



Breakfast without Za'atar!

By Yara Dahdal



Western white stork and black kite during migration season. Palestine is located on the second most important migrating route in the world and is considered to be a bottleneck for migratory soaring birds during spring and autumn migration seasons.

As an environmentalist, I feel very fortunate to live in Palestine. Our region is blessed with a rich biodiversity, which can be attributed to its distinct location as well as to its diverse biogeographic zones and topography. Nevertheless, combating the consequences of climate change worldwide is one of the most challenging problems in modern history, and Palestine is no exception. If you are skeptical about the reality of climate change and its negative effect on our lives, just ask our Palestinian elders if they remember such weather extremes (high and low mean temperatures, flooding, heat waves, droughts, sandstorms, etc.) in their early days! One can argue that extreme weather events have been happening since the flood in Noah's time, yet the frequency and severity of these events increase the complexity of the issue.

Although the Palestinian carbon footprint (the amount of greenhouse gases produced) is very low, scientists nevertheless define the Eastern Mediterranean zone as a climate hotspot. The region is warming up significantly faster than any other inhabited region. An updated assessment of the impacts of climate change in the Middle East was recently published in a review paper authored by scientists, including myself, from nine different countries in the region. The review (*The Journal of Geophysics*) concluded that a 0.45 °C increase per decade is projected to continue, unless a serious decrease in global emissions takes place. Furthermore, the review warns about the danger caused by the extreme weather events and their disruptive impacts. All these changes are expected to severely impact water resources, agriculture, health, ecosystems, biodiversity, and forest fires. The question then becomes: What would happen to our natural wealth if the present situation persists?

It is evident that climate change is altering temperature and rainfall regimes (timing, intensity, and duration), which are the two major components that affect biodiversity. The overall decrease in precipitation, coupled with short periods of heavy precipitation, threatens freshwater resources that are vital for ecosystems and their constituents. The increase in mean temperature is causing stress on various living species, pushing them either towards a very fast adaptation track with respect to the new climatic conditions or towards a decrease in their population, rendering them rare, which eventually may lead to extinction.

Climate change affects each ecosystem differently. For instance, species living in desert areas (fragile ecosystems) are already surviving in extreme physical conditions. Any further decrease in rainfall will lead to the drying of the woody plant inhabitants, which would negatively affect the dynamics of the whole ecosystem. The increasing dry periods in the Mediterranean biome are leading to the drying of different species of oak trees, such as the Mount Tabor oak, which is already scarce in the West Bank. In addition, the frequency of fires is increasing, causing a change in the structure of



Wild sage, an important medicinal plant in Palestine, is becoming a scarce commodity due to over-picking and uprooting.



Mount Tabor oak acorn, a rare species in Palestine.

Both transition and desert habitats are seen in the horizon. The image is taken from eastern Bethlehem.





An immature Mount Tabor oak acorn.



Za'atar in the wild, the herb that is deeply rooted in Palestinian cuisine and cultural heritage.



Akkoub, a delicious plant with medicinal properties, is a significant element of Palestinian identity and heritage. Its mature seeds are an important source of food for some threatened bird species such as the European goldfinch.



Jerusalem wilderness (deserecosystem) and the Dead Sea, as seen from the Bethlehem district, both threatened by the consequences climate change.

plant community and the ecosystem. The transition biogeographical zones (Mediterranean to desert) are expected to be highly susceptible to climatic changes, causing a real threat to the rich species diversity and composition. Herbs, medicinal plants, and many other perennial herbaceous plants living in various ecosystems are particularly sensitive to rainfall amount and variability, and are consequently highly vulnerable to climate change. *Za'atar falasteeni*, sage, *akkoub*, and many other popular species, which are connected with our cuisine and natural heritage, suffer from being over-picked and uprooted from the wild, as well as

from the consequences of climate change. This may eventually lead to breakfast without *za'atar* for the next generations. Can you imagine a breakfast without *za'atar*?

Rising temperatures caused by climate change are changing the lifecycle timings in migrating bird species. Moreover, climate change is causing the Mediterranean to warm up, leading to a decline in the population of thermally sensitive species. Finally, climate change will open the door for invasive species (terrestrial and aquatic) to thrive and negatively impact biodiversity, agriculture, health, and the socio-economic reality.

Mount Tabor oak tree. Approximately 50 of these trees currently thrive in the West Bank.



Climate change is only one part of the pessimistic equation. Added to it are urbanization, habitat fragmentation, unsustainable use of resources, pollution, overgrazing, over-picking, and the access restrictions imposed by the Israeli occupation forces on most of our key biodiversity areas, nature reserves, and open spaces.

In the past decade or so, almost every official document or scientific research study in the domain of biodiversity included "climate change" as a major threat to biodiversity in Palestine. Nevertheless, research on both taxa and species levels comes to naught.

This situation cannot persist. More research needs to be invested in order to better understand the impact of climate change, especially on endemic, near-endemic, threatened, and endangered species. This will create the right bases for proper management, climate adaptation, and resilience programs to protect our natural wealth.

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A panoramic view of the desert ecosystem surrounding Wadi al-Qelt. The city of Jericho can be seen on the horizon.