unicef
for every child

WASH Field Note FN/26/2023

Shaping a Greener Tomorrow: Solar-Powered Education and Healthcare in Iraq

SUMMARY

Ensuring sustainable access to safe Water, Sanitation and Hygiene in schools and health care institutions in Iraq presents many challenges and is likely to become even more difficult with the increasing impacts of climate change. To address these challenges, UNICEF is supporting a package of services to enable reliable access to green energy for education and health care facilities that lack a reliable source of electricity and using diesel generators. UNICEF has designed and implementing a programme in 199 schools and 4 HCFs which incorporates the risks associated with climate change and uses renewable energy to provide sustainable access to safe WASH services, provide adequate protection for girls and boys in their learning environment and healthcare facilities. This approach has also been used as part of the water scarcity mitigation actions to ensure safe water is available in the required quantities.

Introduction

Achieving SDG 6 and the human rights to safe drinking water and sanitation remains a significant challenge in Iraq especially among the most vulnerable and disadvantaged children. Iraq faces significant challenges related to climate change, including water scarcity, which impacts peace and security throughout the region and globally. UNICEF's Children's Climate Risk Index (CCRI) ranks Iraq 61 out of 163 countries and 42nd among the most water-stressed country in the world[1]. Key environmental impacts of climate change in Iraq includes water scarcity, water and air pollution, extreme temperatures, and drought. Climate change also impacts on water availability that then affects children and young people's ability to learn and thrive in schools. This is also true for other learning gateways as well as for health care facilities where energy is critical for not only safe water supply but also proper vaccines storage. Inadequate supply of electricity is one of the top concerns in Iraq, negatively impacting daily life, national development, economic growth, private sector regeneration and job creation. The country's electricity sector suffers from a series of simultaneous and complex challenges. After years of sanctions, conflicts, and civil unrest, investments in reconstruction, rehabilitation and expansion of electrical infrastructure have been insufficient to cope with growing demand, leading to a dilapidated national electricity grid and poor supply reliability. This has an impact on education outcomes as lack of electricity in the learning environment can lead to poor access to drinking

[1] The Climate Crisis is a Child Rights Crisis, Introducing the Children's Climate Risk Index

water due to cut of national grid and lead to school drop out for girls and boys.

Figure 1: Shortfall in electricity and its impact on a child in school

Source: Renewable energy company

There are many challenges in the domain of education in Iraq. According to UNICEF-WHO, Ministry of Education and Ministry of Health Joint WASH-IPC comprehensive survey conducted for 19,301 schools and 3,624 Health Care Facilities (HCF) across Iraq, 48 pe cent of schools lack basic water services, 35 per cent lack basic sanitation services and 50 per cent lack hand hygiene services[2], whilst 31 per cent of HCFs lack basic water services, 52 per cent lack basic sanitation services and 38 per cent lack hand hygiene services. The figure above demonstrates that education can be impacted due to lack of electricity in the learning environment leading to poor access to drinking water due to cut of national grid.

Figure 2: Renewable energy in the current life and for the future of children and young people

Source: Renewable energy company

Access to safe and reliable water is a critical precondition for providing a safe school environment that supports equal opportunities for high-quality education and healthy development of children. To create WASH-friendly and health-promoting schools, common problems beyond the provision of proper WASH infrastructure – such as water consumption, water losses, use of diesel generators – need to be addressed. Key challenges also include operation and maintenance and persisting taboos, such as talking about toilet use and menstrual hygiene matters. UNICEF Iraq has supported the development of an information package comprising an online monitoring package for water consumption, water losses, the sum of carbon reduction during the use of solar power system. This online platform is being gradually delivered to the local staff in the Ministry of Education and schools administration in order to manage cleaning, operation and maintenance of solar power as well as ensure the operation of monitoring cameras to protect girls and boys during the use of latrines based on alarms indicator in the online system.

In terms of school children, a child friendly mobile application was developed to help children to visit the location of their schools and monitor the water consumption, losses and the status of solar panels. This helps to deliver this initiative to their peers, relatives and families on the importance of solar systems and water conservation.

[2] WASH-IPC in Schools Dashboard – 2022

Figure 3: A new child friendly mobile app

Source: Android App.

A focus on children and young people is particularly necessary today as an unprecedentedly large proportion of the population in Iraq is transitioning into their most productive years, creating the potential for a demographic dividend[1]. Children in Iraq currently represent 48% of the population and youth aged 15-24 account for another 20%. Approximately, 43% (8 million) are adolescents below the age of 15 years and 31% are young people between the ages of 10-24 years. Iraq's adolescent and youth population is expected to reach 16.4 million by 2030 (31% of the population[2]) and 23 million by 2050. Adolescents and Youth in Iraq are growing increasingly frustrated and disempowered by low access to quality education as well as other skills-development opportunities.

Description of Intervention

The primary aim of the UNICEF Iraq WASH programme is to support Government to increase access to resilient, sustainable and safe water and energy systems at schools and healthcare facilities. The initiative also targets reduction of diesel generator use and associated carbon emissions. The multi-dimensional approach supports the installation of solar power systems, installation of smart water meters to measure water consumption and water leakages, and the calculating the sum of carbon reduction according to solar power generation.

Additionally, a new children friendly online platform was developed for generating evidence on the level of water consumption, water leakages and carbon reduction. To ensure sustainability of the intervention and mobilize learning skills for children, a new mobile application for Android and IOS was developed for teaching girls, boys and schoolteachers on how to monitor water consumption, water losses and carbon reduction.

Intervention

Decentralized sustainable energy solutions are becoming increasingly financially and technically viable. They enable uninterrupted essential services with the potential to power healthcare, water and educational facilities. They also contribute to reducing greenhouse gas emissions and can be more resilient in the face of disasters. Providing sustainable energy is key to pursuing a just energy transition to ensure that communities' and households' social and economic needs are met.

Figure 4: UNICEF Meeting with Taskforce @ COMSEC-Baghdad/ 2023

UNICEF advocated for the greening of schools and HCFs? with the federal government of Iraq and as a result, a national taskforce has been created, formulated at the Secretariat for the Council of Ministries chaired by the volunteerism general directorate and comprising members form the Ministry of Education, Mayoralty of Baghdad, the Ministry of Agriculture, UNICEF, Iraqi Banks,

Association, private sector, LNGOs and youth groups of volunteers.

Figure 5: Installation of solar panel in Al Hijrah school-Baghdad, 2023 photo captured by UNICEF consultant

The intervention focuses on children in their learning environment since they are the best persons acting as the agents of change and delivering such innovative idea to their families, relatives, and peers. As of September 2023, a total of 199 schools across Iraq (including KRI governorates) as well as piloting in 4 HCFs, supporting vaccination campaigns in two selected governorates

Design of the System

During the design of system and at all stages of the implementation, UNICEF provided technical oversight by reviewing and approving the site specific designs. The solar system consists of twelve 450W solar panels, eight 200Ah gel-type, a 5kVA 48-volt inverter. The array is housed in a 2mm thick galvanized steel panel structure supported by four concrete pillars. The system powers the water pumps as well as LED lights (50-100W) at the school's entry and in latrines.

Figure 6: An Online Monitoring Platform on water consumption and losses/Iraq

[3] Greening in Schools and HCFs-IRAQ

Development of an online Enterprise Project Management (EPM):

To complement all software and hardware components and ensure more efficiency, UNICEF created an Enterprise Performance Management (EPM) software which helps in analyzing, understanding, and reporting on planning, budgeting, forecast, and performance as well as consolidating and finalizing financial results. It allows users to create and manage project portfolios, define project hierarchies, set project baselines, track progress, and analyze project performance. Additionally, the EPM is extremely useful and has numerous advantages for a business organization[3]. UNICEF ICO continue to provide regular maintenance and support to address any reported issues, apply updates, and gather staff (user) feedback to improve the system over time. UNICEF continues providing technical advice, building the technical capacity of young people to open green market in country and advocate government of Iraq at higher level (decision makers) and one of best practices from the local government of Diwaniya (south of Iraq) which they have allocated financial resources (12 million US$) from federal budget to scale up the greening concept in all primary schools within governorate after piloting project in 1 school by UNICEF.

Figure 7: A new online monitoring platform

Source: UNICEF online Monitoring Platform "URL"

KEY POINTS

- *Emphasize strengthening the enabling environment, public financial management systems and private sector strengthening, to develop and implement appropriate service delivery models that can get services closer to the population.*
- *Sustainable Development: By incorporating solar system, educational institutions can contribute to sustainable development goals. Solar energy is a renewable resource that reduces reliance on fossil fuels and minimizes the carbon footprint associated with traditional water supply methods.*
- *Resilience and Emergency Preparedness: Solar system can enhance the resilience of education facilities by providing a self-sufficient water supply during emergencies, natural disasters, or disruptions to the main water infrastructure. This preparedness can ensure the continuity of education and safeguard well-being of students (girls and boys) and staff in challenging situations.*

Figure 8: Female health care worker monitoring vaccine in Al Kawther PHC-Najaf/Iraq 2022

Site Selection

UNICEF supported careful targeting of schools and health care facilities to make sure there were compliant with the approach. Criteria included three main pillars: water system suitability, energy requirement, and readiness of school administration. all actors, including UNICEF, Gov, private sector and young people actively engaged in subject initiative, while leveraging technical skills and creating green jobs was undertaken between UNICEF and using expertise from youth engineers from private sector who played critical key role in delivering knowledge and information on operation and maintenance. The initiative specifically supported the new generation of youth engineers in the project and leverage youth technical expertise and. The creation of new green jobs for youth was one of the main objectives and successes for UNICEF, where a total of 50 youths (9 female) engaged in theoretical and on-site training on the installation of the solar system, with many of them subsequently getting green job opportunities in the private contractors.

Carbon Impact

By eliminating the need for diesel generated electricity, the 203 solar systems (199 schools and 4 health care facilities) reduced annual carbon dioxide emissions by 1,240 tons. Below presented an example of one solar system and the sum of reduced carbon dioxide:

Figure 7: Calculation of carbon reduction per school per annum

Category	Setting
Solar unit (4.4 Kw/hour)	1
KW generating/unit	4.4
Sunlight projection, hours/day	5.5hours
Total generated (KW/ day)	**24.2**
780-Carbon footprint) Kg, Co2/Kw/hour	0.78
Carbon reduction (Kg/day)	**18.8**
Per annum.	**360**
Total carbon dioxide reduction per year.	**6,795**

Lessons Learned

- Education and Awareness: Installing solar systems in schools and health care facilities provided an opportunity to educate students on the impact of water scarcity, the importance of water conservation, and sustainable solutions for water supply. It raised awareness about environmental issues and inspired students to take action to conserve water resources.

- Practical Learning Experience: Solar water systems are serving as practical learning tools for students, allowing them to understand the principles of renewable energy. Students gain hands-on experience by monitoring and maintaining the units, fostering their understanding of sustainable technologies.
- Community Engagement: Schools use solar system to engage with the local community and address water-related challenges. They engage parent and teachers' associations to contribute to the sustainability of operations and learn from the experience of using solar power. The initiative has contributed to promoting solar power and solarized water treatment within communities.
- Demonstrating Leadership and Innovation: By implementing solar systems, educational institutions can showcase their commitment to environmental sustainability, demonstrate innovative solutions, and inspire other schools and organizations to adopt similar practices. It can position the institution as a leader in sustainability and contribute to its reputation.

Figure 9: School girls in Ghamdan child friendly school washing their hands- Baghdad, 2023 captured by UNICEF staff

Next Steps

UNICEF is focusing on the learnings of this initiative to further address climate change and build resilient education and health care systems through:

- Strengthening children and young people's education for sustainable development, environmental education, and green skills.
- Mainstreaming water conservation concept among school children, teachers and health care workers.
- Scaling up adolescent engagement and youth-led action on climate change, with a specific focus on adolescent girls and young women.
- Building climate resilient and greener school facilities.
- Strengthening education systems for climate change adaptation and disaster risk reduction.
- Adapting new learning methods through developing and disseminating a booklet that informs children and young people on the importance of green energy, water conservation, monitoring water consumption and other climate topics.

References

The Children's Climate Risk Index, August 2021- UNICEF

Climate Landscape Analysis for Children report UNICEF, 2023

UNICEF guidance note/ How UNICEF regional and country offices can shift to climate resilient WASH programming, 2020/UNICEF

The Climate Crisis is a Child Rights Crisis: Introducing the Children's Climate Risk Index, UNICEF, 2021

MENA-Water Scarcity Report, UNICEF, 2021

Acknowledgements

UNICEF would like to take this opportunity to express its sincere appreciation to the Government of Germany through KfW and the Republic of Korea for their essential and generous financial contribution in support of the children and young people of Iraq.

About the Authors

Ali Al-Khateeb, Ph.D., Chief of WASH, UNICEF Iraq.
Ali Auob, WASH Specialist, UNICEF Iraq.
Hussein Al-Azzawi, WASH Specialist, UNICEF Iraq.

About the Series

UNICEF's water, sanitation and hygiene (WASH) country teams work inclusively with governments, civil society partners and donors, to improve WASH services for children and adolescents, and the families and caregivers who support them. UNICEF works in over 100 countries worldwide to improve water and sanitation services, as well as basic hygiene practices. This publication is part of the UNICEF WASH Learning Series, designed to contribute to knowledge of good practice across UNICEF's WASH programming. In this series:

Discussion Papers explore the significance of new and emerging topics with limited evidence or understanding, and the options for action and further exploration.

Fact Sheets summarize the most important knowledge on a topic in few pages in the form of graphics, tables and bullet points, serving as a briefing for staff on a topical issue.

Field Notes share innovations in UNICEF's WASH programming, detailing its experiences implementing these innovations in the field.

Guidelines describe a specific methodology for WASH programming, research or evaluation, drawing on substantive evidence, and based on UNICEF's and partners' experiences in the field.

Reference Guides present systematic reviews on topics with a developed evidence base or they compile different case studies to indicate the range of experience associated with a specific topic.

Technical Papers present the result of more in-depth research and evaluations, advancing WASH knowledge and theory of change on a key topic.

WASH Diaries explore the personal dimensions of users of WASH services, and remind us why a good standard of water, sanitation and hygiene is important for all to enjoy. Through personal reflections, this series also offers an opportunity for tapping into the rich reservoir of tacit knowledge of UNICEF's WASH staff in bringing results for children.

WASH Results show with solid evidence how UNICEF is achieving the goals outlined in Country Programme Documents, Regional Organizational Management Plans, and the Global Strategic Plan or WASH Strategy, and contributes to our understanding of the WASH theory of change or theory of action.

Readers are encouraged to quote from this publication but UNICEF requests due acknowledgement. You can learn more about UNICEF's work on WASH here: https://www.unicef.org/wash/

www.unicef.org/wash

United Nations Children's Fund
3 United Nations Plaza, New York, NY 10017, USA
For more information, please contact: WASH@unicef.org

Document No: WASH/FN/23