Madhya Pradesh
State Action Plan on Climate Change

Sector Policy Brief: WATER RESOURCES

The people of Madhya Pradesh depend mainly on rainfall to provide the water they need for drinking, growing crops and running businesses. Most of the annual rainfall arrives in the summer during the monsoon, feeding the State's seven major rivers and replenishing underground aquifers. Groundwater is the most important resource, particularly for agriculture. But this has been overexploited in the past. In addition, the water storage infrastructure is not well developed and irrigation practices are generally inefficient and wasteful.

Historically, the State has suffered from climate variability with a high incidence of floods and droughts, with extreme events causing widespread destruction of crops and property, and loss of life. Furthermore, high rates of evapo-transpiration, steep topography and rapid rainwater runoff, combined with low rates of natural groundwater recharge and rising levels of water pollution, contribute to a reduction in water availability. Even without the effects of climate change, meeting the State's future water demand would present a considerable challenge. There is therefore an urgent need to understand the implications of climate change for water resources and to develop and introduce strategies to improve water use efficiency and infrastructure.

What does climate change mean for the water sector?

Analysis of observed rainfall data in Madhya Pradesh over the past 50 years indicates that annual rainfall totals are falling. At the same time, the incidence of heavy precipitation events, which lead to rapid runoff, is increasing. Both these trends adversely affect the rate of groundwater recharge. Since groundwater provides two-thirds of the water used for irrigation and 95% of drinking water, groundwater depletion is a major cause for concern.

Rising temperatures (projected to increase by up to 4°C by 2100) are also likely to increase evapo-transpiration, thus reducing the amount of rainfall that is available for crops, recharging groundwater and contributing to stream flow.

Rainfall projections for 2021 to 2050 indicate that winter rainfall (December–February) is likely to decrease, particularly in the west. Reduced winter rainfall has implications for *rabi* crops like wheat and so will affect food security.

Meanwhile, the monsoon is likely to bring more rain to most parts. But this precipitation is likely to fall on a fewer number of days, therefore will be of greater intensity. Heavy rain does not recharge groundwater and is likely to cause soil erosion, neither of which is good for agriculture. While more frequent and extreme rainfall events provide an opportunity for water harvesting and storage, they also increase the danger of flooding, with greater magnitude flood events likely. Furthermore, extremes of rainfall cause widely fluctuating river levels and are likely to disturb river ecosystems.

Datia farmers harvest water as well as wheat

The monsoon rains of 2012 were around 19% below average, with the western part of Madhya Pradesh receiving only three-quarters of its usual rainfall during the first half of the monsoon. But farmers in Datia District did not lose hope. They have been working with KrishiVigyan Kendra (KVK), a grassroots organisation to learn new techniques of water conservation.

The first step was to develop an integrated water management plan, which involved mapping all watersheds, catchments and waterways, as well as identifying priority areas for water use. The farmers then constructed many small-scale water-retaining structures that harvest the monsoon water and divert it to recharge wells and groundwater reserves. So instead of fears for a complete crop failure of the *rabi* crop, which is sown at the end of the monsoon, they have water to irrigate their fields throughout the dry period up to April or May. They are also prepared to shift from their traditional varieties of wheat to those that require less water and they have begun to adopt more efficient methods of irrigation, such as drips and sprinklers.

Source: http://www.bkpindia.net/publication/Article_from_zeenat.pdf and KVK

Adaptation and mitigation strategies set out in the SAPCC

The water sector needs to focus on gathering information, developing appropriate infrastructure and improving water use efficiency, particularly in agriculture. The key strategies are to:

- Develop a comprehensive water database to support forecasting and research into adaptation strategies and an assessment of future water needs.
- Accelerate surface water development activities, e.g. renovate canal systems and village ponds, and encourage rural people to adopt simple rainwater harvesting techniques.
- Promote recharge of groundwater with a special focus on over-exploited areas and shallow aquifers. This includes converting traditional water storage facilities into groundwater recharge structures.
- Increase water use efficiency in irrigation, domestic supply and industrial use, e.g. reduce wastage and introduce recycling of wastewater. This includes establishing a State Water Authority to monitor water management and oversee allocation to different purposes. Fiscal instruments may be used as a means of promoting behavioural change.
- Promote basin-level integrated watershed management to include artificial groundwater recharge from monsoon runoff water.
- Build institutional and human capacity within the water sector to integrate climate change concerns into water planning processes.

Writing, editing and design: Green Ink (www.greenink.co.uk)

State Climate Change Knowledge Management Centre
Environmental Planning and Coordination Organisation (EPCO)
Paryavaran Parisar, E-5, Arera Colony, Bhopal - 462016 Madhya Pradesh
Phone: +91 755 2464318
E-mail: mpsapcc@epco.in / epcoccc@gmail.com
Website: www.epco.in

The Madhya Pradesh State Action Plan on Climate Change (SAPCC) has been prepared by the Climate Change Cell, Environmental Planning and Coordination Organisation (EPCO), Housing & Environment Department. Government of Madhya Pradesh. The Plan outlines the strategies required to strengthen development planning and build a more climate-resilient State. It aims to promote the integration of appropriate adaptation/mitigation strategies into the State's development policies and programmes. It is based on secondary data and promotes 'no regret' measures.

In order to share the results of the Madhya Pradesh SAPCC and begin to address climate change concerns through development policies and programmes, the Climate Change Cell of EPCO commissioned a series of policy briefs. CDKN was tasked with producing these, based on the Madhya Pradesh SAPCC, as a Communications Project. This brief is one of a series of ten sector policy briefs, designed to inform stakeholders about the strategies and commitments established in the SAPCC that are of relevance to their sector. Further information can be found in the full SAPCC, available at http://www.epco.in/pdf/Draft_MP_SAPCC.pdf

This document is an output from a project funded by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS) for the benefit of developing countries. However, the views expressed and information contained in it are not necessarily those of or endorsed by DFID or DGIS, who can accept no responsibility for such views or information or for any reliance placed on them.This publication has been prepared for general guidance on matters of interest only, and does not constitute professional advice. You should not act upon the information contained in this publication without obtaining specific professional advice. No representation or warranty (express or implied) is given as to the accuracy or completeness of the information contained in this publication, and, to the extent permitted by law, the entities managing the delivery of the Climate and Development Knowledge Network do not accept or assume any liability, responsibility or duty of care for any consequences of you or anyone else acting, or refraining to act, in reliance on the information contained in this publication or for any decision based on it. Management of the delivery of CDKN is undertaken by PricewaterhouseCoopers LLP, and an alliance of organisations including Fundación Futuro Latinoamericano, INTRAC, LEAD International, the Overseas Development Institute, and SouthSouthNorth.