for water users (to adapt to the new laws). As an example in the UK an analysis has been developed, which includes forecasts of what the policy context will be in the future and how agents will react or behave in response to possible policy scenarios (i.e.: agent based modelling of different license allocations). While such advanced analysis might not be reproducible in all settings, they could serve as frontier benchmarks in a catalogue of possible methodologies for cost/impact estimations. Realities in different contexts should however also be taken into account when analytical tools are proposed.

A clear issue in the assessments of costs and benefits: certain sectors clearly display both benefits and costs from the impacts of the drought, the net impact depending across actors and settings. Examples: agriculture, tourism, and even mitigation options such as reservoirs (and their multiple uses, from agriculture to tourism or ecosystem services and biodiversity). Whilst such differentiation on the sign of the drought impacts can be captured by water prices in well-formed water markets, this is of course not the case in most countries.

Setting the baseline to benchmark the costs/benefits of interventions is also an issue although examples probably exist in the literature on disaster management and flood impact assessments: suggestion for the next steps is to compare acute costs within a drought vs costs in a water-scarce situation, which could be based on the existing hydrological indices.

Costs of inaction: Two approaches are typically pursued in flood assessments: 1. Reported impacts (when it happened, how often, etc.) and 2. Vulnerability and exposure to a hazard, risk assessment and likelihood of certain impacts. The choice of one of the two approaches also depends on the scale: usually, a global scale analysis uses vulnerability assessment, whereas a local analysis is can rely on impact reporting.

Scarcity costs are typically difficult to assess, as based on **water demand curves** which are not widely available across the world. These demand functions, or marginal benefit curves (of water),

can be estimated in a step-wise approach, with different technologies providing different steps of water supply at a specific cost. As scarcity increases, one moves up the type of technology to provide water (at this price). By categorizing countries, one could have groups of technologies to price (across similar production systems) and thus reduce the burden. A remaining issue for a comprehensive assessment of drought preparedness: the benefits lost due to drought (direct and indirect) arise from a wide range of sectors (economic and others). How do the different sectors transform water into economic (or environmental) services? Even restricted to economic services, to calibrate this in order to assess the scarcity costs was a huge effort in the US – hardly feasible in data-poor environments. Thus valuations of costs and benefits could remain very partial and sectors not represented might undermine credibility.

The group seems to uniformly support the idea of a **catalogue of costs and benefits**, and the development of a common **template for assessments**, at least for given sectors (e.g. agriculture). The catalogue could be completed by an examination of the linkages between impacts in specific settings (i.e. leading to recording of indirect impacts (the case of drought in PNG was mentioned, impacts from agriculture, to low drinking water availability, to health, and to water transports and relief delivery)).

There was a discussion on why water trades as a means of addressing water scarcity are not used more often in the UK, compared to US or AUS? Do such considerations require institutional analysis (i.e. is the current regulatory process for trading constraining to trade)? These are typically very difficult issues to examine (and economics not the best tool for this). It is furthermore important to look closely on what options exist in LDCs.

Issues to tackle in a comprehensive assessment of drought preparedness (next steps):

- Several sectors and services are affected, at different scales and through time, hence different performance metrics are used - how can we aggregate to show overall impacts?
- How far can indirect effects be captured? Suggestion: do not venture into new territory, but cover existing knowledge and agreed upon metrics, brought into the focus on drought, so that we have legitimacy already
- Secondary effects such as salt intrusion, wild fires, impact on buildings, and land degradation impacts have all been mentioned as important to capture

Not treated in the review and suggested to be included in a revised version:

- What exactly are the costs and benefits of insurance schemes (crop insurance and particularly index versus indemnity based schemes for instance)?

Summary of Session 3 Discussions: addressing obstacles and opportunities

Cognitive failure is a clear issue – people don't recognize, don't remember, that drought happens and causes impact (and keeping drought on the political agenda between episodes is key to move the preparedness agenda forward). All types of failures matter, but maybe there is a hierarchy – and cognitive failure, especially at managerial level, is the main cause of inaction? E.g. drought preparedness plans exist, but no one knows about them, as they are never implemented. In LDCs,

capacity development and marketing of these plans are key (cognitive failures), and the economic argument developed in this project is an attempt to communicate this better. Risk management, as a step wise approach, is not an insurmountable task.

Institutional failures: the physical boundaries of drought are not corresponding to political ones – how to implement decisions?

Information failure: Annual supply and demand calculations do not capture what happens during drought events. In addition, even though simulations are good, they project the future, but they do not show what actions would have brought as benefits for the last event – which works better to grasp what the impacts of action are. This is very much done in climate change adaptation strategies, why not in drought?

Looking at the **co-benefits of drought preparedness and drought mitigation**, as ways to guarantee that actors will take steps.

Suggestion: focus maybe on assets that were built but never used: do we have investments in water supply that are not used? Idle structures? This would ensure some focus on the wide set of indirect effects, whose comprehensive treatment might go beyond the capacity of the expert group (in terms of quantifying those) and the readership of the drought issue. Further, the issue of what happens to benefits and costs when drought does not happen? Yet, tying the planning of drought mitigation actions to the planning and actions in other fields, thus mainstreaming benefits into other fields, seems to be the most promising way to get the ball rolling. Further, while planning, it is important to raise the potential surprises that can happen in action – testing the plans for stress events, and to identify who to draw from for the revisions of plans when surprises happen? Are the strategies we see born out of actual events?

Not treated in the literature: what are the impact channels/pathways? Once we reach a certain level of severity, what will happen, to whom, where, how? LDCs have very different impacts from developed countries' impacts (with management capabilities to mitigate drought effects) – for instance: how to quantify conflicts, migration, etc.? What are the differences between awareness raising indicators and drought management indicators?

Not covered in the review and to be included (at least briefly) in a revised version:

- transboundary issues (how do they appear in the context of drought, what costs are they associated with and what kind of preparedness plans do they affect)

Summary of Session 4 Discussions: main messages and next steps

Emerging points from the meeting:

1. Framework or structured way of looking at impacts, direct and indirect, by sectors (agriculture, health, tourism, environment, ...) seems necessary.
2. Tracking benefits to different sectors, costs of inaction, costs of action, benefits without drought event, is necessary but very challenging

3. There seems to be value in developing comparable methodologies – such as a handbook on performance metrics (see session 1 and 2 above).
 - Get USDA ERS involved, they may have the capacity to support
 - Bring in people who work on the Water-Energy-Food (WEF) nexus? They would have good input, they will know who this issue speaks to. Note: in the White House WEF nexus, the cutting theme is drought
 - Include risk aversion from decision makers (water board managers) in the identification of the methodologies to consider - i.e. include reflections on the distribution/spread of outcomes rather than focus on average values (as CBA traditionally does), the latter being more relevant to risk averse decision-makers
 - Generally tailor the report to the target audience – which is?
 - Cataloging of impacts at different levels and geographies
4. Is there value in reworking the review and pushing this new publication forward?

There is a strong value seen in publishing the work done under the IDMP in order to use the economic argument for developing and implementing drought preparedness plans. The following items would need to be first addressed:

 - Include gaps identified in the meeting (see above, under “not covered in the review”), but ensure that the publication does not get substantially longer
 - Include IDMP partner examples (call for examples to go out once this report is finalized)
 - Urban examples to add in this report as a box
 - Rework the first page of the report and be clear about the “risk-based approach” (not the traditional sense from engineers, which is a minimization of expected values)
 - Two points were raised, which could be potentially addressed in a revision of the literature review (depending on means/scope): a) Identify more clearly which part of the costs could action reduce, and b) What do we do with the risks that are not being assessed?

There were four products identified for the future with the responsible people identified:

1. Finalizing the report of the meeting
2. The review, with IDMP contributions and additions suggested from the meeting for publication (importance not to extend too much) as an IDMP publication and subsequently, if timeline allows, as an input to or chapter in the book edited by Don Wilhite.
3. The work/handbook on the economic indicators, methods / performance metrics – examples exist from which to inspire this work, E.g. H2020 (tbd). It could be a useful contribution to guide further studies.
4. The idea of larger workshop on the issue raised which needs further development by IDMP partners, in order to start addressing the knowledge gaps identified in the Expert Group Meeting and in the literature review.

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