Kusewera School
Permaculture Design Exercise

April 04, 2019

As part of their *Permaculture Design Certificate* (PDC) process, two interns from *Never Ending Food* (www.neverendingfood.org), Jacob Jumpha and Kondwani M'dale, used the grounds of Kusewera School to conduct their mapping and design activities. Permaculture Design follows a three-step process of: observation, mapping, and design. The following report will highlight the main findings in each of these areas.

Observation:

Good observation includes the 'basics', the 'analytical', and the 'investigative'. Observation of the basics includes taking time to identify things like:

- Sounds
- Smells
- Directional orientation
- Slope of the land
- Types of buildings/structures
- Diversity of vegetation
- Animals (domestic/wild/birds/insects)

Analytical observation digs a bit deeper and tries to identify things like:

- Variations in soil types
- Climate and microclimates
- Water flow from structures/land
- How structures are being used
- Variations in sun/shade patterns
- Benefits of vegetation (food/fuel/building supplies/seeds)
- Above and below ground considerations (gas/water/electricity)

In the investigative phase, a 'stakeholder' analysis is generally done to determine things like:

- Historical considerations/use of the site
- Main needs trying to be met
- Future plans of the site (additional structures/infrastructure changes)
- Perceived challenges/solutions

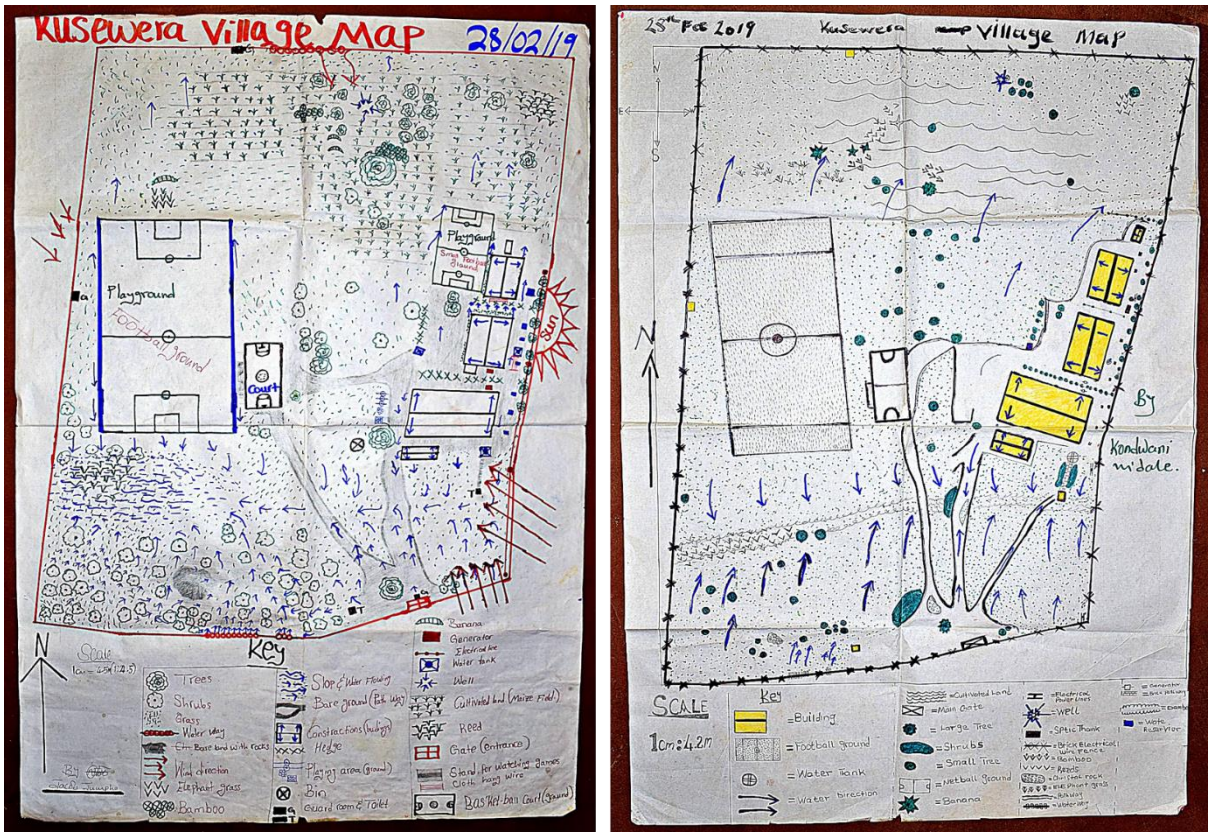
The following are some of the main observations from Jacob and Kondwani:

- The entire site is bordered by a brick and electric-wire fence with one main-gate access for cars on the south-east of the wall.
- The approximate size of the site runs about 280 meters along the west wall, about 215 meter from across the north end, about 250 meters along the east wall, and 190 meters along the south wall, giving an average square meter area of 53,850 (or approximately 5 hectares).
- Along the southern wall is natural and diverse forest regeneration taking place.
- Water runoff from the surrounding community flows from outside the site down to the south wall and enters the site through pipes that were built into the bottom of the wall.

- The south-west area of the site is a very-saturated wetland (dambo) area.
- A new football pitch is being constructed along the west wall.
- The north side of the site contains a bit of wetland area, but is currently being used by the community for staple-field production.
- The east wall is currently used for school/office buildings, kitchen, and housing.
- The middle of the site is higher in elevation and contains a netball court.
- Predominant wind comes from the east.
- Fire threats come from the north and east.
- The school is surrounded by agricultural land on the west and north, a village on the east, and a growing residential area on the south.
- The soil on the majority of the site is suitable for the growth of trees, crops, and horticulture.
- Several of the buildings on-site already have solar panels for energy and are connected to the ESCOM grid.
- One house on the north-east end of the plot is keeping chickens.
- The school has future plans to add a primary and secondary school, a trade/vocational center, a clinic, a welding shop, and an amphitheater.

(Three Google Earth views of Kusewera School: Close-up of the site (left), school and village (top right), full view of school and surrounding areas (bottom right))

The following maps of Kusewera School were drawn by Jacob and Kondwani (to scale). These maps show the buildings, structures, landscape features, vegetation, direction of water flow, the car and foot paths, and other already-existing features. Maps help to show what is already there, whereas designs show possible ideas for improving the future use of the area.



(Maps of Kusewera School: Jacob Jumpha (left), Kondwani M'dale (right))

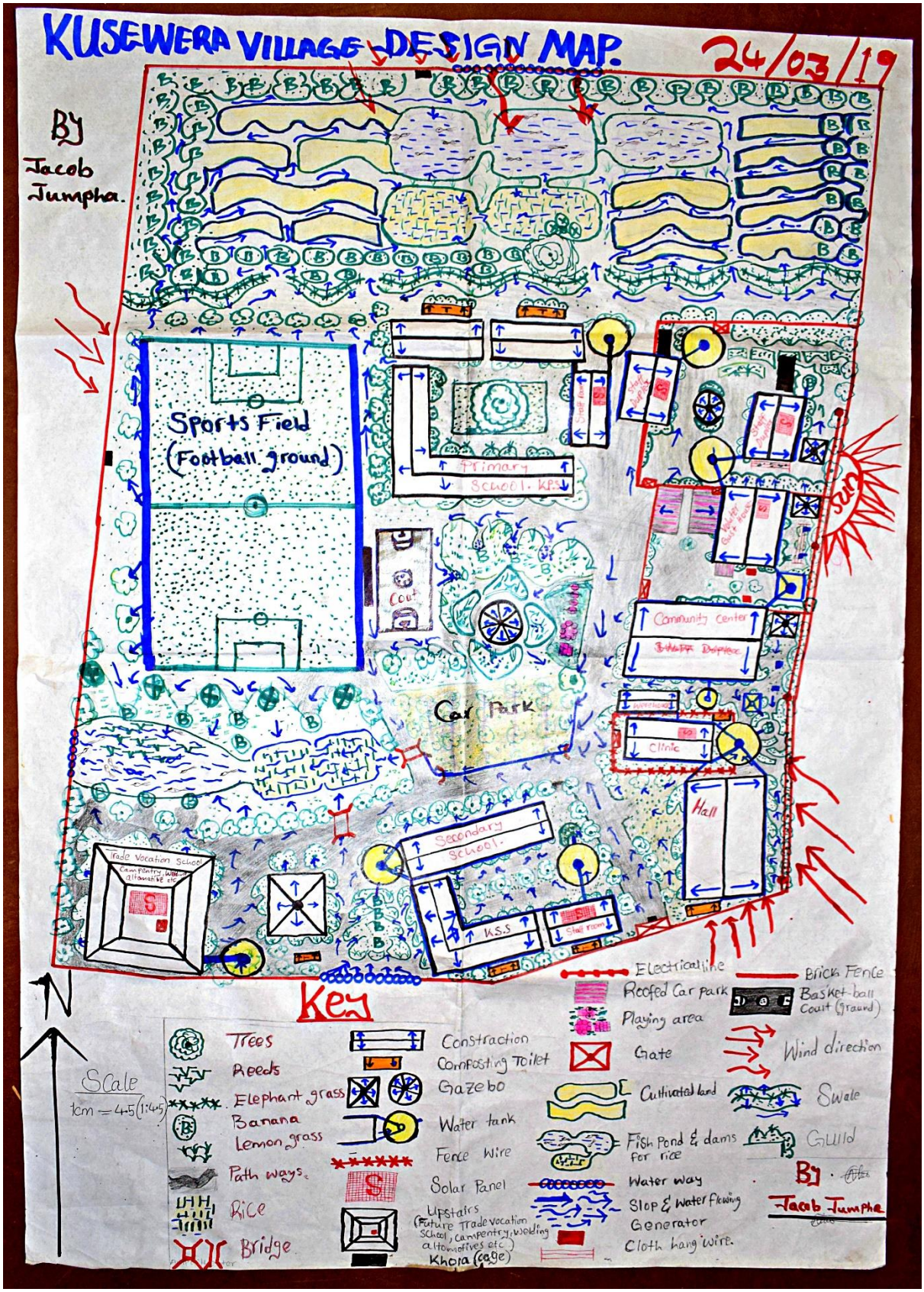
These maps show the flow of water into the wetland areas, the flow of water off of existing structures, the vegetative/woodland/agricultural areas (as they currently exist), and the other features such as football pitch, netball court, driveways, footpaths, wind direction, and borders.

What follows are the Permaculture *designs* that each of the interns developed. Good designs strive to maximize the potential and benefits of resources by placing them in the best possible location. The placement of these resources is done in coordination with the future use and needs of the area as described by the school staff. Each intern created a separate design, so Kusewera can compare the ideas and see if there are areas which can be used to improve the long-term sustainability of the site.

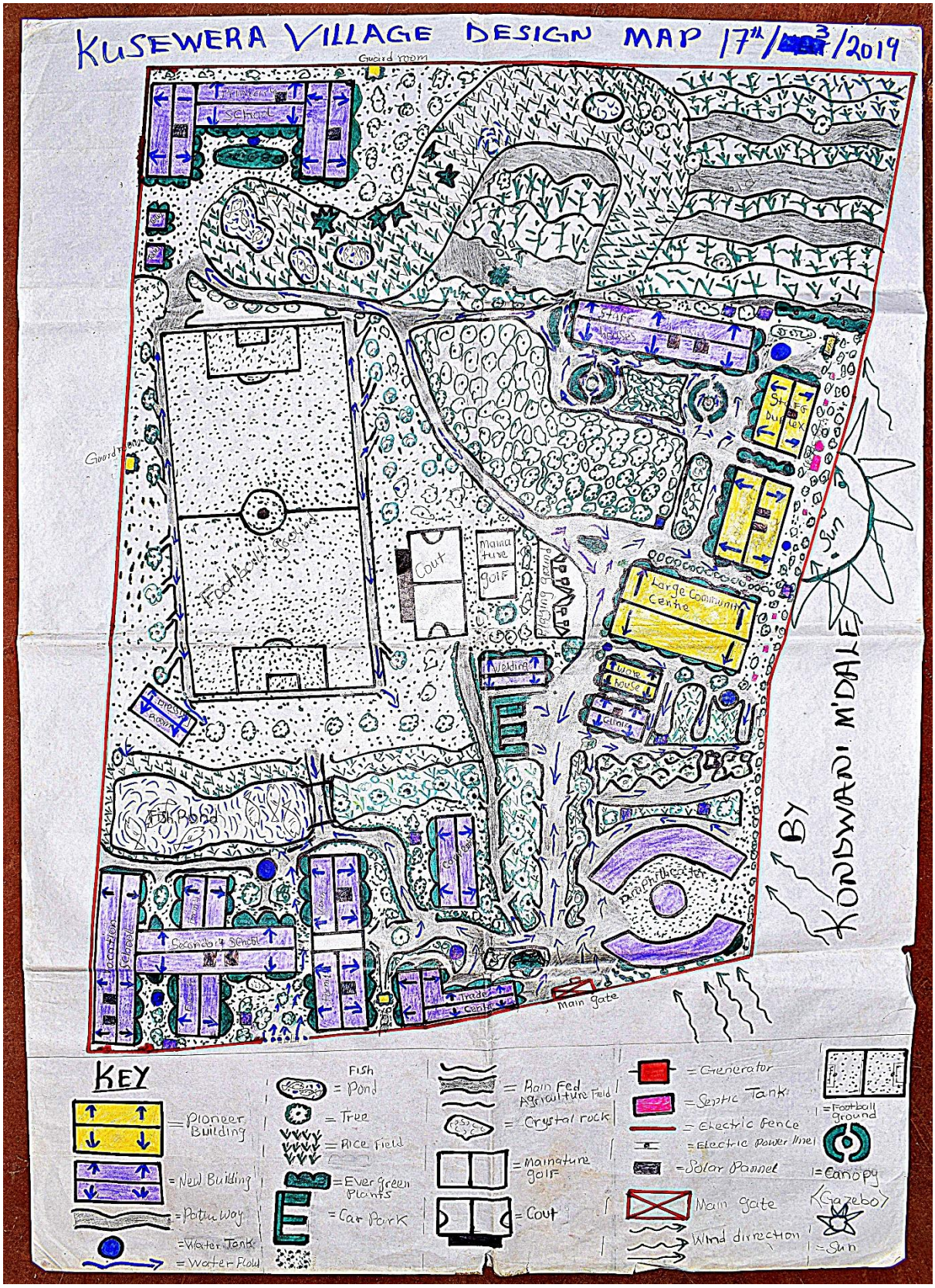
Both designs have included things like the future primary and secondary school blocks, eco-sanitation toilets, additional solar panels, trade/vocational center, amphitheater/hall, clinic, etc. Some concerns which were identified were the proposed placement of future school blocks in the wetland area in the southwest corner of the site. This is the wettest area of the site and perhaps more suitable for fishpond/water-loving species. By moving some of the buildings closer to the southern, northern, or center or the site, it takes advantage of higher ground and eliminates the need for trying to backfill the wetland areas with additional soil for building purposes.

Both designs suggested the use of small contour ridges along the edges of the new football pitch to channel water into fruit-tree pits which would serve the triple purpose of harvesting water, providing shade for sports spectators, and offering an increase in nutrition security. Water coming from buildings can be used for the irrigation of plants and trees closer to the kitchen. While fruit, fuel, and shade trees can be established near the children's playground area.

They have also both considered the use of a car park for school activities and sport events, the addition of solar panels on each of the new buildings, composting toilet blocks, and the continued use of a staple-food area near the northern wall.



(Permaculture Design by Jacob Jumpha)



(Permaculture Design by Konwani M'dale)

There are also some unique features on the designs. For example, on Jacob's design, he included rainwater catchment tanks on many of the proposed buildings to help with irrigation, mopping, or other washing needs. He included an outdoor classroom between the trade/vocation center and the secondary school which could be placed over a large flat stone area that was identified during the initial observation phase. And, he suggested a walled area around the staff/volunteer living areas for added privacy and protection.

On Kondwani's design, he placed the welding shop away from the classroom blocks to help minimize noise which may interfere with lessons. He also added a changing room near the football pitch for students and team members who may be playing there. The secondary school on Kondwani's design is located at the far northwest corner with the wetland area in front of the building. This would allow for water features, fishponds, and even ornamental/functional landscaping around and near the school block.

Functional living areas can be places of food, herbs, natural medicines, recreation, and peace. Water features and fish ponds also don't have to be enormous costly structures, but can be integrated on a smaller scale into the functional landscaping. The possibilities of transforming Kusewera into an abundance of natural resources can be a very achievable reality!

Never Ending Food would like to thank Kusewera School for allowing Jacob and Kondwani to conduct their practical design work on site and we hope that some of their ideas will be helpful to the continued success of the community. We will be meeting with the staff to present these ideas, but if there are any further questions or comments, please feel free to contact us by emailing neverendingfood@gmail.com or by visiting our website at www.neverendingfood.org.