

Climate change adaptation to protect human health



JORDAN

This summary gives an overview of the aims, activities, challenges and results of the project “Climate change adaptation to protect human health” for Jordan.

Project background

The “Climate change adaptation to protect human health” project is a global initiative jointly implemented by the World Health Organization (WHO) and United Nations Development Programme (UNDP). The seven pilot countries were Barbados, Bhutan, China, Fiji, Jordan, Kenya and Uzbekistan. The project was co-funded by the Global Environment Facility (GEF) Special Climate Change Fund (SCCF).

Overall project goal

The series of pilot projects aimed to “increase adaptive capacity of national health system institutions, including field practitioners, to respond to climate-sensitive health risks”.

Jordan at a glance

Jordan is located in the Middle East, north west of Saudi Arabia, between Palestine to the west and Iraq to the east. The climate in Jordan is Mediterranean, with hot dry summers, cool wet winters and two transitional periods in between. Overall, Jordan is classified as a semi-arid to arid country, with scarce water resources compared with other countries in the Middle East. Water resources in Jordan depend mainly on precipitation within the country, with most of the rain falling in winter from December to March.

Climate change and health in Jordan

Climate change is expected to increase temperatures and change precipitation patterns, decreasing surface water availability and, acting on top of other stresses, increase water scarcity in the country.

In Jordan, water resources are already seriously limited and are far below the water poverty line of 1000 m³ per capita per year. Projected increases in temperature and changes in precipitation patterns are expected to increase water scarcity even more.

The lack of water and secondary effects of these changes are considered the highest priority threat to health in Jordan. WHO/UNEP studies have shown a strong link between per capita water availability and the incidence of diarrhoea.

Even though the government has given priority to domestic use of clean water, the proposed increase in reuse of wastewater for agriculture is likely to pose health risks (untreated wastewater more than treated), particularly intestinal diseases and exposure to toxic chemicals for farmers, neighbouring communities and consumers.



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Objectives of the Jordan project

In view of the projected aggravation of water scarcity in Jordan, the general objective of the project was to increase adaptive capacity of national health system institutions, including field practitioners, to respond to climate-sensitive health risks, with a special focus on health risks resulting from climate change-induced water scarcity.

This was pursued through:

- ▶ Strengthening monitoring and surveillance capacity for climate-sensitive health risks arising from water scarcity;
- ▶ Developing the necessary institutional and regulatory framework for safe use of wastewater; and
- ▶ Increasing the capacity for taking health protection measures and pilot testing these in the field.

The main national benefit from this project related to minimizing the health risks resulting from increased use of wastewater as a response to water scarcity caused by climate change.

The project was implemented under close cooperation of and coordination between the Ministry of Water and Irrigation (MWI), which was the executing agency, and the Ministry of Environment (MoE). The Inter-Ministerial Steering Committee (ISC) was the National Technical Advisory Group (TAG) for the project, with representatives from the Ministry of Health, MWI, Ministry of Planning, MoE, Ministry of Agriculture, Department of Meteorology, a representative from WHO/Centre for Environmental Health Action (CEHA), a representative from UNDP/GEF and representatives from major nongovernmental organizations (NGOs) and universities.

Main outcomes and outputs: climate change adaptation in Jordan

The three outcomes defined for the global project on “Piloting Climate Change Adaptation to Protect Human Health” were adjusted slightly to the specific context of Jordan and its identified health risks related to climate change. In view of the precarious water situation in Jordan, the project specifically focused on the design and implementation of a comprehensive national framework for the safe use of wastewater.

Barriers/challenges to implementation of the various strategies, policies and procedures

The following barriers were identified:

- ▶ The direct use of treated wastewater in agriculture was unregulated at the beginning of the project. The reuse criteria were limited to only wastewater quality and certain types of agriculture. There were no reuse criteria related to hygiene, public health, quality control, irrigation techniques, degree of wastewater treatment, and choice of areas and types of crops to be irrigated.
- ▶ The level of knowledge and skills for preventing climate-sensitive diseases was limited among the general population and health-care system personnel. Awareness among farmers and the public at large was also low.
- ▶ Efficient control and monitoring of safe practices for direct wastewater reuse in agriculture was limited, as this practice was not allowed.
- ▶ There was a lack of trained personnel in all the competent authorities on the use of the WHO guidelines for safe use of treated wastewater in agriculture, and on adaptation to climate change and preventing its negative health impacts.
- ▶ Health-care system personnel were not fully aware of the relationship between climate change and variability and health impacts.
- ▶ There was a lack of communication and information dissemination between the different parties involved in implementing the project.
- ▶ Even without additional tasks and requirements, the health surveillance system in Jordan was under pressure.

At the outset of the project, none of the district health managers considered their existing response plans to be effective in dealing with climate-sensitive diseases and 71.43% considered that interagency and intersectoral barriers prevented effective responses, but this perceived vulnerability considerably decreased by the end of the project.

Solutions

- ▶ In order to overcome all these challenges, intersectoral capacity building became a priority, in order to strengthen communication and sharing of experiences among different stakeholders.
- ▶ Communication activities were implemented to increase awareness of the links between climate change and health, and effective ways to prevent health risks.
- ▶ Information materials were developed on the benefits of wastewater reuse for agricultural products and disseminated extensively.

Outcome 1

A comprehensive and integrated monitoring and surveillance system for health risks associated with wastewater reuse activities was established

In the frame of this project, a series of steps were taken to strengthen surveillance of health risks associated with wastewater reuse for agriculture and the early warning system (EWS):

- ▶ Capacity for water and wastewater monitoring and for health surveillance was strengthened. Capacity for crop monitoring was also strengthened with a national agreement on creating a national monitoring system.
- ▶ A literature review on the impact of wastewater on farmers' health was carried out and reported.
- ▶ Integrated monitoring and surveillance systems for wastewater reuse (WWR) activities were established, with procedures to monitor the health indicators of consumers of agricultural products irrigated with reused water. The equipment with the technical specification required for wastewater monitoring was also delivered.
- ▶ Training was carried out on the use of new technologies for water and crop monitoring according to the guidelines of the State crop monitoring and testing programme for fresh vegetables produced with reclaimed water in Jordan.
- ▶ A health alert system was developed for climate-sensitive diseases.

Outcome 2

Regulatory and institutional frameworks for management of health risks associated with increased wastewater reuse in unrestricted agriculture were improved and implemented

Under Outcome 2, the first sanitation safety plan framework in the region was drafted. Sanitation safety planning is a systematic risk-based approach that assists in implementing the 2006 WHO *Guidelines for safe use of wastewater*. This approach can also be applied to all sanitary systems to ensure that the system is managed to meet health objectives. The draft framework introduced the conceptual structure and base for the development of a sanitation safety plan for reclaimed water for agricultural use in Jordan. A detailed plan was developed in order to facilitate the implementation of Jordanian standards JS 1766:2014 for wastewater reuse in agriculture. Several steps were taken during the development process:

- ▶ A stakeholder analysis was completed.
- ▶ A framework for a wastewater reuse safety plan was drafted.
- ▶ Three validation workshops were carried out to finalize the framework for a wastewater reuse safety plan.
- ▶ Strategic policy guidance was provided.

- ▶ The regulatory and institutional frameworks for the management of health risks associated with increased wastewater reuse in unrestricted agriculture were improved.

Outcome 3

Health protection measures for safe wastewater reuse were defined and implemented in 10 pilot sites

This outcome was adjusted from the global outcome 3: "Pilot disease prevention measures in areas of heightened health risk due to climate change" to implement measures that matched the national project focus on safe wastewater reuse.

The use of treated wastewater is an important risk factor for health, which requires the implementation of hygiene practices. Under Outcome 3, several cost-effective health protection and adaptation measures were undertaken:

- ▶ Safe agricultural production was developed on pilot farms using treated wastewater.
- ▶ A pilot study on safe use of wastewater in agriculture was carried out through the University of Jordan. Two experiments were conducted during the 2014 growing season:
 - The first study investigated whether irrigation with water contaminated with pathogenic microorganisms was the main source of contamination of raw vegetables with bacterial pathogens; and whether harvesting, handling, transportation and marketing processes were noteworthy sources of contamination.

This study revealed that irrigation water was only one element affecting produce quality. While it may have presented a risk with respect to pathogenic contamination, manure fertilizer can be a main source that had not received the required attention and control so far. The study clearly showed that even applying drinking water quality to water for irrigation did not guarantee that the produce would meet recognized standards with respect to pathogens at farm level. Non-composted manure was particularly responsible for such contamination.

The study also showed that distribution of responsibilities in Jordan with respect to quality control and assurance of produce was not clear and efficient. Both the Ministry of Agriculture and Ministry of Health have the mandate to control the quality of produce with respect to its impact on human health. However, tasks and responsibilities had not been distributed. Moreover, coordination between the two ministries did not follow a clear systematic structure. Accordingly, two scenarios that defined the responsibilities of both the ministries were suggested and discussed.

- The second study validated health protection measures established by the 2006 WHO *Guidelines for the safe use of wastewater, excreta and greywater*.

- ▶ An international training course on the reuse of treated wastewater for agriculture was offered in 2014 in Amman, Jordan to further disseminate and promote WHO efforts in safe agricultural reuse of treated wastewater as an adaptation action. Representatives from Barbados and Bhutan attended the training.
- ▶ Recommendations on best practices are updated based on a periodic risk assessment of health associated with WWR.

Awareness-raising campaign

To support the above-mentioned activities and to increase their effectiveness, a multifaceted awareness-raising campaign for prospective health professionals and the public was conducted. It comprised the following:

- ▶ Development of information, education and communication (IEC) materials and tools;
- ▶ Social media (Facebook and Twitter) activities managed by students (Twitter account: https://twitter.com/who_cchh);
- ▶ A video (in Arabic and in English) available online (<https://www.youtube.com/watch?v=A3i3WPGIKT8&feature=youtu.be>);
- ▶ An ambassador competition. The competition allowed the identification of ambassadors for Climate change and human health as a way to strengthen awareness on the health impacts of climate change;
- ▶ 12 lectures in 12 universities (covering a total of about 500 students) (Photos 1, 2).

Lessons learned

- » Coordination between stakeholders was essential for project implementation and sustainability, but needed to be improved in order to scale up the project.
- » Involving local researchers, academics and senior decision-makers in the project proved to be very useful. However, effective participation of additional stakeholders (food safety and trade) was challenging.
- » Piloting disease prevention measures was challenging and additional control measures needed to be identified than those identified in the initial project.
- » Experiences from Jordan specifically showed that linking the health adaptation projects with activities undertaken by the national climate change team can reinforce enabling conditions and provide opportunities for addressing existing institutional barriers to implementation of an adaptation project.



Photo 1: Poster of a lecture in a university on climate change and health



Photo 2: Lecture in a university about climate change and health

Efforts to ensure sustainability of the structures and measures

Integrating and mainstreaming climate change and health measures in policies and action plans ensures that these issues are considered across sectors beyond the end of the project. National climate change adaptation strategies facilitate longer-term adaptation for health.

Jordan developed a comprehensive National Policy for Climate Change, reflecting the priorities and objectives of various environmental and development sectors. The Ministry of Health of Jordan developed a National Climate Change Health Adaptation Strategy and Plan of Action, with technical and financial support from WHO/CEHA. This policy document was the main source of information for developing the health chapter of the National Policy for Climate Change. Implementation of the policy was supported by this project.

Continuous efforts to keep the media involved (from the inception to the final meeting) in Jordan proved to be useful in supporting awareness-raising and disseminating results and information.

The development and approval of regulatory documents at the ministerial level and dissemination of project results increased project sustainability.

Opportunities to scale up

- ▶ The output of the project will be used to implement new irrigation guidelines.
- ▶ The functioning of the steering committee will continue beyond the project period.
- ▶ It is recommended that the crop-monitoring programme be widened and piloting expanded to cover more farms.
- ▶ The results are expected to save hundreds of millions of dollars otherwise planned for tertiary wastewater treatment. The wastewater treatment plants of Jordan needed to be upgraded to meet the old wastewater reuse standards, for example, by adding denitrification and disinfection units. Adding such processes would cost US\$ 250 million, as stated by the MWI. As per the findings of the project, these procedures are not necessary any more.
- ▶ Mobilization of resources for expanding the pilots was initiated.

Key products

Key products that may be of interest to other regions or countries include the following:

- ▶ The Sanitation Safety Plan, which gives the framework for implementation of the guidelines on reuse of treated wastewater for Jordan
- ▶ IEC materials
- ▶ video (in Arabic and in English) <https://www.youtube.com/watch?v=A3i3WPGIKT8&feature=youtu.be>.

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