Research is able to take up the complex challenges raised by diseases of health and economic importance by combining the most basic work, including genomics which provides an understanding of pathogenesis mechanisms and pathogen emergence, with recent mathematical modelling tools, and field work. This integrative approach involves researchers, but also decision makers, managers, and surveillance operators. The regional scale seems to be the most appropriate scale for this approach in preventing and controlling cross-border emerging diseases. The CaribVET network is such an example.

The hotspots of biological diversity are often associated with the emergence of new pathogens. The Caribbean, a region rich in contrasting ecosystems and socio-economic situations, is a model zone for conducting monitoring and research programmes. The technological development and quality of the infrastructures in overseas France make it an ideal place for research. Furthermore, a regional approach improves the surveillance and control of animal and zoonotic diseases. The CaribVET network is such an example.

A network based on research-surveillance interactions

CaribVET, the Caribbean animal health network, has been developed around scientific and technical operations since the beginning of the 2000s and was officially recognized by the member countries of the Caribbean Community (CARICOM) in 2006. It brings together the veterinary services of thirty-two Caribbean countries and territories, the diagnostic laboratories, research institutes and universities of the region, along with regional and international animal health organizations. The network is organized around a Steering Committee, a Coordination Unit run by CIRAD and several working groups defined on the basis of priority diseases (avian influenza, Newcastle disease, ticks and tick-borne diseases, swine diseases, veterinary public health) and transversal activities (epidemiology, laboratory).
The network endeavours to strengthen and harmonize national surveillance systems and the diagnostic capacities of the laboratories in the region, notably in identifying priority diseases, conducting risk analyses, organizing surveys, developing surveillance protocols and databases, etc. The essential elements of effective CaribVET functioning are the organization of regular work meetings, training of the partners in the network, communication and exchange of information and data via the www.caribvet.net participatory website and other means of communication.

In 2010-2011, the network strengthened its partnership with the OIE and the FAO, expanded into Dutch territories (Aruba, Bonaire and Curacao) and American territories (Puerto Rico and the American Virgin Islands) and adopted a charter affording it an official and consensual status. This trilingual formalized charter is considered as a tool for the perpetuation of the network.

The sustainable installation and regional recognition of CaribVET facilitate joint work and access to numerous quality data and samples, from which research questions can be developed (host-pathogen interactions, emergence mechanisms). The research products (risk maps and factors, models of vector population dynamics, etc.) make it possible, in turn, to improve surveillance and control systems (e.g. targeted surveillance in risk zones) thereby improving the cost-benefit ratio of the networks. CIRAD Guadeloupe provides its scientific expertise though its research work on ticks and tick-borne diseases, and its role as a regional diagnosis laboratory for vector-borne or emerging diseases (avian influenza, West Nile disease, heartwater). It also offers a state-of-the-art technological platform for the Caribbean zone.

An example: tick population dynamics

Current knowledge on the biology and ecology of the Tropical Bont Tick (TBT) has been represented in a mathematical model of population dynamics. This model is used to determine seasonal variations in populations, test the effectiveness of different control strategies (molecule, frequency, seasonality, etc.), draw up risk maps to target surveillance and characterize the risks of tick dispersal to other territories.

At the same time, studies on TBT infestation rates and rates of infection by the bacterium responsible for heartwater in ruminants have resulted in disease risk levels being evaluated, making it possible to monitor changes in the epidemiological situation, propose control strategies and improve surveillance. All these data generated by research are passed on to the surveillance operators in the Caribbean zone (veterinary services) within the CaribVET “Ticks and Tick-Borne Diseases” working group. This group comprises researchers, the heads of veterinary services of islands concerned by TBT, people in charge of surveillance and tick control experts. The action plan thus proposed, which responds to the issues raised by surveillance operators, takes into account the latest data provided by those operators and is derived from research results. These recommendations can then be applied to improve disease surveillance and control.