population_counts

load libraries

```
library(tidyverse)
library(terra)
```

load data and check crs

```
# read in population data
pop <- rast('../../../../capstone/netzerohydro/data/raw/global_pop_2020_CN_1km_R2025A_UA_v
crs(pop) # no crs, we will assign 4326
```

[1] "GEOGCRS[\"WGS 84\",\n   DATUM[\"World Geodetic System 1984\",\n   ELLIPSOID[\"WGS

```
pop <- project(pop, "epsg:4326")
crs(pop) # looks good
```

[1] "GEOGCRS[\"WGS 84\",\n   DATUM[\"World Geodetic System 1984\",\n   ELLIPSOID[\"WGS

```
# read in river data
nepal_rivers_3up <- readRDS("../../../../capstone/netzerohydro/data/cleaned_v1/nepal_ri
nepal_rivers_vect <- vect(nepal_rivers_3up)

# read in future dams and make terra object
nepal_future_dams <- readRDS("../../../../capstone/netzerohydro/data/cleaned_v1/nepal_f
nepal_future_dams_vect <- vect(nepal_future_dams)
crs(nepal_future_dams_vect)
```

[1] "GEOGCRS[\"WGS 84\",\n   DATUM[\"World Geodetic System 1984\",\n   ELLIPSOID[\"WGS
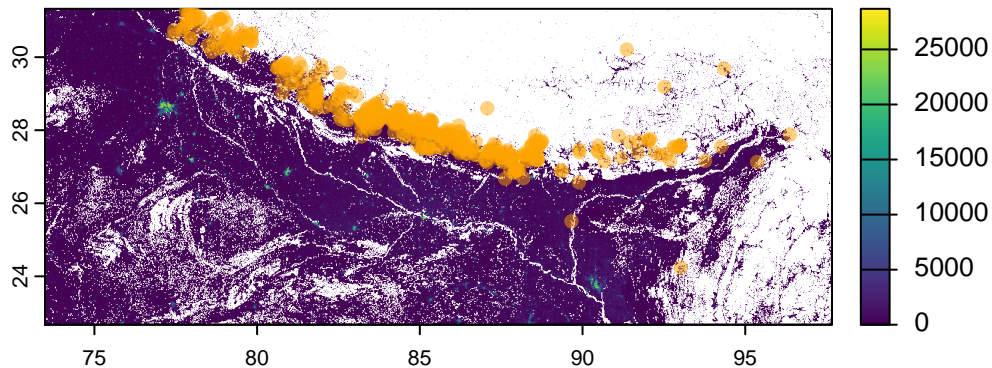
crop population to nepal

```
pop_nepal <- crop(pop, nepal_rivers_vect)

# # remove 0s, I don't think there were any
# pop_nepal_nozero <- subst(pop_nepal, 0, NA)
# # filter for populations less than 100
# pop_nepal_nozero[pop_nepal_nozero < 100 ] <- NA
```
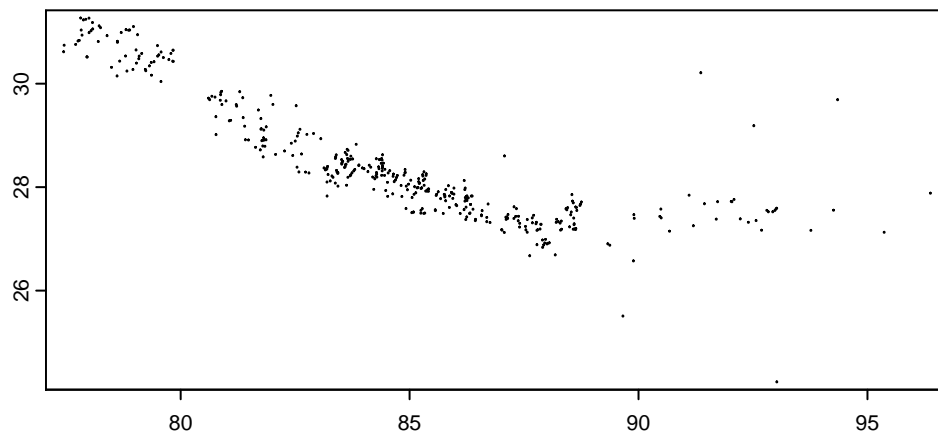
quick plot

```
plot(pop_nepal)
plot(nepal_future_dams_vect, add = TRUE, col = "orange", alpha = 0.5)
```


create buffer around dams

```
# create buffer around future dams
nepal_future_buffer <- buffer(nepal_future_dams_vect, width = 1000) # 1000 meters
plot(nepal_future_buffer)
```

find population counts for future dam buffers

```
# find pop values within the buffer
pop_nepal_values <- extract(pop_nepal, nepal_future_buffer, fun = sum, na.rm = TRUE) %>%
  rename(total_pop = global_pop_2020_CN_1km_R2025A_UA_v1,
         future_dam = ID)

head(pop_nepal_values)
```

```
  future_dam  total_pop
1          1  769.97297
2          2  107.10135
3          3   64.60206
4          4 2003.32944
5          5 1936.52963
6          6   20.35302
```

To check:

- Is population values total counts of population, or in 1000s?
- Can I make the future dam number dam_id?