
SEI/Roengchai Kongmuang

Discussion Brief

Water management in times of scarcity in the Mekong Region

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Introduction

Managing water resources in an equitable and sustainable manner in the context of climate change and greater uncertainty is a challenge that all countries in the Mekong Region - Vietnam, Lao PDR, Cambodia, Thailand and Myanmar – are already facing. The challenge is made more difficult in times of water scarcity when total water use in a system affects both the supply and quality of water while existing institutional arrangements are unable to cope with economic demands, domestic demand and environmental flows.

Water scarcity is a relative concept and can occur at any level of supply or demand. Scarcity may be a social construct – a product of affluence, expectations and customary behaviour – or the consequence of altered supply patterns stemming from climate change, for example (WWAP 2012). Water scarcity is sometimes referred to as drought, and the terms are often used interchangeably. However, Loon and Lanen (2013) allude to an important distinction in that drought is a natural hazard whereas water scarcity refers to water shortage due to unsustainable use of water.

The Mekong Region is no stranger to water scarcity: The Lower Mekong Basin has historically experienced major drought events leading to millions of dollars in economic loss (Thilakarathne and Sridhar 2017). In 2015-2016, the region was hit with a severe drought caused by an El Nino event (Thirumalai et al. 2017).

This brief, based on a literature review[1], presents key findings and recommendations for future research to understand the current state of scientific knowledge on the policies and practices for water management in times of scarcity. The findings are summarized under four categories: institutional, social, financial and political and climatic factors that influence water-related risk and water management in times of scarcity.

[1] Findings are based on literature review of over 200 articles on water scarcity, policies and access in the Greater Mekong Region (Aung and Noble, 2018).

Laws, policies and water institutions in the Mekong Region

Some typical features of water governance in the Mekong Region are worth highlighting. First, water governance falls under the authority of apex bodies, made up of influential entities such as politicians or industry actors. Often the power that these entities wield is institutionalized and this is best exemplified in Thailand, where water governance is often criticized for being top-down and markedly uncoordinated among water agencies (Mirumachi 2011).

Second, water management usually relies on various water-related laws, one overarching water law or several water management policies that establishes a framework for governance. However, in the Mekong Region, these frameworks have been criticized for lacking enforcement and legitimacy, particularly in regards to water allocation. For example, the Thai National Water Policy and Vision ostensibly legitimizes water user groups, yet in reality the groups have no influence on water allocation nor a say in the quality of water supplied to their canals (Hoanh et al. 2009). Countries of the Mekong Region do not have any binding contracts between the state and individuals that guarantee individual rights to a certain volume of water at all times[2], though Cambodia's 2007 Water Law article 11 ensures a right to use stating that "every person has the right to use water resources for his/her vital human need including drinking, washing, bathing and other domestic purposes including watering for animal husbandry, fishing and the irrigation of domestic gardens and orchards, in a manner that will not affect other legal right of others" (Government of Cambodia 2007).

[2] For instance section 27 (1) of the South African Constitution states that "everyone has the right to have access to…..sufficient food and water….." and the subsequent agency rule for the Department of Water and Sanitation Services effectively guarantees that "a minimum volume of 6 000 litres (or 25 litre per person per day) of potable water shall be made available to a household per month." https://cer.org.za/wp-content/uploads/1997/12/National-norms-and-standards-for-domenstic-water-and-sanitation-services.pdf

As well, agency operating protocols have major implications on water availability in times of scarcity. For instance, policies encouraging farmers to produce three crops of rice annually, rather than a single wet season crop, can have unforeseen and unintended consequences on water availability that arise when changing the demand for water through the provision of irrigation infrastructure (Hoanh et al. 2003; Molle 2004).

Finally, Lower Mekong Basin's riparian states that are party to the Mekong River Commission (MRC), an intergovernmental river basin organization, loosely follow protocols from the MRC on the main stem of the Mekong River and its tributaries. Notable for addressing water scarcity are its requirements on maintenance of minimum monthly natural flows in the main stem of the Mekong River during the dry season and allowance of natural reverse flow to take place in the Tonle Sap during the wet season. The MRC makes an exception to compliance in cases of historically severe droughts or floods (MRC 2006).

Social factors: water users and allocation priorities

Ideally, all water users should have equal access to water. In reality, some water users have priority over others. In most Mekong countries, water demands for metropolitan areas with populations of high density and industries of high economic value are prioritized in times of scarcity (Molle 2004; Molle and Berkoff 2009).

Additionally, different social groups are exposed to different levels of risk. Wealthier households and those living in proximity to water infrastructure are better positioned to manage water-related risks than the poor and more marginalized (Kirby et al. 2010; Molle 2004). The most vulnerable are women and rural poor who are often the last to receive the benefits of water projects due to their financial and locational constraints (Huynh and Resurreccion 2014; Resurreccion 2006).
In times of scarcity, agriculture needs are not given priority. The diversion of water from agricultural to urban and industrial uses threatens the livelihoods of farmers and, as a consequence, jeopardizes food security in the Mekong Region. Further, given the prevalence of rainfed agriculture in the region, even brief water shortages when seasonal rain is scarce can affect crop yields if supplementary water resources are not made available (Kirby et al. 2010).

Farmers are often left to deal with water shortages by their own means. In Thailand, some traditional water systems in the uplands, called muang faai, manage water scarcity by successfully implementing the principle of equal sharing (Ounvichit 2011). Similarly, within the Chao Phraya River Basin, farmers adapt to water scarcity in the dry season through measures such as adjusting cropping patterns, changing crop schedules, and developing conjunctive uses when they deploy both ground and surface water by digging ponds or wells and installing pumps (Molle 2004; Molle et al. 2010; Molle and Berkoff 2009).

In addition to supplying farmers for agricultural uses, groundwater also serves as a supplementary source for urban and industrial uses. During a time of water shortage near Bangkok in 2005, the Government responded to the needs of industrial and tourism sectors by rapidly drilling 290 artesian wells and facilitating 6 inter-basin river transfers to provide short-term water relief (Molle and Berkoff 2007).

Financial and political factors shaping water management

Financial resources have shaped the way that water resource management has been handled in the Mekong Region. The World Bank and the Asian Development Bank have been highly influential in setting national Government agendas and influencing the priorities and approaches in the water sector. For instance, in 2009 both banks promoted irrigation infrastructure to manage the inefficiencies of agricultural water use, citing that the sector receives 80-95% of water resources in developing countries globally (Molle et al. 2010). The banks' involvement led to the expansion of irrigation infrastructure to manage agricultural water in various countries in the region (Hoanh et al. 2009; Molle and Floch 2008).

Political motivations also lie behind the adoption or promotion of these solutions. Irrigation within the region has been viewed by politicians as the way to promote the agricultural development that is necessary to lift poor farmers out of poverty and to gain their votes (Hoanh et al. 2009; Molle and Floch 2008). For example, in Thailand, some of the major water management projects within the past 20 years such as the Thai water grid, Khong Chi Mun and Green Isan were promoted by politicians primarily to gain votes from constituents (Molle and Floch 2008).

Financial donors have also promoted the uptake of the Integrated Water Resources Management (IWRM) approach (Evers and Benedikter 2009; Jensen 2013). The MRC has adopted IWRM into their policies on addressing water security at a regional level (Molle and Floch 2008). An outcome of the IWRM discourse is the promotion of participatory and bottom-up approaches to water management. The success of this discourse is reflected in various water laws in the region that call for the establishment of water-user groups and river basin organizations (Molle 2005; Resurreccion 2006b; Sithirith 2017).

Climate change and water scarcity

Climate change is projected to bring seasonal uncertainty though not expected to bring substantial changes to seasonal trends (Arias et al. 2014). Overall future climates for the region will become slightly warmer, with a longer hot season covering a large area of the basin (Lange and Jensen 2013). Daily maximum and minimum temperatures will be higher with temperature increases varying considerably between parts of the basin (1.5-4.5 ˚C) (Lange and Jensen 2013). Increases in temperature will be more pronounced in areas which have had historically cooler wet seasons. These areas will experience greater temperature changes during the wet season (1.7°C to 5.3°C), compared to the dry season (1.5°C to 3.5°C) (ICEM, 2013).

Annual precipitation is projected to increase between 3-14% (ICEM, 2013). However, there are high levels of uncertainty with rainfall projections up to 2050. In fact, Johnston et al. (2013) find that there will be no significant changes in rainfall

across the Mekong Region (Johnston et al., 2013). Estimated increased in rainfall are, however, based predominantly on assumptions of higher intensity rainfall events during the monsoons and greater run-off. Increases are expected to be lower in the southern catchments, where dry-season precipitation is expected to decline in the Cambodian floodplains, Tonle Sap and the Mekong Delta. This will contribute to greater seasonal variation in rainfall. The middle and northern regions of Thailand and Lao PDR are expected to receive greater precipitation in the dry season (Lange and Jensen 2013).

The impacts of these changes will be unequally distributed across countries in the region with Vietnam and Thailand facing greater climate hazards than Lao PDR (Lange and Jensen 2013). The adaptive capacities of countries will differ with economically stronger countries such as Thailand and Vietnam in a better position to adapt to the impacts compared to Lao PDR, Myanmar and Cambodia. The most vulnerable groups with the least capacity to adapt are women, ethnic minorities and other disadvantaged groups (ICEM, 2013).

Agriculture is the largest consumer of water and is therefore highly sensitive to the impacts of climate change. Availability of water may change with higher increases in incidents of drought and floods. Further, water demand for crops will increase with increased evapotranspiration and greater temperatures (Johnston et al. 2010). Increased nighttime temperature may also reduce yield in rain-fed and irrigated rice (ICEM 2013). Given the importance of farming livelihoods in the Mekong Region, particularly with a heavy reliance on rain-fed agriculture, the impacts of climate change on agriculture will have long-term, adverse consequences (Arias et al. 2014; ICEM 2013; Kirby et al. 2010). Projections suggest that seasonal water shortages associated with climate change will mainly affect northeast Thailand and Cambodia. Agricultural productivity in these regions is already low and vulnerable, predominantly due to poor soils and cultivation of low yield varieties (Kirby et al. 2010).

Conclusion and recommendations

Using a literature review, this brief has highlighted some of the social, financial, political and institutional factors affecting water management during times of water scarcity in the Mekong Region and presented some challenges from the changing climate. Decision makers and financial institutions in the region have the authority to influence these factors and determine water allocation priorities for different water users. Key research areas that focus on addressing future risks under a water-scarce region and build resilience to anticipated climate change drivers should be considered.

The impact of climate change brings risks and uncertainties to water resources management in the Mekong Region. All countries, regardless of economic status, urgently need to plan for how best to adapt to climate uncertainties, particularly in relation to water use. Given the region's reliance on the agricultural sector, with thousands of farming livelihoods and food security in the region at stake, research will need to support decision makers and water users to plan better for future water scarcity.

Specifically, based on the findings from the brief, the following research areas need to be considered:

(i) Critical analysis of water-user needs and water management to meet those needs, especially those of marginalized groups including women, children, the elderly, people with disabilities, indigenous people and ethnic minorities, rural populations and the poor
(ii) Further analyses of meeting water-user needs given the region's vulnerability to water scarcity from climate change
(iii) Comparison and evaluation of successful and failed water scarcity management practices, policies, laws and under different climate scenarios
(iv) Water allocation priorities and access to water of sufficient quality and quantity across different water-user groups and under different climate scenarios.

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