

Climate, Water and Food Security in Lesotho

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The finest hour continuously beckons. Arid lands like Lesotho face an uncertain future, because of a combination of rising temperatures, decades of misguided land use, and an accumulation of strained historical conditions. Nevertheless, by focusing on water and interceding in the hydrological cycle, it is possible to significantly improve environmental conditions. In Jan. 2024, BBCDC was invited by the World Food Program (WFP) to visit three sites and propose a rapid work plan based on climate action, water and food security. BBCDC is a small technical and commercial school founded in 1993, and where sustainable development is taken seriously. It began with inspiration from Permaculture and the WCED (Bruntland 1987).

The problem with rainfall in Lesotho and Southern Africa is that the pattern is characterized by volatility; long periods of drought are interspersed with bursts of monsoon like conditions. The landscape is ill adapted to this situation, and instead responds with flash flooding, erosion, extreme cutting of gullies and then heat pollution (and frost) during the dry phase in the cycle. Radiation in contrast is relentless and unambiguous.

Without water in the equation, solar radiation is primarily converted to sensible heat and conduction into the ground, with the corresponding huge oscillations in temperature between day and night, and summer and winter. BBCDC operates a significant solar energy education,

utilization and commercialization program. This informs a deep understanding of atmospheric ecology. Drawing on Permaculture and other progressive environmental management disciplines, BBCDC developed the term landscape energy quality. LEQ refers to the elaborate pattern which emerges when sun, water and life form cordial relations. This happens when water retention and management is coupled with biological vitality and the helpful order introduced by competent design.



Fig. 1: Crew at Ha Bokoro starting work April, 2024. (Evacuated tube solar cooker at hand).

Applying the above, what BBCDC proposed to the WFP was an ambitious workplan to stop water at 3 schools, and to reinvigorate three demonstration farms with sand dams, water supply and solar pumps which was approved. Over 6 months, April – Sept. 2024, the task was accomplished. Three greenhouses were also constructed for area farmers to be used for seedling production and passive heating, and a workshop held for farmers as a follow up.



Fig. 2: Sand dam and solar pump Waterfall Village.



Fig. 3: Terraced school garden Lithakaling.



Fig. 4: Terraced garden at Ha Bokoro.



Fig. 5: Solar box cooker Ha Bokoro.

WFP accelerated due process to ensure adequate finance and administrative support on time. The courtyard at 3 primary schools was intensively landscaped to include level garden beds, and soil amended with manure. Stone masonry walls were built to stop erosion, and ensure that water from roof tops and sidewalks was all retained. Rainwater tanks previously fitted can now work better. The school grounds were also swaled (contour bunds/ditches) to collect storm water. One of the schools received a large box solar cooker. At 3 other sites serving WFP demonstration farms, sand dams were constructed on ephemeral stream beds, and at two of the sites complete water supply infrastructure added, that included collection, solar pumping, storage and distribution. The weather cooperated and two substantial rain events over the winter (the normally dry period in Lesotho) filled the dams with water and began silting with sand.



Fig. 6: Sand dam and pump Lithakaling.



Fig. 7: Solar pump at Lithakaling.



Fig. 8: Water for irrigation Lithakaling.



Fig. 9: Water where there was little before Lithakaling.

These seven sites will now exhibit cooler summer temperatures and more moderate winter temperatures because of the huge infusion of water that was missing before.

The work for WFP was not all of it. In March 2024, his Majesty King Letsie III, Lesotho's head of state contacted BBCDC and asked us to build water retention/sand dam structures on pastures near Mantsonyane, Ha Mafa, in the middle of the country. Over a four-week period (Aug. 2024) BBCDC sent a crew there and constructed 3 more dams. All of the project sites maintained a gender balance on the workforces.



Fig. 10: Water impounded at Ha Mafa.



Fig. 11: Workshop on Climate, Water and Food Security Oct. 14-18, 2024. Farmer field school.

At all the project sites, biological potential is much enhanced. Subsequent differentiation of the surface geometry through accelerated growth of living mass will further complicate energy flow.....landscape energy quality. Start small but think big. The vast arid lands of the world are short of water and have poor soils and lack biomass. The oceans are rising and the air contains too much CO₂. The least we can do is ameliorate this displacement, and shift water to land, and carbon to soil and new rainforests, and obtain natural air conditioning in the bargain. Let's be ready when it rains. This is a pressing time on earth for everyone; pitch in and manage the transition from micro to meso to macro climate.... the finest hour.

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Fig. 12: solar greenhouse with seedlings.



Fig. 13: winter rain halted by a new swale Lithakaling Primary School.