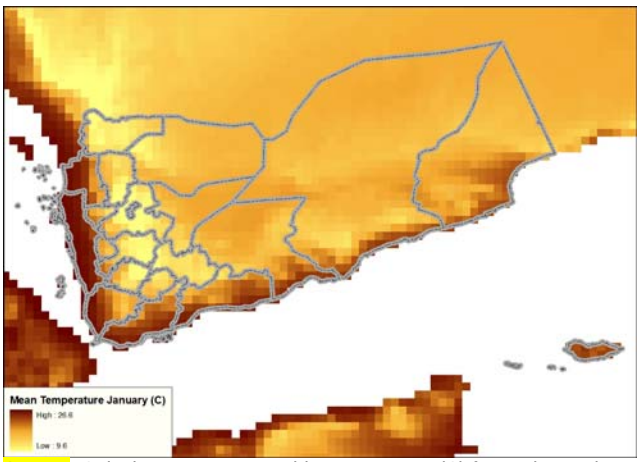
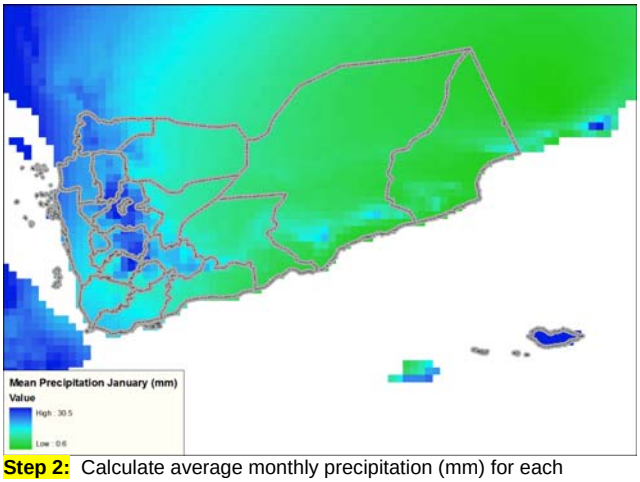
# Yemen Health Information System: Using Data for Decisions

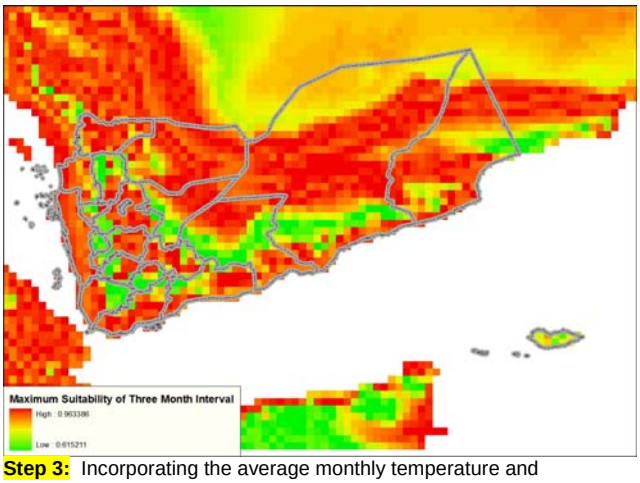
**Health GIS Sample Analyses: Malaria "Hotspots" in Yemen and Assessing Vulnerable Populations**



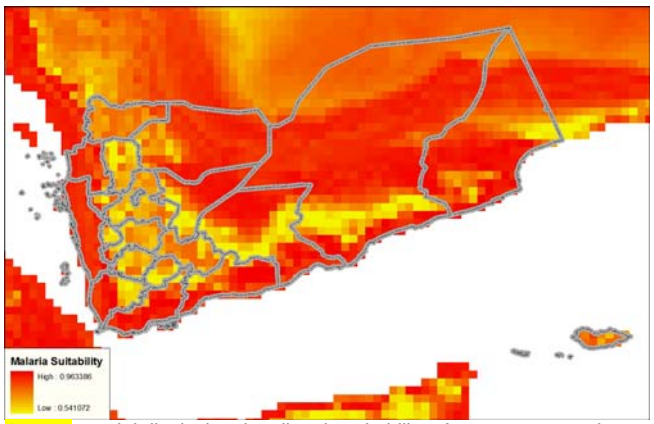

**Step 1:** Calculate average monthly temperature (C) for each month from 1961 – 1990 (e.g. January shown).



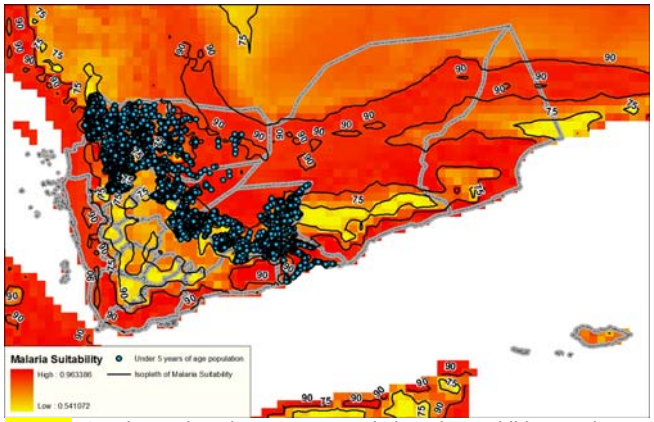

**Step 2:** Calculate average monthly precipitation (mm) for each month from 1961 – 1990 (e.g. January shown).




**Step 3:** Incorporating the average monthly temperature and precipitation, calculate and adjust the climatic suitability for transmission seasons at three consecutive month intervals (Craig et al., 1999).




**Step 4:** Model displaying the climatic suitability of temperature and precipitation for malaria transmission for any three consecutive months.




**Step 5:** Overlay and analyze target populations (e.g., children under 5 years of age) using the ***Demographic Profiler*** and assess high priority sections of Yemen for monitoring, evaluation, and intervention based on clusters of vulnerable populations in likely underserved rural areas.

**Results:**

Mapping climatic suitability for malaria facilitates the identification of the spatial variability to the population at risk. In a model using temperature and precipitation (Craig et al., 1999), the climatic suitability index is a value between 0 (not suitable) and 1 (highly suitable). The table below summarizes by governorate: average values of the climatic suitability, selected malaria cases (WHO, 2002), and number of participation in malaria from the Yemen Survey.

| Governorate | Malaria Suitability | Cases | Participation |
|---|---|---|---|
| Al Jawf | 0.88 | NA | 7 |
| Amran | 0.73 | 14,406 | 77 |
| Marib | 0.86 | 7,231 | 70 |
| Sa'adah | 0.82 | NA | 36 |
| Shabwah | 0.85 | 4,636 | 107 |

Young children (under 5 years of age) are most vulnerable to malaria morbidity and therefore they are particular concern in this analysis. Out of a total population of 415,625 children, the climatic suitability above 0.90 includes 120,046 children, and 374,375 children live in an area of suitability greater than 0.60.

In conclusion, malaria mapping can inform the decision maker of the spatial variability of climatic suitability for malaria transmission with regards to cases and prevention (e.g. distribution of bed-nets).

Craig M, Snow RW, Le Sueur D (1999). A climate-based distribution model of malaria transmission in Sub-Saharan Africa. Parasitology Today 15: 105-111.
New, M., Hulme, M. and Jones, P.D. (1999). Representing twentieth century space-time climate variability. Part 1: development of a 1961-90 mean monthly terrestrial climatology. *Journal of Climate* **12**, 829-856