World Health Organization

Vision 2030

The resilience of water supply and sanitation in the face of climate change

Technical report

Guy Howard
Jamie Bartram

Public Health and Environment
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Guy Howard
Department of International Development
United Kingdom

Jamie Bartram
University of North Carolina, Chapel Hill
United States of America

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Executive summary

This report presents the findings of research into the projected impact of climate change on water and sanitation services by 2020 and by 2030. These time horizons are relevant to investment decision-making and have been used in other water-using sectors. Results for the year 2020 indicate the potential for climate change to undermine investments already made and committed towards achieving the MDG targets and towards improving access to safe-drinking water and sanitation beyond 2015; and estimates for 2030 provide for responses in technology selection and planning to expected climate changes.

This study represents the first attempt to address this issue at a global level. This report is particularly focused on low- and middle-income countries, but has global relevance. It provides an analysis of the resilience of water supply and sanitation technologies, and of management approaches. It also reviews the policy implications of the findings, identifies hotspots where attention is particularly needed and points to research needs. It draws on background studies into the resilience of water and sanitation technologies, decadal climate forecasts for 2020 and 2030, and projections of water and sanitation coverage by 2020. It is important for policy-makers and practitioners to understand the likely impact of short-term climate change on water and sanitation services.

The climate is changing, and this will be felt in different ways in different regions. Although the precise nature and extent of change are not yet certain, planners and policy-makers responsible for the water and sanitation sector need to start acting now to build for resilience and support adaptation to climate change in the sector. Waiting for certainty is not an option. By making water supplies and sanitation more resilient and adaptable to climate change there is the potential to improve how the sector performs. Therefore climate change is an opportunity as much as a threat. Because of inherent uncertainties in predictions of climate change, planning needs to allow for flexibility in responses.

The main technologies used for water supply and sanitation were assessed to determine resilience. They were categorized as to whether resilience was high (resilient to most possible climate changes), medium (resilient to a significant number of possible climate changes) or low (resilient to a restricted number of climate changes).

For the water supply technologies, tubewells were found to have high resilience, with protected springs having a medium resilience. Piped water, household rainwater collection and dug wells were considered to have low resilience as technologies. Management approaches were found to be critical to resilience for water supplies. Utility-run piped systems were found to have high resilience, thus management is able to overcome the low resilience of the technology. By contrast, small community-managed systems had low resilience. Dug wells and household rainwater collection should be considered primarily as interim or supplementary water supplies.

For sanitation, pit latrines were found to have high resilience, septic tanks and different forms of sewerage medium resilience, and no technology was found to have low resilience. In contrast to water supply, the management approach had a much more

limited impact on resilience, which was primarily driven by the technology. Thus, household-provided sanitation systems using resilient technologies is likely to be more resilient than more complex sewerage systems despite the more comprehensive management available for the latter.

Current estimates of global coverage with water supply and sanitation do not take climate resilience into account. If they did, it would be clear that the world is badly off-track to meet both the water supply and sanitation targets. A reduction in coverage can be expected unless action is taken, because communities will find that their water and sanitation services are not resilient to climate changes in the short and medium term. While there are uncertainties in climate prediction, the signals are clear enough in critical regions. Enough is already known about the resilience of technologies to act now.

There is a strong rationale for monitoring, and targets set for years after 2015 should be more graduated, with greater emphasis on technologies and approaches considered appropriate at a regional level, rather than applying universal categorizations of technology adequacy.

Significant changes in policy and programming for water supply and sanitation provision are required. Decentralization of water supply infrastructure will be important to hedge drought and flood risks, but should be placed within a context of greater centralization of management, or at least much stronger ongoing central support. International targets after 2015 should also focus on increasing access for low-income groups to an at-house water supply. It is unlikely that this can be achieved solely through piped water supplies, so the potential of achieving this through providing household tubewells warrants further investigation. For sanitation, decentralization of technology and management appears likely to be more resilient, although some central supporting functions will be needed.

The decadal climate forecasts for 2020 show large-scale, spatially coherent changes, which continue to 2030. The changes predicted for 2030 are generally consistent with the trends identified by the Intergovernmental Panel on Climate Change (IPCC) for 2050 and beyond. Regions identified as hotspots of concern with regard to the implications of climate change for water and sanitation are southern Africa, the Mediterranean basin and north-eastern South America, which are all likely to get drier, and south and east Asia, which are likely to have increased risks of flooding. Although large parts of the world are unlikely to see major changes in precipitation by 2030, there is still a need to carry out local climate risk assessments in these areas to ensure that appropriate technologies are identified and used.

It is expected that coverage with water supply and sanitation will significantly increase by 2020, with most regions having over 75% coverage with water supply, but lower rates of sanitation coverage. Water supply coverage is likely to be dominated by piped supplies and tubewells. Pit latrines tend to dominate the sanitation increase. Of particular concern are those areas which are drying and also projected to have high rates of coverage with piped water and sewerage systems. Improvements in management will be urgently required in these regions.

Research is required to improve those technologies currently considered to have only medium resilience, to increase their potential for application. Research is also required into non-piped alternatives to deliver at-house water supplies, and to assess whether water usage would be at the same level as for piped supplies. The development and use of climate risk assessment tools for the sector is a priority. There is an urgent need to improve the knowledge and monitoring of water resources if future demands are to be met within a changing climate. This is particularly important for groundwater, where knowledge is most lacking. Further development of climate models is needed to improve capabilities for decadal prediction on regional scales.

Organizations involved in the delivery of water supply and sanitation services need to develop and pilot approaches to adapting to climate change, and to document those that effectively build resilience. This includes documenting autonomous community-level adaptations that occur and prove successful.

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