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Building resilience to emerging disease-transmitting species and improving surveillance in Spain

Climate change adaptation efforts reduce the risk of infections in Navarre

Navarre is improving its surveillance and monitoring systems for emerging insect disease transmitters, fostering collaboration among various stakeholders and raising awareness among the population.

Key Learnings

- **A multilevel and cross-sectoral climate change adaptation approach improves resilience**: The Climate Change Roadmap for Navarre combines mitigation, adaptation, and crosscutting actions, based on strong coordinating efforts across governance levels and sectors.
- **Transmitter surveillance is becoming an emerging health priority**: Climate change is accelerating the spread of disease-carrying transmitters, such as ticks and tiger mosquito (*Aedes albopictus*), that affect humans and animals. Surveillance and control of those species have become critical to public and livestock health strategies.
- **Crosscutting Technical Group on Disease-Transmitters**: Step-by-step Navarre created a Technical Working Group to enable effective collaboration between public institutions and professionals from diverse fields under a *"One Health"* perspective, facilitating an integrated response to emerging health threats.
- **Efficient use of public resources to reduce health risks**: The coordination and exchange of technical knowledge within the Technical Working Group has led to more efficient use of public resources, improved public health protocols, and strengthened regional resilience to climate-related health risks.

About the region

The Navarre region, located in northern Spain, spans approximately 10,400 km² and has a population of about 680,000. Navarre has a great climatic diversity, which in turn creates a wide variety of ecological communities, landscapes, and land use. This variety and richness of climatic nuances mainly characterise the region's climate, which climate change is now threatening. Changing climatic conditions lead to the spread of disease-transmitting species in general, and specifically for invasive alien species – non-native species to an area, which replace native species.

Climate hazards

Extreme Heat

Sector

Health, Biodiversity

Key system

Health and Well-being

Figure 1: Location of Navarre region within Spain and Europe.

Climate threats

Climate change is a global issue that requires both regional and local action. It is altering climatic conditions across various regions, leading to higher temperatures and changing precipitation patterns, among other factors. These shifts are driving native species into new areas, while exotic species are settling outside their historical ranges. Some of these species carry and spread diseases, increasing the risk of infection through bites or stings. Rising temperatures are accelerating the spread of non-native insect species, which carry diseases such as malaria, posing a significant health risk to humans.

Climate change regional strategy

In response to the rising risk of climate change and its impacts, the Navarre region has developed a Climate Change Roadmap. This strategy includes measures such as energy saving, the promotion of renewable energy and sustainable mobility, adaptation to natural, urban, and rural environments, as well as the fight against energy poverty, among others. The strategy addresses various governmental departments of Navarre as well as its public agencies and companies.

The Climate Change Roadmap for Navarre (CCRN) also includes a series of "crosscutting actions", which include capacity building, networking, communication, awareness-raising and dissemination to foster coherence and complement the set of measures. Regional authorities and the LIFE-IP NAdapta-CC project jointly developed these measures, establishing cooperation networks, platforms, and forums, and strengthening communication, dissemination, knowledge transfer, replication, training, and strategic capacity building.

Within the roadmap, two working lines focus on reducing the risk of disease transmission through insects on livestock and humans.

- **Agriculture and Livestock – Monitoring climate-induced insect transmissions of emerging animal diseases**: Climate Change adaptation in animal health includes monitoring insect transmitters of emerging diseases, such as ticks or mosquitoes (Culex, Anopheles, Aedes, Tabanidae and *Stomoxys calcitrans*). Both the Government of Navarre and the public company INTIA (The Institute of agri-food technologies and Infrastructure of Navarre) organise training and have developed a Monitoring and Warning Station with a new Integrated Pest Management model.

- **Human Health – Developing a surveillance system to detect invasive species transmitting human diseases**: Navarre fosters the monitoring of invasive species-transmitted diseases, such as malaria, Zika or dengue, which is transmitted by the tiger mosquito (*Aedes albopictus)*. This also includes the improvement of warning and preventive protocols for early response actions to control diseases in case of detection.

Results, benefits and future outlooks

With respect to animal health, a regional Warning Station for disease-infested livestock prevents large-scale infections as it detects infected individuals early on. The public company INTIA manages this warning station. Moreover, the Institute of Public and Occupational Health of Navarre implements the tiger mosquito *Aedes albopictus* plan, which also helps detect the presence of other possible mosquitoes of the Aedes genus, such as *Aedes japonicus*.

Currently, the Institute of Public and Occupational Health of Navarre aims to formalise the Technical Working Group within its organisation and to provide it with tools, skills, and resources. An official commission or committee may be created on a short-term basis. This will allow the continuation of the work promoted mainly by the LIFE-IP NAdapta-CC project and other complementary actions.

The Technical Working Group discusses and analyses new topics regarding transmitter surveillance, such as Japanese mosquito (*Aedes japonicus*), Culex (West Nile Fever carriers) and rodents (Leptospirosis carriers). Due to climatic changes in Navarre's north, which are leading to more tropical conditions regarding temperature and humidity levels, the presence of mice, rats, and coypu (small rodents in general) is increasing. This, in turn, increases the risk of bacterial infection transmission. The Technical Working Group is making it possible to bring together information, methodologies and prioritisation of objectives according to risk levels such as emergency thresholds, resource allocation, timelines, and communication through local media.

The Technical Working Group strengthens coordination between the agents involved to monitor and improve public health protocols that capture the presence of invasive transmitting species of emerging diseases, such as mosquitoes or ticks. This coordination depends directly on sharing knowledge and data. Since the creation of the Technical Working Group, this health governance system actively contributes to

providing a “One Health” vision to different regional agents, such as project partners, public administrations and other professional bodies. European institutions recognise that human, animal and environmental health are intrinsically connected and interdependent.

Figure 2: Last Technical Working Group meeting in October 2024, Pamplona. Image Credit: LIFE-IP NAdapta-CC.

Since emerging diseases due to climate change are a threat to all people, Navarre considers it necessary to raise awareness and foster public participation. A citizen science activity aimed at students focuses on the tiger mosquito prevention and spread control. This activity is part of the Observatory of Citizen Science’s catalogue in Spain, which compiles all cases of citizen science in the country. This activity aims to raise students' awareness of the problems associated with climate change and the spread of emerging diseases and contribute to controlling the presence of the tiger mosquito. To this end, theoretical sessions have been conducted, followed by practical fieldwork in which the students themselves placed mosquito traps, thereby expanding the official monitoring network for *Aedes albopictus*. This expansion led to the first detection of adult specimens in a region of Navarre known as Sakana, which had previously been considered free of this mosquito.

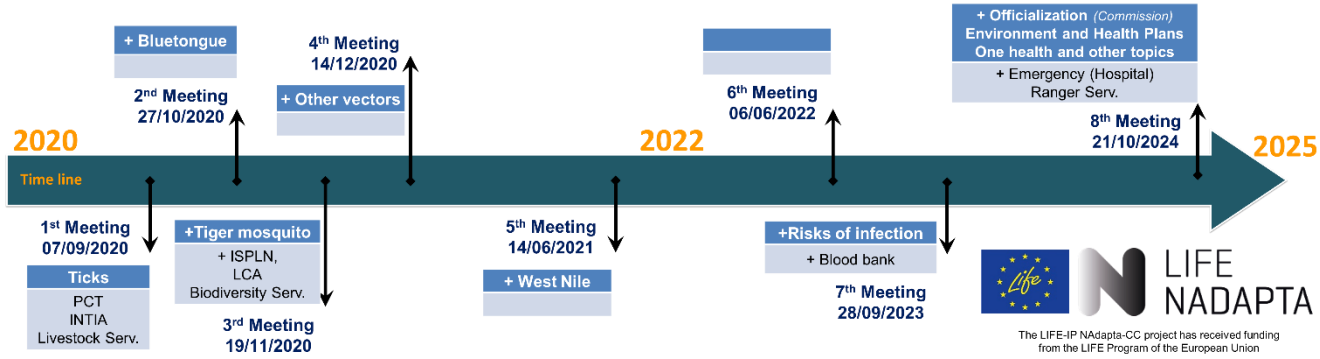

Figure 3: Infographic of the historic view of the CTG on Vectors, with its most relevant milestones. Image Credit: LIFE-IP NAdapta-CC.

This integrated work allows better surveillance and monitoring systems in the future, and fosters preventive actions. It also contributes to a better public service for citizens, and to optimising the public expenses by providing more information, more data, and expanding the monitoring network.

Figure 4: Photograph of one of the citizen science sessions held at a high school. Image Credit: LIFE-IP NAdapta-CC

Summary

Climate change is causing the gradual settlement and the spread of emerging disease transmitters, which increasingly threaten both human and animal health. Consequently, improving surveillance and monitoring systems for these diseases and disease carriers has become a current priority. However, this requires coordinated efforts among various societal stakeholders through a stable governance system. Since 2020, a technical working group has addressed the challenges related to emerging transmitted diseases from a One Health perspective. This group, which has expanded to include a growing number of interested parties, will be converted into an official committee to address the official health and climate change goals in Spain and in Navarre.

Further information

The work presented within this adaptation story is part of the LIFE-IP NAdapta-CC project.

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- Climate Change Roadmap for Navarre (CCRN- KLINa): Website
- Vectors of emerging diseases. Institute of Public and Occupational Health of Navarre: Website
- Agriculture and Livestock Warning Station of Navarre: Website

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