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How Groundwater Wells Develop Rural Areas into Sustainable Communities

Since the 1950s, the private, public, and nonprofit sectors and local communities have developed African groundwater sources into community groundwater wells. Established as The Dublin Principles in 1992, Integrated Water Resources Management (IWRM) is a strategy where stakeholders in the private sector, public sector actors including various African national governments, the African Development Bank, African Ministers Council on Water, the African Union, the European Union, the United Nations, and the United States Government, the nonprofit sector, and local communities work together to efficiently and effectively produce and deliver goods and services for local communities.¹ The benefits of such an endeavor have been apparent in the increased access to water sources in regions where the strategy was implemented. This paper will reveal the inextricable link between providing access to clean water and flourishing civilizations. Furthermore, the ways in which investing in water well construction leads to the transformation of rural areas into sustainable communities will be explained.

Water wells can provide clean water for hundreds of villagers. A pump or a tap built in the center of the community can save an entire day of walking to the nearest muddy puddle, and save hundreds of lives by preventing exposure to harmful or even deadly diseases.²

¹Global Water Partnership, “The Need For An Integrated Approach,” Last Modified March 1, 2017. <https://www.gwp.org/partnership/en/About/why/the-need-for-an-integrated-approach/>

²Emily Nusz, “Providing Clean Water to an African Village: Not A Simple Turn Of The Tap,” Last modified October 28, 2015. <https://blog.epa.gov/2015/10/28/providing-clean-water-to-an-africanvillage-not-a-simple-turn-of-the-tap>

Since the emergence of technology that enables the construction of water wells in the 1950s, groundwater wells have provided the aforementioned benefits, among other advantages in developing countries' local communities. With proper maintenance and effective efforts to educate local communities about water and sanitation, pumps can last up to twenty years.³ In African countries, access to clean water has been found to cause countries to experience less conflict due to an increase in water sources and increased hygiene and irrigation.⁴

Water is an entry point to advance core democratic values around equality, transparency, accountability, women's empowerment, and community organization. Governments that deliver basic water and sanitation services are often seen working on behalf of the people-creating a more stable environment. Countries that cooperate on water are less likely to go to war and networks established for water and sanitation services have used to strengthen community responses to challenges such as Ebola and other infectious disease outbreaks.⁵

Since the 1990s there have been increased efforts to provide rural areas in Africa with access to clean water. Various nonprofit organizations, rural African villages' governments, public utility companies and private sector companies that manage African governments' water supplies⁶ have worked together to develop rural African villages' groundwater sources into community groundwater wells through legal, technical, and financial plans for groundwater wells' construction, water allocation, and maintenance:

³Gillings of Public Health. "The Key to Drilling Wells With Staying Power In The Developing World." Accessed March 5, 2019.

<https://sph.unc.edu/sph-news/the-key-for-drilling-wells-with-staying-power-in-the-developing-world/>

⁴County Government of Marsabit, "Water, Environment, and Natural Resources," Accessed March 7, 2019.

<https://marsabit.go.ke/water-environment-and-natural-resources/>

⁵USAID, U.S. Government Global Water Strategy, Last modified 2017, 5.

https://www.usaid.gov/sites/default/files/documents/1865/Global_Water_Strategy_2017_final_508v2.pdf

⁶Efam Dovi, "Bringing Water to Africa's Poor," *Africa Renewal Online*, Last modified October 2007.

<https://www.un.org/africarenewal/magazine/october-2007/bringing-water-africa's-poor>

The central government, local government, and NGOs play the greatest roles in most aspects of rural water service provision. Urban utilities and community service providers play the smallest roles, though community service providers are most involved in the direct provision of service. Although regional governments, rural agencies, and the private sector also contribute to water provision in certain countries, they are generally less involved across the range of countries and tasks (table 4.6)⁷

Effective efforts made by nonprofit organizations include organizing water, sanitation, and hygiene (WASH) committees to technically and financially plan the construction of water wells, and educate locals about personal hygiene.⁸ The committee's members include nonprofits, rural African villages' governments, public or private water utility companies, and public sector actors including African governments, African Development Bank, African Ministers Council on Water, African Union, European Union, United Nations, and United States Government, and local communities. Customarily, African rural villages' governments possess legal jurisdiction over the community groundwater wells.⁹ Also, all national African governments have a minimum of laws concerning rural water, while approximately 50 percent of national African governments have a government agency devoted to water.¹⁰ After the groundwater wells' construction, the public or private utility company, in cooperation with the rural African villages' municipal governments, maintains, regulates and manages water services, and allocates the community water supply according to local needs, i.e. the WASH agricultural sectors. Most

⁷Sudeshna Ghish Banerjee and Elvira Morella, *Africa's Water and Sanitation Infrastructure: Access, Affordability, and Alternatives*, Ed. Vivien Foster and Cecilia Brinceno-Garmendia (Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank, 2011), 110.

⁸Tina Rosenberg, "To Maintain Water Pumps; It Takes More Than A Village," Last modified December 13, 2011. <https://www.opinionator.blogs.nytimes.com/2011/12/13/to-maintain-water-pumps-it-takes-more-than-a-village/>

⁹Sudeshna Ghish Banerjee and Elvira Morella, *Africa's Water and Sanitation Infrastructure: Access, Affordability, and Alternatives*, Ed. Vivien Foster and Cecilia Brinceno-Garmendia (Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank, 2011), 112.

¹⁰Sudeshna Ghish Banerjee and Elvira Morella, *Africa's Water and Sanitation Infrastructure: Access, Affordability, and Alternatives*, Ed. Vivien Foster and Cecilia Brinceno-Garmendia (Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank, 2011), 113.

national African governments provide their people with utility subsidies to offset the high costs for consuming the public utilities' goods and services.¹¹

Established and mandated by the United Nations in 1981 and 2010, respectively, WASH initiatives are programs that promote and provide developing countries with drinking water, water sanitation, and personal hygiene resources. Water treatment disinfects groundwater and sustains the community's water supply by making it reusable in public places and public residences. A primary task of WASH initiatives includes having rural African villages' governments, nonprofit organizations, and their partners provide rural villagers tanks to store clean water in their homes, an effort that significantly benefits locals.¹²

Using clean well water at home promotes WASH initiatives. With improved sanitation, less people suffer from waterborne illnesses from contaminated water, dehydration, and illnesses related to these two situations like diarrhea. Also, effective WASH initiatives results in improved health for women due to the ability to better manage menstruation and pregnancy. Practicing sanitation and personal hygiene promotes social, economic, political, and educational development since people can congregate without spreading diseases, contracting illnesses, and developing infections from unsanitary practices, dirty clothes, and contaminated materials for making, serving, and eating food. The more available the water supply, the more the economy and society will expand since they can pursue more activities concerning water. "Rain-fed

¹¹Sudeshna Ghish Banerjee and Elvira Morella, *Africa's Water and Sanitation Infrastructure: Access, Affordability, and Alternatives*, Ed. Vivien Foster and Cecilia Brinceno-Garmendia (Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank, 2011), 181.

¹²County Government of Marsabit, "Water, Environment, and Natural Resources," Accessed March 7, 2019. <https://marsabit.go.ke/water-environment-and-natural-resources/>

agriculture, low use of irrigation and water use efficient technologies” make it impossible to raise the capital to create a water supply for sustainable local food production.¹³

The African rural villages’ community food supply is the rural African villages’ last stage of economic development since irrigation is only possible after “domestic, industrial, and livestock water demands have been met.”¹⁴ Irrigation leads to small farmers’ usage of water storage since energy costs are higher and results are cleaner for pumping groundwater than for surface water.¹⁵ “In rural communities and smaller villages, locally suited fit-for purpose dams and reservoirs hold potential to provide water to disadvantaged groups that traditionally encounter particular challenges in obtaining and securing water supplies”.¹⁶ Irrigation and associated water storage infrastructure allows smaller farmers to select more yielding, diverse, and valuable crop varieties; growing techniques increasing water use efficiency; and adapt to climate change. Smaller farmers would have more jobs; higher salaries; more nutritious food; women empowerment, and increasingly secure food sources. “Especially giving women and children the resources to develop their communities and raise their own crops and livestock would break poverty and reduce the need for humanitarian assistance.”¹⁷¹⁸

¹³Network of African Science Academies, *The Ground Challenge of Water Security in Africa*, (Karen: Network of African Science Academies, 2014), 4.

¹⁴Yvan Altechenko and Karen G. Villholth, “Mapping Irrigation Potential From Renewable Groundwater in Africa-A Quantitative Hydrological Approach,” *Hydrological and Earth Sciences*, 19(2): 1055-1067. <https://www.hydrol-earth-syst-sci-net/19/1055/2015/hess-19-1055-2d5.pdf>

¹⁵Franklin Cardy, John Chilton, Stephen Foster, Marcus Moench, and Manuel Schiffer. *Groundwater in Rural Development: Facing the Challenges of Supply and Resource Sustainability*. Washington, D.C.: The World Bank, 2000, 1 and 3. documents.worldbank.org/curated/en/264071468776788418/pdf/multi-page.pdf

¹⁶WWAP (UNESCO World Water Assessment Programme,) 2019, *The United Nations World Water Development 2019: Leaving No One Behind*, Paris. UNESCO, 59.

¹⁷Wendy De Stefano, “Why Humanitarian Assistance Is Essential To Carry Out Hunger Relief Efforts” (Report, Embrace Relief, 2019), 8.

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In conclusion, the private, public, and nonprofit sectors and local communities have been establishing African water sources with Integrated Water Resources Management since 1992. Integrated Water Resources Management theoretically transforms groundwater wells built by nonprofits into community groundwater wells for rural African villages. Groundwater wells enable rural African villages' political, economic, and social development to evolve their societies into sustainable communities.

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¹⁸Wendy De Stefano, "Why Humanitarian Assistance Is Essential To Carry Out Hunger Relief Efforts" (Report, Embrace Relief, 2019), 8.

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