Case Study Anopheles

In order to forecast the spread of malaria it is essential to model the anopheles population. The following (simplified) ecology has have to be represented in a System Dynamics Model:

1. In the beginning, 800,000 eggs and 330,000 larvae live in a pool; 70,000 adult anopheles exist (neglecting sex of mosquitos).
2. An adult anopheles lays 5.1 eggs per day. However, only if the temperature is higher than 19 degrees Celsius.
3. The water is sufficient to feed 3,000,000,000 eggs and 1,500,000,000 larvae. All eggs and larvae exceeding this limit will die immediately.
4. 32 % of eggs die every day.
5. 10 % of eggs become larvae every day.
6. 15 % of larvae die every day.
7. 5 % of larvae become anopheles every day.
8. 20 % of anopheles die every day.
9. temperature follows a seasonal pattern with 25 degrees (day 1-60), 30 degrees (day 61-90), 25 degrees (day 91-150), 20 degrees (day 151-240), 15 degrees (day 241-300) and 25 degrees (day 301-365).

# Assignments:

1. Develop an Excel model to forecast the anopheles population throughout the year.
2. Simulate the impact of a reduced pool size (drainage 50 %).
3. Simulate the impact of Global Warming with and without increased precipitation (pool size).