Air & Water
Borne Diseases

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Introduction

Vector-borne diseases (VBD) transmitted by arthropods are responsible for over 1 billion cases and 1 million deaths every year, corresponding to at least 17% of all infectious diseases in human populations. Among them, we can nd malaria, leishmaniasis, onchocerciasis, lymphatic lariasis, Chagas disease, and African trypanosomiases, as well as several arboviral diseases such as dengue and Zika virus. Some of these have reemerged in new parts of the world and have become a topic of growing importance in public health and in political and scienti c agendas. Several factors are contributing towards the reemergence of VBDs [1].

Vector-borne parasitic infections pose signi cant health challenges worldwide, a ecting millions of people annually. ese infections are transmitted to humans through the bites of infected vectors, such as mosquitoes, ticks, and ies, which serve as carriers for parasitic organisms. Common examples of vector-borne parasitic diseases include malaria, dengue fever, leishmaniasis, and Chagas disease. In the quest to reduce the burden of these diseases, sustainable control strategies have become imperative, combining innovative technologies, community involvement, and cross-sector collaborations [2].

Integrated vector management

One of the cornerstones of sustainable control is Integrated Vector Management (IVM), an approach that employs a mix of complementary interventions tailored to the local context. ese interventions include biological, chemical, and environmental strategies, with an emphasis on minimizing adverse e ects on non-target species and the environment. IVM encourages surveillance, monitoring, and research to continuously re ne and adapt strategies to changing circumstances.

Insecticide-treated nets and indoor residual spraying

ITNs and IRS have proven highly e ective in reducing the transmission of diseases like malaria. ITNs create a physical barrier against vectors while also releasing insecticides, deterring their entry and killing those that come into contact. IRS involves the application of long-lasting insecticides to indoor surfaces, reducing vector populations and their ability to transmit diseases [3, 4].

Biological control

Using natural predators, parasites, or pathogens to control vector populations is a sustainable alternative to chemical interventions. For example, introducing mosquito larvae-eating sh in water bodies or deploying bacteria that target mosquito larvae can help control mosquito populations naturally.

Vaccination

Vaccines can play a crucial role in controlling vector-borne parasitic infections. Malaria vaccine development, for instance, has made signi cant strides, o ering hope for reducing disease transmission. Similarly, e orts are underway to develop vaccines against other vector-borne diseases like leishmaniasis and dengue fever [5].

Community engagement and education

Engaging communities in vector control programs is pivotal for long-term success. Educating individuals about disease transmission, vector habits, and preventive measures empowers them to take ownership of their health. Community participation in environmental management, such as proper waste disposal to eliminate breeding sites, can also contribute to sustained vector control [6].

Data-driven decision making

Harnessing technology and data analytics for surveillance and monitoring allows authorities to identify disease hotspots, track vector populations, and respond swi ly to outbreaks. is approach aids in targeted interventions and resource allocation, making control e orts more e cient and e ective [7].

Cross-sector collaborations

E ective control of vector-borne parasitic infections demands collaboration across sectors such as health, environment, agriculture,

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