**Well Usage**

* **“**Groundwater in Burkina Faso is primarily accessed by unprotected dug wells and used mainly for drinking water supply, particularly for small supplies in rural areas and smaller towns” (<https://upgro.org/country-profiles/burkina-faso/>)
* “Some groundwater is used for small-scale market garden irrigation which is largely accessed through shallow wells, for example supporting dry season cultivation in the south. It is also used for livestock watering. Industry is the smallest user of groundwater in the country” (<https://upgro.org/country-profiles/burkina-faso/>)

**Drought Resistance 🡪 max allowable period without rain**

**Maize, Pearl Millet, Sorghum**

* **“**A significant rain event every 10 to 14 days is required to prevent damage to the corn crop” (<https://www.farmprogress.com/corn/corn-yields-will-be-limited-without-irrigation>)
  + **Assuming this would constitute a devastating damage to maize 🡪 meaning all would be lost (this shouldn’t be our lower design limit, even a percentage loss would be bad)**
* “golden rule of corn production is that highest yields will be obtained only where environmental conditions are favourable at all stages of growth. The amount of yield loss that occurs during dry weather depends on what growth stage the corn is in and how severe the dry conditions become” (same as above)
* Based on the visual observations (Figs. 1, 2) and mean percent dead plants due to drought stress, the crops could be ranked in the increasing order of drought tolerance as soybean < blackgram < greengram < groundnut < maize < sorghum < pearl millet < bambaranut < lablab bean < cowpea (<https://biblio.iita.org/documents/S99ArtSinghRelativeInthomNodev.pdf-21f180cf00386db8c908dcf22df80731.pdf>)

**SPI and crop yield reduction**

* “We use crop-country specific standardized precipitation index (SPI) and census yield data for 1961–2016 to build a probabilistic modeling framework for estimating yield loss risk under a moderate (−1.2 < SPI < −0.8), severe (−1.5 < SPI < −1.3), extreme (−1.9 < SPI < −1.6) and exceptional (SPI < −2.0) drought” (<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6341212/>)
* “Yield loss risk tends to grow faster when experiencing a shift in drought severity from moderate to severe than that from extreme to the exceptional category, demonstrating the non-linear response of yield to the increase in drought severity.” (same as above)

Graphical user interface, text, application, email

Description automatically generatedChart, scatter chart

Description automatically generated

Table

Description automatically generated

“Overall, drought-driven yield loss risk is projected to increase by 9%–12%, 5.6%–6.3%, 18.1%–19.4% and 15.1%–16.1 for wheat, maize, rice and soybeans, respectively, without considering adaptations or CO2 fertilization effect”

🡪 can design for desired yield loss risk (for example, don’t want risk to exceed 60% then need to design to prevent effects of moderate drought (SPI = -1.2 to -0.8))

What percentage of crop loss is acceptable to design for?

**Miscellaneous**

“Meanwhile, drought frequency in West Africa is expected to be intense causing reduction in agriculture production. It is estimated that crop growing periods in West Africa may shorten by an average of 20% by 2050, causing a 40% decline in cereal yields and a reduction in cereal biomass for livestock” ([https://www.preventionweb.net/files/78476\_cs17.samuelparteycasestudyoutlinedr.pdf?\_gl=1\*7ncatv\*\_ga\*NDIwMTQ3MDQ1LjE2NzgxMTc1ODU.\*\_ga\_D8G5WXP6YM\*MTY3ODExNzU4NS4xLjEuMTY3ODExODEyMS4wLjAuMA](https://www.preventionweb.net/files/78476_cs17.samuelparteycasestudyoutlinedr.pdf?_gl=1*7ncatv*_ga*NDIwMTQ3MDQ1LjE2NzgxMTc1ODU.*_ga_D8G5WXP6YM*MTY3ODExNzU4NS4xLjEuMTY3ODExODEyMS4wLjAuMA)..)