Health is Wealth:

A One Health Approach to Control Vector-born Diseases and Promote Sustainability.

By Teresa E. Leslie, PhD

At the Sustainability Conference held on St. Eustatius in December 2017, the panel "Health is Wealth" explored the interrelationship between the environment and health within the context of the island's sustainability. Environmental conservation is often presented as a constraint to development instead of a tool for achieving human wealth (which includes health) (Nunes et al., 2016). A presumption of this panel discussion was that a broad-based and holistic approach to the topic of sustainability could potentially serve to engage the local population and empower them to conserve nature, protect the environment and safeguard their health.

The One Health model (Thompson, 2013)

The one health model (Feburay, 2015), which recognizes that the health of populations is connected to the health of animals and their surrounding environment, was specifically emphasized throughout this panel discussion. The goal of the one health model is to encourage collaborative, inter-disciplinary, and inter-departmental actions that will result in the best health for people, animals, and the environment. Within the context of the one health model, a healthy population is not just a concern for the public health department and/or the health care system but is a concern for all.

The panel specifically focused on the topic of vector-borne diseases, more specifically on mosquito-born diseases. Panelists included Dr. Teresa E. Leslie (Eastern Caribbean Public Health Foundation), Ms. Delia Goilo (Erasmus University and Medical Center), Dr. Sharon Viera (Chief Veterinary Officer Sint Eustatius) and Mr. Javier Gomez (Vector Control, Sint Eustatius Department of Public Health).

Vector-borne diseases are transmitted among human, animal, or plant hosts by arthropods, usually insects such as mosquitos. A broader definition of vector borne diseases recognizes that other animals can serve in the role of infectious disease vector by harboring pathogens that cause disease in susceptible populations (f.e. fleas on rats during bubonic plague).

Recently known examples of mosquito-born diseases impacting the Caribbean human population include dengue, chikungunya (CHIKV) and Zika. Possible symptoms of these diseases include fever, joint pain, headache, vomiting, muscle and joint pain, skin rash and Zika could cause birth defects (microcephaly). Dengue has been endemic in the region for years (Leslie et al., 2014), but CHIKV and Zika recently caused epidemics. It can be assumed that all three are currently endemic which means that the disease is regularly found among people in a certain area (Leslie et al., 2017).

It is possible that other diseases are circulating, however, there is a lack of data available and more information is needed. Little is known for example about the West Nile Virus (WNV) in the Caribbean. WNV, a mosquito -borne pathogen that can affect people and birds, has wiped out millions of birds every year across North America (Morell, 2015). WNV could also impact equine populations such as horses and donkeys (Bolfa et al., 2017). The research raises concern about the long-term impacts of the disease, particularly on threatened and endangered bird species.

On St. Eustatius, mosquito density is correlated with human actions, especially cleanliness. A clean environment helps decrease the number of mosquito breeding grounds and therefore the incidence and prevalence of disease. However, individual/household actions such as proper waste and animal management are sometimes limited. In addition to increasing the risk of mosquito breeding sites, inadequate waste management and roaming animals have the potential to disrupt Statia's fragile island ecosystem. Furthermore, the accumulation of waste can harbor rat populations which not only threaten the public's health but also threaten native species such as red-billed tropicbirds (*Phaethon aethereus*) and *iguana* nesting sites. Unattended roaming animals not only harbor zoonotic pathogens but can damage the island's biodiversity by eating many plant species. Proper waste and animal management strategies are therefore not only important to prevent mosquito-born diseases but also to nature conservation.

During the session Ms. Delia Goilo (Ph.D. student, Erasmus University and Medical Center), reported on the the NWO funded project "Dutch Caribbean Preparedness for Mosquito Bourne Diseases (DUCAMID)". DUCAMID aims to improve research preparedness of the Dutch Caribbean islands and to predict, detect, and study emerging mosquito-borne infectious diseases, as well as establish a network to optimize the investigation of those factors driving arboviral disease emergence. This will be accomplished by the integration of basic laboratory science and epidemiology. Erasmus University and Medical Center is the lead on DUCAMID and brings together key players in Curaçao (Curaçao Biomedical & Health Institute and Fundashon Dier en Onderwijs Cariben) , Sint Eustatius (Eastern Caribbean Public Health Foundation)and the Caribbean Netherlands Science Institute (CNSI). Additional partners include the Netherlands Centre for One Health (Erasmus MC) and Wageningen University with its vector ecology research program.

The partners involved in DUCAMID from the Caribbean play an essential role in research on vector-borne diseases and are linked to regional research and public health expertise.