

## Annex I – Template for shaping the Optimal Drought Management Model according to the national characteristics

### National dialogue – why

Even though Optimal Drought Management Model (ODMM) aims at improving country's drought management practices, through regional cooperation it can only be improved to a certain level while its fine details can only be addressed via national dialogue within each country itself. Only through collaborative working meetings of different vulnerable sectors it is possible to find out to what scale country's priority fields are already addressed in relation to drought and what is left to be done to reach country's satisfactory level of drought management.

The purpose of these meetings is to collect what still needs to be done in order to start implementing proactive national drought management. At the same time, it initiates the cooperation and national dialogue among key authorities and creates the momentum.

### National dialogue – with whom

Sectoral help and communication is essential here: ministries covering the vulnerable sectors, sectoral agencies, national institutions involved in monitoring and responding to drought and other key stakeholders who can contribute with their sectoral expertise (i.e. hydropowers, food production companies, forestry institutes etc).

## Part 1 – Opening questions

Participating institutions:

Opening questions:

- Where in the ODMM's institutional scheme would you position your institution (with regard to its legal tasks)?
- Can, beside meteo offices, also companies and institutions of vulnerable sectors improve from using <https://www.droughtwatch.eu/> portal at daily work? What other national datasets would they wish to have available in DroughtWatch to make it more useful for them?
- Does any sector *regularly* collect drought impacts (meaning *periodically*, and not only pot-festum after some severe drought)?
- Do key institutions recognise DroughtWatch and efforts with NRN as useful and applicable in their country?
- Is there potential to create something similar as NRN also for collection of other sectors' impacts?

## Part 2 – ODMM review

Danube Drought Strategy proposes also some activities to be carried out in order to set ground for implementing proactive drought management (chapter 5.1).

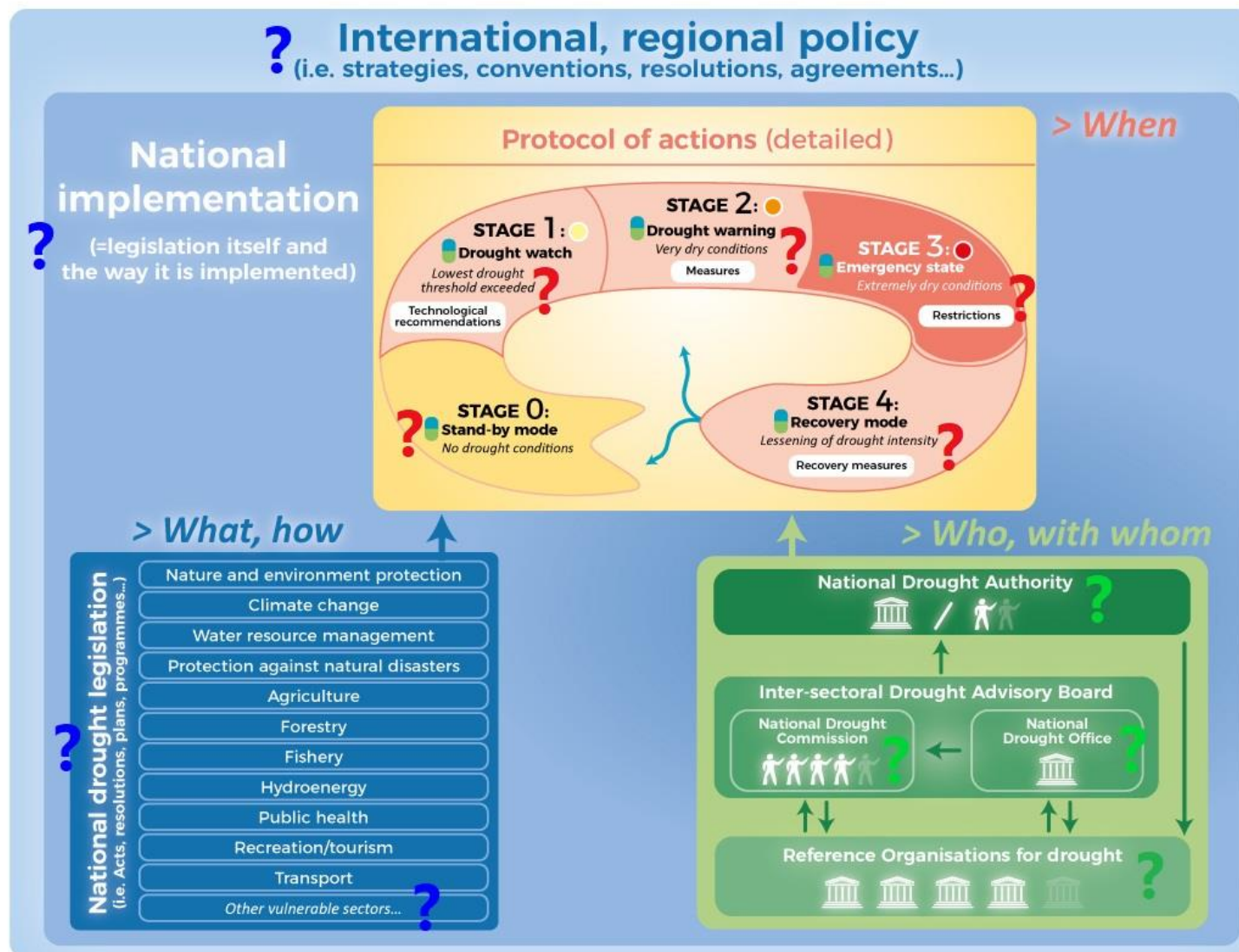
Areas within the ODMM that those activities address and therefore where national characteristics are required, are shown in picture 1.

Accompanying to it is Table 1 below, in which options stand for the following:

- Option 1: the activity is already in place and implemented,
- Option 2: the activity is already on national or sectoral agenda,
- Option 3: the interest is expressed but the activity is not on the agenda yet,
- Option 4: not enough interest expressed, not foreseen to be on the agenda yet.

Picture 1: areas within Optimal Drought Management Model **where national characteristics are required in order to** See attached file for further explanation of the model.

## Optimal drought management model (detailed)



<b>Proposed activities to carry out in order to set ground for implementation of proactive drought management (Drought Strategy) in your country</b>	<b>Level of interest for the activity at country-level</b> <i>Mark a relevant option with 'x'. If options differ for different sectors, mark all relevant options and label in comments accordingly</i>				<b>Additional comments</b>  <i>If option 2: in what frame is the activity going to be implemented? Who will carry it out?</i> <i>If option 3: in what frame could this activity be carried out and who could be in charge?</i>
	Option 1	Option 2	Option 3	Option 4	
<b>Institutional cooperation scheme</b> >?<					
<b>Identify</b> groups at risk and develop stakeholder network, initiate discussions.					
<b>Nominate Reference Organisations.</b> Select among the existing public, governmental or private institutions.					
<b>Nominate</b> National Drought Office and assign their concrete responsibilities.					
<b>Nominate</b> National Drought Commission and assign their concrete responsibilities.					
<b>Nominate</b> National Drought Authority and assign their concrete responsibilities.					
<b>Drought policy</b> >?<					
<b>Review and evaluate</b> existing national drought management policies and plans.					
<b>Identify</b> conflicts among water users.					
<b>Develop and define</b> objectives and goals of national drought management per each vulnerable sector, then define relevance and national-level priorities.					
<b>Develop</b> an inventory of drought data in a country (monitoring and impacts data per vulnerable sectors) and financial resources available.					

<b>Prepare</b> national plan for drought management (with concrete protocol of actions as its driving force).					
<b>Find place</b> for drought management plan in national legislation.					
<b>Protocol of actions (drought scale) &gt;?&lt;</b>					
<b>Improve</b> national drought monitoring approach by means of available results from research (additional integrated drought indices, methods, tools etc.).					
<b>Define</b> thresholds for drought stages (and for each vulnerable sector if needed).					
<b>Develop</b> a manner of national-level communication on drought with public (national website for regular up-to-date drought status and early warning information for users).					
<b>Define</b> concrete measures for each drought stage.					
<b>Define</b> national drought protocol of actions – an operational roadmap with concrete “who does what and when”.					
<b>Identify</b> research needs for each vulnerable sector, and develop a way of assessing drought risk and collecting sectoral drought impacts.					
<b>Edication, media</b>					
<b>Build</b> public awareness, share knowledge and information.					
<b>Develop</b> educational programmes for all age and stakeholders groups.					

**Short conclusion based on cross-check analysis of marked ,x' and answers to questions listed within the instructions:**

Table 1: Proposed activities to carry out in order to set ground for implementation of proactive drought management. Corresponding aspect within ODMM that they aim at improving is graphically shown in picture 1 above (question marks).

### Part 3 – Potential measures reviewed (next page):

A drought monitoring and early warning system (DEWS) is the foundation of effective proactive drought policies. That information, if used effectively, can be the basis for reducing vulnerability and improving mitigation and response capacities of people and systems at risk. can then trigger appropriate mitigation and response actions.

(From IDMP: <http://www.droughtmanagement.info/pillars/monitoring-early-warning/>)

The examples of measures in Table 2 below can be evaluated according to the level of applicability in a country, as well as organised in terms of specific drought stage it can be assigned to:

- 0 - Stand-by mode (the preventive)
- 1 - Close monitoring (first signs of drought)
- 2 - Drought warning (drought develops to intense)
- 3 - Emergency state (crisis management approach)
- 4 - Recovery mode (mitigation and evaluation)

Examples of measures for different drought stages		How useful/applicable/adoptable are these measures for a country? <i>Mark relevant option with ,x'</i>				Drought stage within ODMM it could be assigned to in a country
		Already in place	Applicable	Conditionally applicable	Not applicable	
<b>Preparedness – long-term</b>						
<b>Water resources</b>						
Enhancing supply	Storage capacity increase					
	Water transfers					
	Locating new potential resources					
	Aqueducts and canals					
	Groundwater recharge					
	Small scale water collecting/harvesting					
	Adjusting legal and institutional framework					
	Artificial recipitation					
	Desalination of brackish & saline					
	Water treatment and reuse of wastewater/recycling					
Improving demand management (in all sectors/users)	Reducing use					
	Reducing losses					
	Reviewing water allocation					
	Monitoring, metering, forecasting					
	Conjunctive use (surface-groundwater)					
	Reviewing education curricula					
	Adopting/reviewing water tariffs					
	Adjusting legal & institutional framework					
	Voluntary insurance, pricing and economic incentives					
<b>Agriculture</b>						

Agricultural water management	Irrigation expansion if/where possible					
	Water loss reduction					
	Irrigation scheme modernisation/conversion to more efficient systems					
	Shifts to less water-demanding crops and cropping systems					
	Research of drought tolerant crops/species/genotypes					
	Adjusting cropping calendars to avoid heat stress					
	Use of non-conventional water resources					
	Deficit irrigation, supplementary irrigation					
	Conjunctive use of surface- and groundwater					
	Soil water conservation practices					
Adopting/reviewing water tariffs						
Crop production	Breeding for drought tolerant species					
	Adaptation to short season					
	Proper fertilisation					
	No-till/reduced tillage systems					
	Crop rotation/cropping systems					
	Seeding rate/density					
	Weeding/adapted pest management					
	Mulching/adapted soil preparation					
	Strip farming					
Crop insurance						
Livestock	Drinking suppliers					
	Balancing livestock in irrigated areas					
	Managing pasture and range supportive capacity					
	Use of indigenous breeds of feed and fodder					
	Genotypes of mammals / low water use					
	Early information for pastoralists					
	Forage reserves					

	Non-conventional doffer sources					
<b>Other sectors – the level of need to introduce further measures for:</b>						
	Municipal water					
	Health					
	Food security					
	Energy production					
	Transportation					
	Tourism/recreation					
	Industry					
	Forestry					
	Rangeland fires					
	Education					
	Environment					
	Ecosystem/biodiversity services					
<b>Preparedness – short-term</b>						
<b>Water resources</b>						
Supply adumentation	Mixing fresh & low quality waters					
	Exploiting high-cost waters					
	Adjusting legal and institutional framework					
	Local new standby resources (for emergency)					
	Providing permits to exploit additional resources					
	Providing drilling equipment					
Demand management	Restricting agricultural uses (rationing, subjecting certain crops to stress...)					
	Restricting municipal uses (lawn irrigation...)					
	Reviewing operations of reservoirs					
	Diverting water from given uses					
	Temporary over-drafting aquifiers					
	Reviewing water tariffs					



	Rationing water supply					
	Sensitising and awareness campaign					
	Adjusting legal and institutional framework					
	Negotiating transfer between sectors					
	Dual distribution networks for drinking water supply					
	Adopting carry-over storage					
	Conjunctive use					
Measures other than supply and demand	Temporary reallocation of water (on basis of assigned use priority)					
	Decreasing transport and distribution costs					
	Banning/restricting uses					
	Providing emergency supplies					
	Elaborating set-aside regulations					
	Inventory of private wells, negotiate purchase of water rights for public use					
	Elaborate regulations on water markets					
	Assess vulnerability & advise water users					
	Elaborate alert procedures					
<b>Agriculture</b>						
Crop production	Supplementary irrigation where water can be mobilised and made available on short-term basis					
	Soil water conservation practices					
	Early warning, information and advice to farmers					
	Review of fertilization programme					
	Soil mulching and crop shading					
	Reducing crop density					
	Weeding					
Livestock	Early warning/advice to herders					
	Destocking/incentives for owners to reduce					
	Review available feed and reduce animal numbers					

	Livestock transfer where/when possible					
	Watering points/water hauling sources					
	Locating potential sites of water for emergency					
	Constituting feed stock					
	Adjusting water salinity to tolerable levels					
	Rapid inventory of grazing potential					
	Protective (natural) shelters					
	Alternative feed (by-products, less and unpalatable shrubs..)					
	Supplementary, substitute feed					
<b>Response &amp; recovery</b>						
	Drinking water supply (humans, livestock, wildlife)					
	Insurance compensation					
	Public aid to compensate loss of revenue					
	Tax relief (reduction or delay of payment deadline)					
	Rehabilitation/recovery programmes					
	Food programmes					
	Feed programmes					
	Fire control programmes					
	Resolving conflicts					
	Postponing payment of credits					
	Implement set-aside regulations					

Table 2: examples of drought measures that could be included in National Drought Policy or other legislative document. <http://www.droughtmanagement.info/pillars/mitigation-preparedness-response/>