



SEGA ONE HEALTH
NETWORK

A "ONE HEALTH"
INITIATIVE
IN THE INDIAN OCEAN

Health security



Human
health



Animal
health



Environmental
health



INDIAN OCEAN
COMMISSION

AVEC LE SOUTIEN DE



AFD
AGENCE FRANÇAISE
DE DÉVELOPPEMENT



Health security



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The Centers for Disease Control and Prevention One Health of the Indian Ocean (CDC-OH-IO) team thanks the persons who contributed to this publication.

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Printing: PRECIGRAPH

This magazine was printed on paper from sustainably managed forests.

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THE SEGA - ONE HEALTH NETWORK

**a health cooperation making a difference
in the Indian Ocean region.**

In 2006, an unexpected crisis, the Chikungunya, shook our region. It was a moment that reminded us all that, in the face of health challenges, no island, no nation can face it alone. It was in this ordeal that, in 2009, the epidemiological surveillance and alert management network: SEGA - One Health, a true pillar of our collective resilience, was created. Supported by long-standing partners such as l'Agence Française de Développement (AFD), and more recently by the European Union (EU), this Network has established itself as a model of regional solidarity and concrete actions for our populations.

Preface by
M. Edgard Razafindravahy,
Secretary General of
the Indian Ocean Commission.

Over the past fifteen years, the SEGA - One Health Network has established itself as a vital instrument to strengthen the capacities of IOC Member States to prevent, detect and respond to health emergencies. This book tells the story of this collective commitment, this human adventure that continues to adapt to emerging threats, while remaining faithful to a holistic approach: "One Health". Through these pages, you will discover how this network has been able to deal with major health crises: the cholera epidemic, the Covid-19 pandemic, and even the threats such as Rift Valley fever, rabies, foot-and-mouth disease and cysticercosis. These showcased a network acting on the front lines, but also capable of forecasting, anticipating, and preparing.

The story of the SEGA - One Health Network goes far beyond crisis management.

What you will read here is the story of meticulous preparation, of patient but essential work, which makes possible such impressive actions as mass vaccination campaigns or the installation of a state-of-the-art laboratory or a mobile veterinary clinic. Behind each action lies rigorous organization, continuous training, and reinforced intersectoral coordination. The Field Epidemiology Training Programme (FETP) is one striking example. It is not just about reacting to crises, but about training, in the

long term, professionals capable of monitoring, analysing, and making informed decisions.

In addition, other specialized training courses have also been set up, covering a broad spectrum of skills in line with the needs of the Member States: biosecurity, community surveillance, entomological surveillance, malaria diagnosis, etc. In this sense, the SEGA - One Health Network is a pool of local and regional know-how.

Paving the way for resilient and proactive Public Health.

Vector risk management, operational research and the study of the links between climate change and diseases are all covered in this book. These topics reflect the network's ambition: to go beyond immediate responses and pave the way for resilient and proactive public health. At the same time, this book also explores often overlooked but now crucial issues, such as non-communicable diseases or antimicrobial resistance.

These are challenges that the SEGA - One Health Network has successfully integrated into its regional strategy, in 2023, for enhanced health security.



This Network demonstrates that together we are stronger.

This book is much more than a simple assessment. It is a tribute to these men and women: health professionals, researchers, field workers, and beneficiaries who embody the strength and soul of the SEGA - One Health Network. Each page immerses you in their daily lives, transports you to the heart of an exemplary cooperation, a human adventure, anchored in commitment and sharing. As health threats become more complex, the need for a strong Network is more important than ever. And the SEGA - One Health Network demonstrates that together we are stronger. The success stories told here are living proof of what we can accomplish when we join forces. I hope that, just as I, you will be inspired by this extraordinary collective journey and convinced that only cooperation can guarantee our long-term health security.

A MODEL FOR REGIONAL COOPERATION

The SEGA - One Health Network to tackle health challenges in the Indian Ocean.

In recent years, the Indian Ocean islands have been confronted with increasingly frequent health crises. In 2024, the Union of the Comoros faced a cholera epidemic, Mauritius suffered a wave of dengue fever, and recently, the authorities of Reunion are concerned about the resurgence of chikungunya. These crises reveal the vulnerability of our region, particularly for the most fragile populations. In this context, regional cooperation is no longer an option, it has become essential to anticipate and better manage these health threats.



"Health is a common good that reveals the fragility of our interdependencies. The SEGA - One Health Network is a cornerstone of our strategy to strengthen health security in the Indian Ocean and the Indo-Pacific."

fragile ecosystems, are undergoing rapid changes: deforestation, urbanization, and rising temperatures. These factors promote the spread of diseases. The vectors of diseases like dengue fever and chikungunya are multiplying under the effect of these climate changes, showing the interdependency between human, animal and environmental health. The SEGA - One Health Network, with its One Health approach, offers a comprehensive response to this reality. It is not just about reacting to epidemics, but also understanding the dynamics that promote their emergence and strengthening local capacities to prevent them. This approach, at the heart of the strategy of AFD, links human, animal and environmental health, and goes beyond the simple control of infectious diseases. Since 2013 and with our financial

support, the SEGA - One Health Network has made this integrated approach its spearhead, well before the COVID-19 pandemic imposed this paradigm shift on a global scale.

A concrete and effective regional cooperation.

The strength of the SEGA - One Health Network also lies in the trust and mutual understanding built over the years among the actors in the region. This relationship makes it possible to effectively coordinate health interventions, react quickly and mobilize reliable relays to deploy the necessary actions on the ground. During the recent epidemics in Madagascar and the Comoros, I was able to see on the ground how the SEGA - One Health Network could coordinate the sending of diagnostic equipment, mobilize laboratories and deploy experts to investigate suspected infections.

I would also like to highlight the excellent collaboration of the Network with technical partners such as CIRAD and the Institut Pasteur of Madagascar, which embody French excellence in infectious disease research.

But the SEGA - One Health Network is not limited to emergency responses. It also invests heavily in training local human resources, the real pillars of the response to epidemics.

Since 2009, more than 2 500 health professionals have been trained in key areas such as epidemiological surveillance, diagnosis and laboratory management. The Field Epidemiology Training Program (FETP), which has already enabled nearly 200 epidemiologists to strengthen their skills, will reach a new milestone in 2024 with the launch of a FETP Master's degree. This initiative marks a major step in building a resilient and sustainable health system in the region.

The sustainability of the SEGA - One Health network is a major challenge today. Despite the many successes of the Network, it is crucial to ensure long-term health surveillance. This is why we support the creation of the SEGA - One Health Fund led by the IOC, to guarantee sustainable funding. This fund will stabilize resources and ensure that each IOC Member States can continue to benefit from this collective infrastructure, which is essential to anticipate and manage future crises.

Another challenge, which is imposed on all stakeholders in health security, is to work tirelessly to break down the barriers between human, animal and environmental health.

The One Health approach requires daily collaboration between these sectors, a complex task.

However, it is imperative to strengthen the links between the different stakeholders, harmonize practices and facilitate coordination to make this approach fully operational. This is fundamental work, but essential to respond to current and future threats.

New funding for a broader ambition.

France, through the AFD, intends to go further. Our partnership with the IOC is now part of a broader strategy, that of the Indo-Pacific. In February 2024, AFD and the IOC signed an agreement worth 15 million euros (including 6.5 million in favour of the IOC) to strengthen collaborations with other networks, such as the ROSSP in the South Pacific and the ECOMORE program in Southeast Asia. This new support is an opportunity to expand the pooling of resources and the sharing of experiences between these three regions, which are particularly exposed to health risks and climate change.

The SEGA - One Health Network: a regional common good to uphold.

Health is a common good that reveals the fragility of our interdependencies. The SEGA - One Health Network is a cornerstone of our strategy to strengthen health security in the Indian Ocean and the Indo-Pacific.

"As regional director of AFD, I am honored that our institution plays an active role in this initiative. Together, in investing in public health and strengthening health systems, we can protect our territories against health challenges and build a more resilient future."



Sustaining the SEGA - One Health Network and breaking down disciplinary silos: a crucial challenge.

By Patricia Aubras, Indian Ocean regional director at the Agence Française de Développement.

The SEGA - One Health Network, supported by the Agence Française de Développement (AFD) since 2009, embodies this dynamic. It is a regional base where the Member States of the Indian Ocean Commission (IOC) pool their resources, share their knowledge and collaborate to anticipate future health threats together. This success is also based on the support of long-standing partners. In close collaboration with the IOC, the AFD has supported the structuring and strengthening of this

network by mobilizing nearly 23 million euros. In 2020, the European Union joined the IOC and the AFD, providing additional resources to develop the action of the Network.

Health threats exacerbated by environmental dynamics.

These health crises are closely linked to environmental dynamics. Our islands, with

TOGETHER AGAINST HEALTH CRISES

The power of solidarity.

Global warming has visible repercussions on the health of populations, particularly those living in tropical regions. Indeed, rising temperatures have an impact on the habitat of disease vectors such as mosquitoes that transmit malaria, which has already appeared in some temperate countries. But in addition to the issue of vector-borne diseases, there are risks of the emergence of zoonoses (pathogens passing from animals to humans) due to the increase in interactions between animals and humans. The World Health Organization recently issued an alert on monkeypox, an alert that calls for preparation and effective coordination between stakeholders within a country, but also between countries themselves to provide an appropriate response and protect populations. The countries of the Indian Ocean region have experienced several episodes of epidemics, the most recent of which are those of foot-and-mouth disease (which affects livestock) in the Comoros, rabies in Madagascar and dengue fever in Mauritius. Faced with these health crises, the Comoros, Madagascar, Mauritius and the Seychelles have been able to depend on the presence and support of the SEGA - One Health epidemiological surveillance network. ("One Health" which addresses health at the interface between animals, humans and the environment) implemented by the Indian Ocean Commission (IOC) with the support of the Agence Française de Développement (AFD) and the European Union.

"The Network has succeeded in uniting teams of health professionals from these countries"

Since its creation, this Network has helped to connect the various national



HE Oskar Benedikt
Ambassador of the
European Union to the
Republic of Mauritius
and the Republic of
Seychelles.

Infectious diseases, viruses, pandemics... These are terms that everyone must have heard with the recent coronavirus pandemic that has cost the lives of 7 million people around the world.

"The Network has managed to unite the teams of professionals health of these countries."

human health and animal health stakeholders, to create a trusted network to improve prevention and response and to encourage the sharing of information between countries. It has helped to strengthen capacities and means for monitoring infectious diseases and vectors, but also for early detection and response to potential epidemics using standard operating procedures and simulation exercises.

Beyond the concrete results obtained in terms of strengthening human resource capacities, acquiring materials and equipment and creating new partnerships, the Network has succeeded in bringing together teams of health professionals from these countries to improve their response capacities to health crises.

The coronavirus pandemic has shown us that infectious diseases do not stop at borders.

Protecting the health of populations therefore requires pooling resources and working together.

This is why the European Union has decided to adopt a strategy to improve global health security and the health of all. This strategy, which

places global health as a key pillar of the EU's external policy, includes three essential and interdependent axes to address global health challenges : improving the health and well-being of people throughout their lives; strengthening health systems and advancing universal health coverage; and preventing and combating health threats, including pandemics, through a "One Health" approach.

A major commitment to the health of the populations of our region and beyond its borders.

In Africa, the European Union supports several initiatives to strengthen prevention, preparedness and response to infectious threats and antimicrobial resistance.

The European Centre for Disease Prevention and Control (ECDC) has been supporting the Africa Centre for Disease Prevention and Control (CDC) since 2021. Furthermore, the European Commission signed an administrative agreement with the Africa CDC in March 2024 to establish the modalities of their cooperation through regular technical dialogue, capacity building and the promotion of technical collaboration.

The European Union and its Member States, as Team Europe, are mobilizing with countries to respond to epidemics. Team Europe has committed to delivering more than 550,000 doses of Mpox vaccines to the Africa CDC.

It also launched the MAV+ (Manufacturing and Access to Vaccines, Medicines and Health Technologies) initiative to equip six countries (South Africa, Ghana, Nigeria, Rwanda, Senegal, Zambia) with their own capacities for vaccine production, which is essential in preventing and responding to epidemics.

In 2020, the European Union joined the action of the AFD and the Indian Ocean Commission for health security by providing a financial contribution of €9million.

In total, the combined support of the AFD and the EU, which amounts to more than €20million, represents a major commitment to the health of the populations of the Comoros, Mauritius, Madagascar and the Seychelles, but also beyond their borders.

THE IOC'S HEALTH JOURNEY

From one emergency to a multifaceted Network.

While it has addressed the region's epidemic threats, such as foot-and-mouth disease, dengue, and COVID-19, the establishment of the SEGA - One Health Network is unique in that it has been implemented as equitably as possible among countries with vastly different economic and demographic profiles. By focusing on complementarity and mutual support, this Network has become a model for health cooperation. The chikungunya outbreak sparked this journey, which has continued to grow and improve, encompassing both human and animal health and gradually integrating environmental services. Here is an overview of its key stages, viewed through the experienced lens of its coordinator, Dr. Harena Rasamoelina.



▲ In the wake of the Chikungunya epidemic, awareness was raised and the SEGA - One Health Network was created.

The SEGA - One Health Network serves as the health arm of the Indian Ocean Commission (IOC). The Indian Ocean Center for Disease Control and Prevention - One Health (CDC-OH-IO) oversees and coordinates the network, ensuring that major strategic directions approved by Member States are implemented and fostering intersectoral collaboration. Today, this regional Network brings

together more than 500 members in key roles across human, animal, and environmental health, working to maintain active health surveillance and ensure an appropriate response whenever an outbreak or disease emerges within or outside the region. This diversity of stakeholders allows the One Health concept to be translated into concrete action in the region. Let's go back 15 years to trace the origins and development of the SEGA - One Health Network. These correspondents work in laboratories, departments responsible for health surveillance and epidemic response, veterinary services management, entomological surveillance, and vector control. Since 2021, they have also been involved in monitoring non-communicable diseases and in health/environment/climate services for climate-sensitive diseases or those linked to pollution. Specialists in environment, biodiversity, and climate are gradually joining the Network.



Dr Harena Rasamoelina, 2nd from right in the 1st row, at a steering committee of the SEGA - One Health Network in Madagascar in 2022.

The "Chik" Revelation

The 2005-2006 Chikungunya epidemic brought an unprecedented awareness among medical communities and decision-making bodies. To varying degrees, all the countries in the region were affected. This vector-borne virus impacted more than one million people across the Indian Ocean. Yet, each country's services managed the emergency independently, without coordination with their counterparts in other affected countries. In October 2006, the IOC Health Ministers gathered in Saint-Denis (La Réunion) and recognized a critical truth: they could have managed the crisis better if information had circulated from one island to another. In a joint declaration, they expressed their commitment to strengthening epidemiological surveillance and information exchange on a regional scale to facilitate early warning and response. The need to create a specific regional mechanism to better prepare for, prevent, and manage epidemics became clear. In 2009, the Epidemic Surveillance and Alert Management Network—or SEGA—took its first steps in the field of human health with the support of the Agence Française de Développement (AFD). The primary goal—health information sharing—was quickly achieved through weekly teleconferences every Thursday. Representatives from each country participated, sharing updates on what

was happening in their areas. "However," explains Harena Rasamoelina, SEGA - One Health Network coordinator at the IOC for the past five years, "they did not have the same capacities or health surveillance tools... Information could be very vague without a standardized data collection system." Support was then provided to strengthen surveillance systems and laboratories, while extensive training was offered on epidemiological surveillance, monitoring tools, and information sharing. It was also necessary to foster a climate of trust that would enable health professionals from different countries to share information transparently and confidently. "Building trust," continues Rasamoelina, "has been the Network's biggest challenge from the start. It's not easy to share sensitive information with other countries, even neighbors. We needed to set up a framework, establish common procedures, and create a code of conduct for information sharing. And then we organized opportunities for people to meet, so they could get to know each other and learn to work together..."

Surveillance structures in their early stages.

At the same time, reconnaissance missions carried out in 2009 in each country revealed that health surveillance was nearly non-existent,

managed by tiny units buried within various ministries. In some cases, health surveillance for the entire country was handled by only one or two individuals. Apart from international programs targeting specific diseases and France's National Institute for Health Surveillance (INVS), this monitoring was diluted within the broader missions of the ministries. The SEGA Network thus set out to promote and support the creation or reinforcement of health surveillance departments tailored to each country's needs. The Comoros established the National Surveillance Service; Madagascar created the Department of Health Surveillance and Epidemiological Monitoring (DVSSE); Mauritius, the Communicable Disease Control Unit (CDCU); and Seychelles set up the Disease Surveillance & Response Unit (DSRU). Training also required a qualitative leap. "We paused mass training sessions at the end of 2010," recalls Harena Rasamoelina, "because we couldn't assess their effectiveness or impact. We needed a strategy to build long-term capacity, ensuring, for example, that the same cohorts of professionals received training across all modules." Inspired by an internationally recognized American concept, the Field Epidemiology Training Program (FETP) was launched in the Indian Ocean in 2011 as part of this strategic shift. In total, 21 health professionals from the region completed the two-year FETP Advanced training,

equivalent to a master's degree, though not yet formally recognized by academic institutions, as it was primarily designed to address the immediate health needs of each country.

The beginnings of One Health

Alongside the creation of the SEGA Network, CIRAD was developing the Animal Risk IO program in collaboration with each country's veterinary services. "The IOC and CIRAD," recalls our source, "actually started coordinating and sharing data in 2008, during the Rift Valley Fever (RVF) outbreak, which affected livestock in Madagascar and the Comoros—and also humans."

In 2013, the SEGA Network incorporated Animal Risk IO, beginning with an assessment of animal health in each country, marking the official adoption of the One Health concept. By integrating animal health alongside human health, SEGA became the SEGA - One Health Network.

From that point on, everyone spoke the same language and understood each other. Networking had been strengthened enough that animal health specialists could work seamlessly with human health specialists. "One Health is about collaboration, complementarity, capacity building, coordination, and synergy across the three main pillars: human health, animal health, and the environment they share. In standardizing the application of One Health across five very different countries, we were already pioneers starting in 2013. We became a concrete example of a

tailored One Health model. Over 90% of activities involving both animal and human health were carried out through our network. One Health is growing globally, but a functional system at both state and regional levels is exceptional—it's a major asset for the Indian Ocean."

The integration of environmental services began in 2018, but COVID-19 paused these activities for two years. "It's a complex challenge," notes Dr. Harena Rasamoelina, "because this approach involves entirely new actors, beyond the medical or veterinary fields." Challenge met: today, it's a new dimension of the network.

Deployment of the animal health network

In 2014, exchanges among animal health officials were still relatively informal. As with human health, veterinary health surveillance systems were reinforced or newly established. In Madagascar, the MADSUR network was set up, and the number of field

veterinarians—or sentinel veterinarians—increased from 13 to over 200. Protocols were established to involve all agroecological systems, and the SEGA - One Health Network supported sampling campaigns.

"For the export of livestock and meat," explains Dr. Rasamoelina, "it's essential to scientifically prove that the country is free from certain diseases. Since the Network expanded nationwide in 2022 with over 200 sentinel veterinarians, it has become possible to certify that Malagasy livestock are free from specific diseases. Initially, this network issued a few hundred notifications annually. Today, that number has risen to 7,000, with Madagascar as the primary contributor." An animal health surveillance network was also deployed in the Comoros. In Mauritius, a dedicated phone line allowed livestock farmers to call a public sector veterinarian in case of an issue. "This service became an excellent investigative tool to identify what was happening and where. We enhanced it by customizing a smartphone application with standardized formats and forms, which was rolled out across Mauritius, Madagascar, and Réunion in 2016. This system

revolutionized animal disease surveillance techniques—everything became traceable!"

This progress did not come without obstacles.

Initially, health ministries were only interested in zoonotic diseases. "But zoonoses are just a portion of the issues veterinarians face—the main diseases are those that kill the most animals, threaten food security, and destabilize livestock operations. The veterinary sector expected One Health to provide broader surveillance and



Dr. Harena alongside other network stakeholders. From left to right: Dr. RAMAHEFASOA Bettelheim (National Focal Point for Animal Health, Madagascar) - RAZAFINDRAIBE Nivohanitra Perle - Dr. HANITRINIALA Sahondraniaina Pâquerette (Director General of INSPC) - Dr. RASAMOELINA Harena - Dr. VOLOLONIAINA Manuela Christophère (National Focal Point for Human Health, Madagascar).

combat against all animal diseases. So, we supported each sector's systems in a comprehensive, non-restrictive manner. We broke down barriers and enabled people to work together. When the Rift Valley Fever outbreak occurred in 2021, they already knew each other; the mechanisms were in place, and the procedures and protocols were standardized everywhere. It was so much easier!"

Foot-and-Mouth disease and Pneumonic plague

The first major crisis where the Network was operational was the Foot-and-Mouth Disease outbreak that impacted livestock in Mauritius and Rodrigues in 2016. Representatives from the CDC-OH-IO made numerous field visits to supply vaccines, support protocols, and, most importantly, bolster the number of veterinarians. "Ten Malagasy veterinarians were deployed. This regional complementarity was a great help to the Mauritians, who, not being

large-scale livestock farmers, were unaccustomed to conducting mass vaccination campaigns for cattle."

On the human health front, "when a new form of plague—pneumonic plague—emerged in Tana in 2017, the protective equipment, 4x4 and smartphones for the surveillance department were invaluable. Unlike bubonic plague, which is spread by fleas and rats, pneumonic plague spreads quickly among humans through respiratory droplets, with devastating effects in urban areas. The high contagion risk in the capital also posed a potential risk of international spread."

WHO specifically requested that the SEGA - One Health Network deploy epidemiologists on-site. Two members of the CDC-OH-IO were sent out for contact tracing and response. The Institut Pasteur of Madagascar and the Ministry deployed the mobile laboratory, set up as part of the SEGA - One Health Network, in Tamatave. "Many health services and partners mobilized to fight the epidemic, but the Network, with the ministry and WHO, enabled contact

tracing to be added in the midst of the response. It was essential to reconstruct transmission chains to apply appropriate preventive treatments."

These events allowed the Network to demonstrate its effectiveness in epidemic response by pooling resources and leveraging each country's strengths. Response management is one of the network's primary functions, but surveillance and preparedness remain priorities too. "In addition to disease reporting," says the regional network coordinator, "we now have an event-based surveillance system that tracks indicators, such as increased rat mortality, which provides much earlier alerts for potential outbreaks. During extreme events like heatwaves or COVID, sometimes it's only through mortality rates that we can detect an anomaly."

A significant budget allocated to laboratories

"The region has around forty public laboratories for human, animal, and entomology, supported by the SEGA - One Health Network. The aim here is to strengthen diagnostic platforms, promote networking, and develop cross-functional capacities in quality management, biosafety, waste management, equipment maintenance, and more."

For example, entomological laboratories in Mauritius and Réunion are working more on the risk of arbovirosis. As a result, entomological surveillance capabilities for dengue fever have been deployed in the other countries, and the platform in Mauritius has been strengthened to search for pathogens in mosquitoes.

A new model for border surveillance

In terms of border surveillance, the first regional information-sharing meeting was held in 2019. Mauritius has an effective surveillance model for malaria, which is now also applied to dengue. Every traveler returning from a country affected by these diseases is visited by a ministry technician, who collects a blood sample for analysis. "This is a model example that could be adapted to any context. We have also

Key challenges lie in the areas of training, integrating climate and biodiversity issues, laboratory development, and antimicrobial resistance.



Dr Harena Rasamoelina, Coordinator of the SEGA - One Health Network.



Three years after the formal establishment of the SEGA - One Health Network through the signature of the Charter, the European Union has joined the Agence Française de Développement (AFD) in supporting the network.

funded thermal cameras and a dedicated border ambulance for the Comoros and Madagascar, and construction of an isolation center in Nosy Be will soon begin." This border surveillance, combined with information-sharing between countries and contact tracing, enabled the detection of a case of Legionnaires' disease in La Réunion, allowing the source in a Mauritian hotel to be eradicated. Additionally, following training at the Institut Pasteur in Tana, testing for Legionella in water could soon become a routine analysis in Mauritius.

A Charter and a regional strategy

In March 2017, Member States signed the SEGA - One Health Network Charter during the 31st IOC Council of Ministers, following prior approval from the relevant sectoral ministries. "This charter institutionalizes the SEGA - One Health Network and reflects the political recognition from member states. The missions and intersectoral collaborations are defined, and States commit to voluntarily contribute to the network's

funding. This shift elevates the SEGA - One Health Network from project status to an operational program and Network. It's the first big step toward securing the Network's long-term sustainability!" The adoption of the Charter led to a reformulation of strategic objectives, transitioning from a concept of working groups to thematic hubs. The initial hubs included surveillance and response, the FETP, the laboratory network, and vector risk. In 2018, the climate/health/environment hub was added, followed by border surveillance in 2019. Finally, starting in 2021, the operational research hub and the non-communicable diseases (NCDs) hub, increasingly significant across IOC countries. NCDs, in fact, open new avenues with substantial challenges, focusing on conditions like mental health, anxiety, and hypertension, which are also climate-sensitive. In 2023, a multisectoral ministerial conference approved the IOC's regional health security strategy as a long-term program, prioritizing the eight thematic hubs of the SEGA - One Health network. This strategy also aligns with global priorities: antimicrobial resistance, neglected

tropical diseases, emerging diseases, and the impacts of natural disasters related to climate change.

A technical unit and a permanent fund for the future

The IOC is currently establishing the SEGA - One Health Fund and creating a permanent technical unit. This department will have its own economic model, drawing on funding from each Member State and the relevant ministries, direct grants from international organizations, donors, and, of course, funding allocated to specific projects. Several member states have already announced their contributions. With its developing programs and network of experts, this permanent unit will continuously support the long-term strengthening of national services and foster intersectoral and inter-country collaboration, complementarity, and cooperation. Major challenges lie ahead in areas such as training, the inclusion of climate and biodiversity issues, laboratory development, and antimicrobial resistance.

Strong, trustworthy, and diverse partnerships

Alongside the AFD and the EU, the first supporters of the IOC's SEGA - One Health Network, there is an active community of partners. These technical and operational partners participate in numerous missions, from the Institut Pasteur in Madagascar to the Centre for International Cooperation in Agronomic Research for Development (CIRAD), as well as the Regional Health Agency (ARS) of La Réunion, Santé publique France, the Indian Ocean Regional Intervention Platform (PIROI) of the Red Cross, and training institutions such as the Mauritius Institute of Health (MIH), the University of Comoros, and Madagascar's National Institute of Public Health. On an international level, the SEGA - One Health Network works closely with major organizations such as WHO, FAO, and the World Organisation for Animal Health (WOAH), as well as the Africa Centre for Disease Control and Prevention (Africa CDC) in collaboration with the African Union.

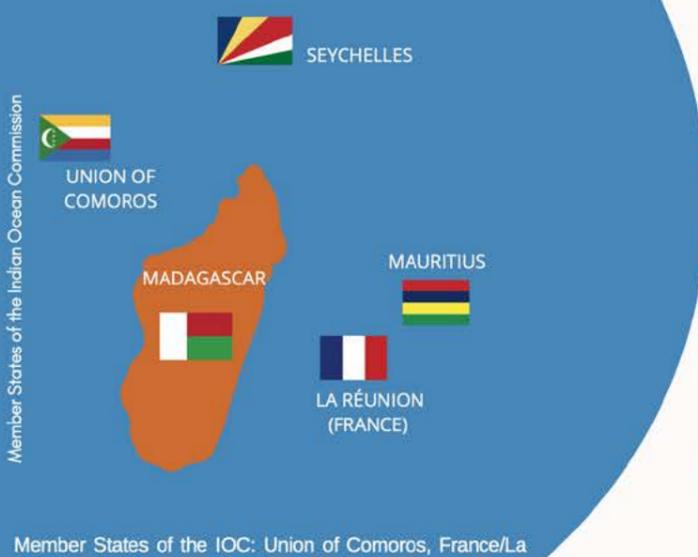
The SEGA - One Health Network of the Indian Ocean Commission (IOC)

A PLATFORM FOR HEALTH COOPERATION THAT MEETS THE NEEDS OF ITS MEMBER STATES

About

EPIDEMIOLOGICAL SURVEILLANCE AND ALERT MANAGEMENT NETWORK

The impacts of the Chikungunya crisis in 2005-2006 led to the creation of the SEGA - One Health Network in 2009.



Member States of the IOC: Union of Comoros, France/La Réunion, Madagascar, Mauritius, Seychelles

A HEALTHIER INDIAN OCEAN REGION

- Ensure health information sharing
- Strengthen health surveillance capacity
- Respond to epidemics
- Strengthen multi-sectoral collaboration



SEGA ONE HEALTH NETWORK

+ 500 HEALTH EXPERTS FROM INDIANOCEANIA

HUMAN HEALTH | ANIMAL HEALTH | ENVIRONMENTAL HEALTH



SURVEILLANCE AND RESPONSE



FETP AND OTHER TRAININGS



LABORATORIES



VECTORIAL RISK



CLIMATE CHANGE AND HEALTH



BORDER SURVEILLANCE



NON COMMUNICABLE DISEASES



OPERATIONAL RESEARCH

INFORMATION SHARING, PREVENTION AND PREPARATION

The 8th Indian Ocean Island Games in Seychelles.

The SEGA – One Health Network embodies a regional model for the prevention and management of health alerts. This expertise proves crucial, particularly during major international events. A concrete example of this capability was demonstrated at the 8th Indian Ocean Island Games, held in Seychelles from 4 to 14 August 2011. This event attracted around 2,000 athletes, as well as of tourists, creating an increased risk of spreading infectious diseases.



Beyond the immediate management of health risks during the Games, this mission laid the foundations for a long-term monitoring system.

COI), was mobilized to supervise this system throughout the Games, at the request of the host country.

An Indian Ocean monitoring bulletin.

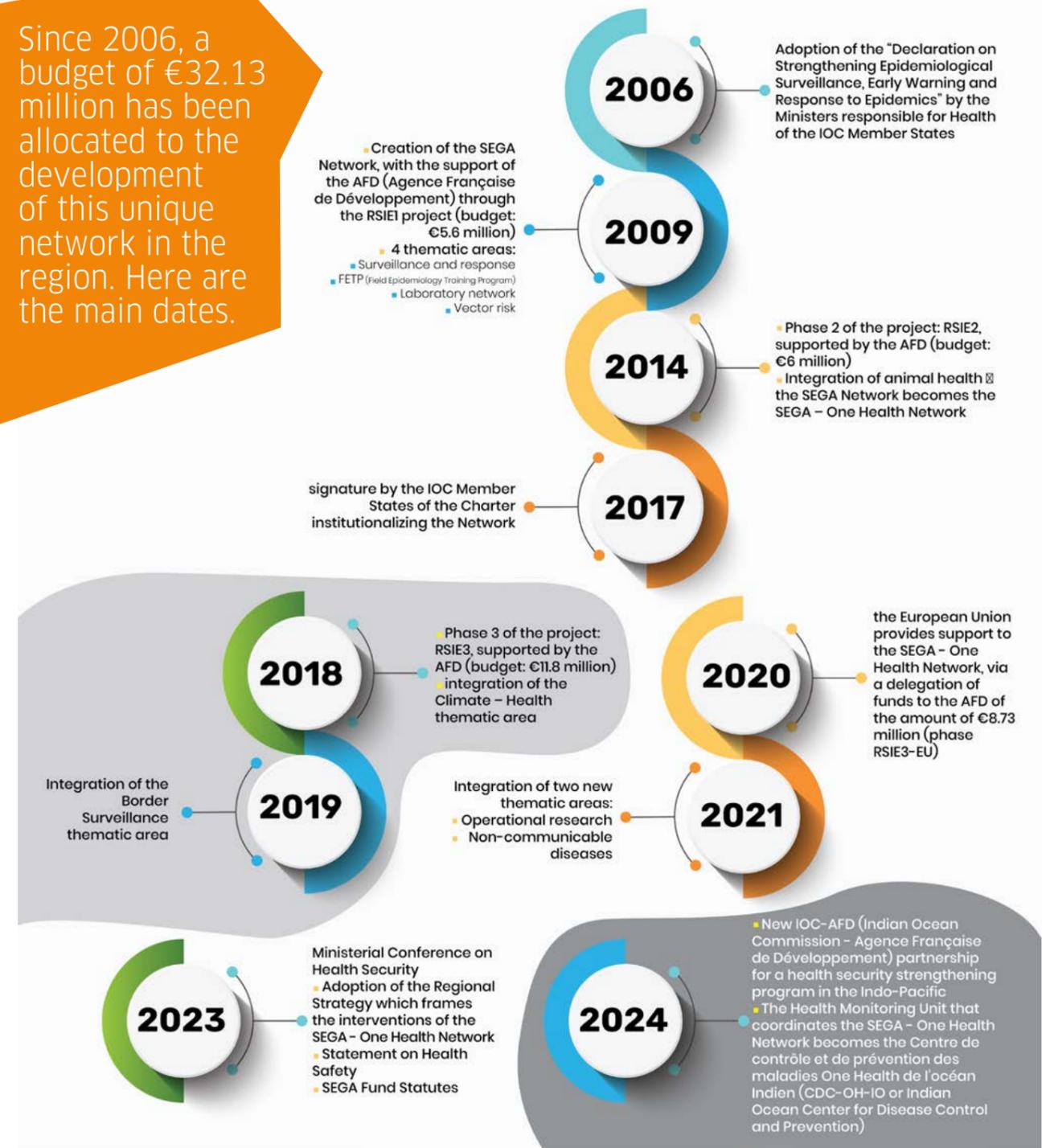
This initiative was structured around several axes. First, a reinforced surveillance system was set up with daily transmission of data from health centres. Then, a digital tool allowed health centres to enter their activity data and notifications of priority diseases in real time, thus facilitating the monitoring of health indicators. In addition, a signal reception platform, active 24/7, was set up to assess and validate any unusual health event, whether of environmental or infectious origin. Beyond the immediate management of health risks during the Games, this mission laid the foundations for a sustainable monitoring system. Indeed, the tools developed were maintained after the event, demonstrating the desire of the SEGA –

One Health Network to strengthen the region's health resilience in the long run. In addition to these interventions during specific events, the SEGA – One Health Network relies on another health monitoring system: the Bulletin de veille de l'océan Indien (Indian Ocean Monitoring Bulletin). This bulletin, published by the Indian Ocean Centre for Disease Control and Prevention – One Health, identifies health risks and current epidemics, both regionally and internationally. It is a crucial source of information for the public health authorities of the IOC islands, allowing them to better prepare for emerging threats. To date, 335 issues have been published. In addition to this publication, weekly teleconferences are organized with the focal points of each country to monitor the epidemiological situation in real time, allowing immediate sharing of information, and adjust intervention strategies. Depending on the situation, thematic teleconferences are also organized on diabetes, mental health, etc.

CHRONOLOGY

of the creation of the regional Network.

Since 2006, a budget of €32.13 million has been allocated to the development of this unique network in the region. Here are the main dates.



COVID-19

Solidarity in action with the Regional Response.

As soon as the epidemic appeared in the Indian Ocean in the first quarter of 2020, the IOC mobilized through its SEGA - One Health Network (Epidemic Surveillance and Investigation Network) to manage this crisis, which was as brutal as it was unprecedented at the regional level. The point of view of Doctor Xavier Deparis, Professor of Public Health and Epidemiology, Director of Health Monitoring and Security, Health and Living Environments, International Cooperation at the ARS (Agence Régionale de Santé) of Reunion Island, and SEGA - One Health Network's National Focal Point.

Deparis, Professor of Public Health and Epidemiology, Director of Health Monitoring and Security, Health and Living Environments, International Cooperation at the ARS (Agence Régionale de Santé) of Reunion Island on the management of the COVID-19 crisis.



Initiated following the chikungunya crisis of 2006, the SEGA - One Health Network of the IOC, a genuine tool for regional cooperation in public health, was strengthened in 2020 by the support of the European Union to fight COVID-19. These new resources have enabled

the implementation of successive response plans against the COVID-19 epidemic in the Indian Ocean. Initially supported by the Agence Française de Développement (AFD), an initial emergency plan of €500,000 was implemented in February 2020, quickly followed by a response plan at the end of April 2020, driven by the Comorian presidency of the IOC Council of Ministers. For this response plan, the AFD granted an additional €4 million, half of which was mobilized through its 'Covid-19 - Santé en commun' initiative, led by France (through Reunion Island), a Member State of the IOC. This response plan, which covered Comoros,

Health at the top of priorities of the IOC

Madagascar, Mauritius, and Seychelles, supported Member States in carrying out emergency actions in response to the epidemic: purchasing equipment and medicines, strengthening diagnostic capacities, and raising awareness among the population. It also mobilized, among others, the Indian

Ocean Regional Intervention Platform of the Red Cross (PIROI) and the Institut Pasteur of Madagascar. Material resources were distributed among the Member States based on their respective needs to:

- Surveillance at points of entry of Member States.
 - Protection of health professionals.
 - The provision of medicines as well as respiratory assistance and resuscitation equipment.
- The responsiveness in implementing measures and the ability to adapt to the needs and specificities of the Member States have demonstrated the efficiency of solidarity actions at regional level and highlighted the crucial importance of regional cooperation in matters of health security.

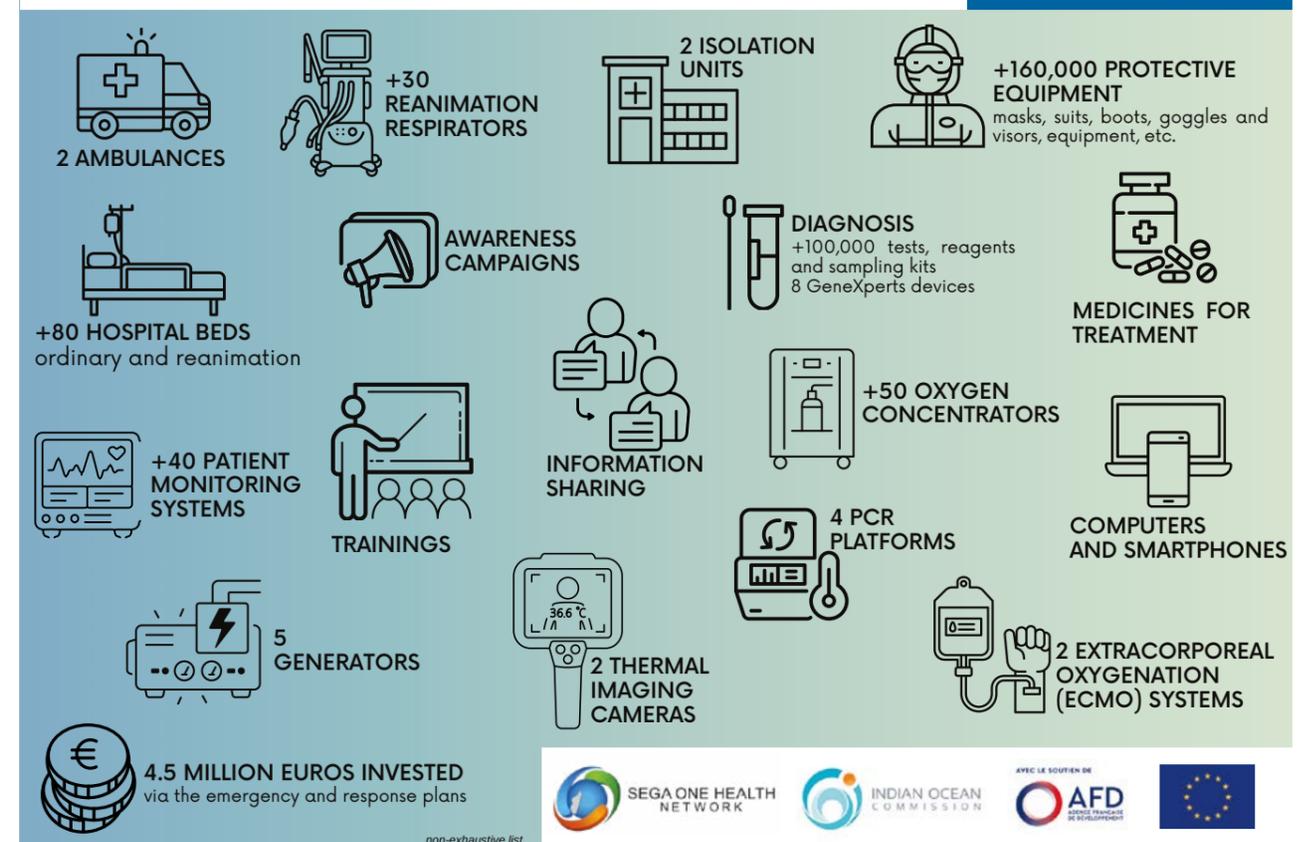
This is, if we can say so, the positive impact of this crisis which has put health at the forefront of the priorities of the IOC with a collective awareness that

health is a good that must absolutely be protected.

An assessment of the health systems of the IOC islands has highlighted a great disparity in terms of resources and organization. Hence the importance of sharing data and health priorities for islands that are forced to unite due to their fragility. Training and information sharing actions to strengthen health security in the Indian Ocean region have continued beyond the COVID-19 crisis with a new step in the field of training local health experts: the launch of the first One Health Masters in Field Epidemiology in the region in 2024, a first in the Indian Ocean.

This training program, adapted to each region, contributes in particular to strengthening health systems by providing reliable data and precise analyses, to guide decisions. It marks the commitment of the IOC, the AFD and the EU to strengthen local public health capacities to respond autonomously and effectively to future health threats.

THE COVID-19 RESPONSE IN INDIANOCEANIA... IN A NUTSHELL



FIELD EPIDEMIOLOGY TRAINING

At the core of the Network's strategy.

Regional cooperation is deeply embedded in the DNA of the SEGA – One Health network, and its training policy reflects this commitment in the best way possible. By November 2024, 21 people had been certified in FETP-Advanced, 273 in FETP-Frontline ('short-term' training) and 17 learners for the Master's degree in field epidemiology launched in July 2024. FETP participants share their experiences below.



▶ **Shariffa Joubert** (standing) is an animal health laboratory technician at the Seychelles Department of Agriculture.

What motivated you to specialize in field epidemiology?

The laboratory bridges the gap between disease diagnosis and treatment. In Seychelles, laboratory staff actively participate in field activities, such as sample collection and surveillance. Integrating field epidemiology enhances the effectiveness of disease management and prevention strategies.

How was your Field Epidemiology Training Program (FETP) training experience?

This training offers key advantages, such as early disease detection and understanding disease spread, improving the surveillance system, highlighting the importance of data collection and analysis, supporting the "One Health" framework, and raising stakeholder awareness. The modules were insightful, particularly those on public and animal health surveillance and geographic information systems (GIS). The most impactful aspect for me was the case investigation. Following this training, our department started implementing new guidelines and methods.

What are the key skills you gained?

I developed skills such as:

- **Data collection and analysis:** The proficiency in gathering and analyzing data from field and laboratory surveys.
- **Epidemiological methods:** Mastery of principles for studying diseases and risk factors.
- **Communication:** Ability to share findings with diverse audiences, including farmers and decision-makers.
- **Problem-solving:** Critical thinking to assess and intervene in complex situations.
- **Laboratory techniques:** Proficiency in diagnostic tools for animal health.
- **Field Skills:** Hands-on experience in conducting field studies, including sampling, observation, and data recording.
- **Teamwork:** Effective collaboration with multidisciplinary teams.

Can you give us an example where your field epidemiology skills helped resolve a public health issue?

In May, we had a suspected case of a notifiable disease on a nearby island. Thanks to the FETP training, a team was mobilized to investigate and inform decision-makers. We enhanced surveillance, implemented control measures, and set up a weekly reporting mechanism. We also raised

awareness among NGOs and private veterinarians on managing the outbreak.

"I now adopt a proactive approach."

How has this training transformed your career and role in public health?

The training has profoundly changed my approach to animal health. I gained skills in real-time data analysis, which enables quicker responses to crises. I now adopt a proactive approach, with an improved capacity to collaborate

with multidisciplinary teams and develop strategies that incorporate community engagement.

What would you say to professionals interested in field epidemiology, particularly in the context of the new master's program?

This training has strengthened my confidence and effectiveness in managing outbreaks, leading to better decision-making and outcomes in public health. I highly recommend this master's program to health professionals. The

modules are well-designed, and we must seize this opportunity offered by the Indian Ocean Commission to strengthen our local capacities.

Do you think women have a particular role in health crisis management?

Yes, training in epidemiology allows women to develop essential skills in data analysis and risk management, critical for leadership roles in this field. They can become role models for younger generations and encourage more women to pursue careers in public and animal health, as well as crisis management.



▶ **Dr. Nestor Ndakala** (center), coordinator of the Field Epidemiology Training Program, with a cohort of students.

Dr. Nestor Ndakala

"Building more resilient health systems to meet future challenges"

What is the origin of this master's program in field epidemiology, and why is it essential for the region?

The Field Epidemiology Training Program Master was established through collaboration between the National Focal Points of the SEGA – One Health Network, training institutions such as the Mauritius Institute of Health (MIH), the University of Comoros (UDC), the National Institute

of Public and Community Health (INSPC) in Madagascar, and the IOC's Health Surveillance Unit.

What are the primary objectives of this program? How does it differ from other training programs?

The main goals include strengthening epidemiological surveillance and emergency management capabilities. What sets our program apart is its hands-on approach, with 75% of the time spent in the field.

This allows participants to gain directly applicable skills while providing valuable services to their health organizations.

In a world where health crises are becoming increasingly common, the Indian Ocean region is taking proactive measures. Dr. Nestor Ndakala, coordinator of the Field Epidemiology Training Program (FETP) under the SEGA – One Health Network of the Indian Ocean Commission (IOC), discusses the relevance of a new academic offering, the Master's in FETP, as a strategic response to the region's health challenges.

Who is this training aimed at, and what qualifications should candidates have?

The program targets professionals already employed in the Ministries of Health, Agriculture, and Environment. Candidates must have a Bachelor's degree plus four years of study and relevant work experience. They must also secure authorization from their supervising ministry to ensure they can apply their skills within their current roles.

What specific modules are covered to address public health needs?

The program includes a diverse range of

"Graduates will have access to international networks to keep their knowledge up to date."

teaching units, from epidemiological surveillance to data analysis. Learners engage in practical internships to apply their knowledge, which is crucial for developing skills suited to the unique needs of our region.

How is the 'One Health' approach integrated into the curriculum?

The "One Health" approach is woven

throughout the program, acknowledging the interconnectedness of human, animal, and environmental health. We encourage collaboration among various health professionals, which is essential in our region to prevent epidemics and improve public health outcomes.

What impact do you expect this training to have on future health crises?

We aim to strengthen health security across the region. Graduates will be mobilized within ministries to combat diseases and manage outbreaks. Additionally, they will have access to international networks to keep their knowledge up to date.

How do regional institutions collaborate with the IOC?

Collaboration is fundamental. We work

with training institutions in Madagascar, Mauritius, Comoros, and Seychelles, allowing us to strengthen local capacities and expand training opportunities. This also promotes research funding and scientific publications.

What are the IOC's future projects in public health and the "One Health" concept?

We aim to offer a range of regionally recognized degree programs. The objective is to continue strengthening the capacities of Member States to address tomorrow's health challenges, while promoting research and innovation in this field. This Field Epidemiology Training Program marks a turning point for the Indian Ocean region, aiming to build more resilient health systems to face future challenges. It seeks to train and make available to Member States competent and readily operational health professionals.

epidemics, despite our experience. We faced diseases such as peste des petits ruminants (PPR) in 2012 and foot-and-mouth disease in 2019. These experiences showed me that specialized training in epidemiology was necessary to enhance my skills and better prepare the country for future epidemics.

What are your main expectations in terms of skills and knowledge?

I aim to acquire the skills to form a national task force capable of addressing challenges in animal and public health. The FETP Master, grounded in the "One Health" concept, allows us to develop expertise across human, animal, and environmental health—a critical foundation for understanding and managing health issues in an integrated way, particularly in the context of climate change.

How do you see your role as an epidemiologist in the face of global health crises?

In the Comoros, where animals live in close proximity to people, the threat of zoonotic diseases is very real. It is essential to take this seriously to prevent

major public health crises. We also need to address vector-borne diseases such as dengue and chikungunya, as well as food security issues, to better protect the population. The emergence of diseases like leptospirosis underscores the importance of proactively managing zoonoses.

"We are learning to collaborate across disciplines."

How is the "One Health" concept incorporated into your training?

"One Health" is central to this program. It's a comprehensive health approach that integrates the interactions between the environment, animals, and humans. In our cohort, which includes veterinarians, biologists, and doctors, we are learning to work together across disciplines to address health from all perspectives, including the impacts of climate. This prepares us to better understand and manage health crises in the region.

What challenges do you foresee in your career, and how does this

master's program prepare you?

The main challenge is to improve integration within the region to meet societal expectations. This master's program strengthens collaboration between countries. For example, in a crisis, professionals from Madagascar could assist in the Comoros, or vice versa. This regional cooperation, already underway, will be a major asset in managing epidemics and building the health capacity of each country.

How do you envision regional and international collaboration in resolving health crises?

During the Foot-and-Mouth Disease outbreak in Mauritius, regional experts were deployed to help. This cross-sectoral and regional collaboration, whether in human, animal, or environmental health, is essential. This training plays a key role in enhancing skills and establishing a regional task force capable of intervening quickly and effectively in health crises. Thanks to the IOC, this collaboration is growing stronger, and it is essential that it continues in order to better manage epidemics at regional level.



Dr. Youssouf Oussen Moutroifi is Head of Veterinary Services for the Comoros and Delegate to the World Organisation for Animal Health.

Dr. Youssouf Oussen Moutroifi

"A regional task force to meet tomorrow's challenges"

The Master in FETP (Field Epidemiology Training Program) and the "One Health" approach provide an essential holistic perspective for addressing both current and future health challenges. Youssouf Oussen Moutroifi emphasizes that strengthening professional skills and maintaining strong regional collaboration are crucial to managing epidemics and protecting public health in our region.

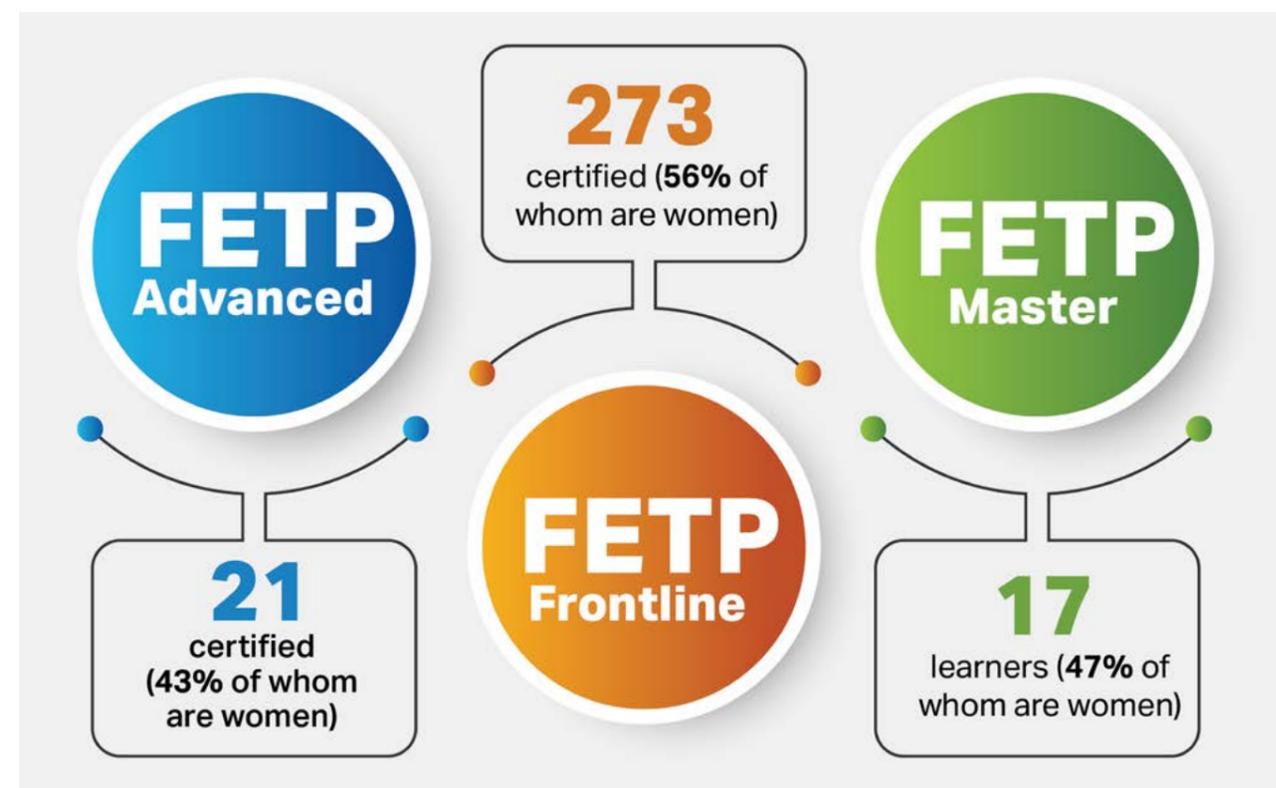
Could you tell us about your professional background before joining the training?

I am a veterinary doctor. After completing my doctorate, I joined the Ministry of Agriculture in the Comoros in 2010, where I worked in veterinary services. I served as Director of Livestock and I am currently the Head of Veterinary

Services for the Comoros and Delegate to the World Organisation for Animal Health.

What led you to pursue this master's degree in field epidemiology?

I have always been passionate about epidemiology, but it was clear that we were not adequately trained to handle



TRAINING

Cornerstone of the Network.

As early as 2009, one of the first activities of the SEGA - One Health Network focused on the mass training of health personnel from Member States, in the areas of epidemiological surveillance, monitoring tools and information sharing. From 2011, the need for a more detailed training strategy that verifies and monitors their impact on the ground became apparent. The Network then adopted the FETP certified programs, or Field Epidemiology Training Program, recognized and deployed internationally since the 1970s. The value of these training standards lies precisely in the inclusion of effectiveness monitoring. The FETP has largely contributed, in the five IOC countries, to consolidating a pool of credible and immediately operational epidemiologists to prevent and combat contagious diseases. But beyond the FETP, which strengthens basic epidemiology skills, training is a systematic component of every SEGA - One Health Network project which is constantly evolving. For community surveillance, each vaccination campaign includes training. In parallel with improving the equipment of vector entomology laboratories or the introduction of sequencing and PCR platforms, regional One Health trainings, now multisectoral, are organized. Veterinary technicians need to know how to identify mosquitoes just as much as those in human health do. With an average duration of one week, these courses are divided into four main categories: surveillance and response, laboratories, vector risks and the methodology for setting up operational research projects. Despite 14 different themes, the vast majority of non-FETP training courses concern surveillance and response (86%), from methods of investigating epidemics to approaches specific to certain diseases such as rabies, including the use of new computer programs. 8% are aimed at laboratories and 5% at vector risk. From 2009 to 2024, 3,382 people have followed these training courses, their number having increased over

Vocational training plays a crucial role in a sector as sensitive as health, where everything must be done to avoid human error at all costs. The SEGA - One Health Network has been ensuring and leading this vital mission, inherent in the networking of public health services, since its beginnings fifteen years ago.



After the training, we do follow-ups to see what is happening on the field. We train, we monitor, we analyse and we rectify if necessary. These programs are only of interest in the long term, they evolve and it is important to adjust them accordingly, explains Harena Rasamoelina, SEGA - One Health Network coordinator (on the left).

3,382 people trained from 2009 to 2024.

the last three years, and 51% of them are women. For all these programs, the SEGA - One Health Network is seeking to

move towards certification or academic recognition, with the project of regional campus for trades and qualifications also contributing to this...

Assessment tests conducted before and after each training show how knowledge levels have evolved. In the field, depending on the topics, certain signs are telling, such as the number of notifications produced by the services.

Following the implementation of community surveillance and event-based surveillance in Madagascar, tools have been developed to assess the level of improvement.

Certain reference signals and the quality

of data generated by the surveillance systems are scrutinized. The more people are trained, the fewer false alerts or erroneous data there are. The performance of the surveillance systems significantly increases thanks to this training". As the challenges of human, animal, and environmental health become increasingly complex, new training needs are being identified. Maintenance of biomedical equipment, management of biological and chemical waste, bioinformatics, diseases affecting wildlife, bees, or aquatic animals, nursing specialties, mental health, etc., these training programs will continue to diversify.

A regional campus for trades and qualifications

In 2022, the IOC Council of Ministers decided to set up a regional programme for vocational training, which has now been technically and politically validated. One of its first projects is to set up a regional campus for healthcare and personal care professions and qualifications, within the SEGA - One Health Network, and to continually improve its impact. Three questions asked to Jean-Claude Chapu. *



"These activities will make it possible to pool practices..."

Why was the decision made to create a regional campus for trades and qualifications within the SEGA - One Health Network ?

The SEGA - One Health Network has proven its effectiveness in providing professional training, based on needs and health crises. For this Network to further contribute to improving health throughout the IOC, a structured and long-term training policy, including all health and personal care professions, is essential.

They must therefore lead to a diploma or certification, and be recognized in all Member States.

A precise analysis and quantification of the needs in terms of jobs and training, with the economic world, are necessary.

How many nurses in Fianarantsoa and Mahé? What jobs do these cities with such different populations and pathologies need? What contextualized training for home care workers or medical secretaries?

But how will this structure address these questions?

The primary mission of the "One Health and Social Action" regional campus for trades and qualifications is to connect training institutions and health organizations to improve technical and vocational training, both initial and ongoing, in the fields of human, animal, and plant health, both quantitatively and qualitatively. With a focus on cooperation and solidarity, these activities will

enable the establishment of diagnostics, the development of regional tools, and the sharing of best practices...

What are the upcoming actions?

We held an initial regional workshop in March 2024. An assessment and the definition of priorities for the region and each country are currently underway, with an observatory for the professions overseeing the process. Regular workshops for reflection and development will enable the finalization of regional tools, the sharing of experiences, and the facilitation of mutual assistance among the organizations...

*Project Manager for International Relations at the French National School of Education (Ecole Supérieure de l'Éducation Nationale française), dedicated to the regional vocational training program of the IOC.

THE SEGA - ONE HEALTH NETWORK IN PICTURES

Vector risk

Monitoring mosquito resistance to insecticides is also one of the focus areas of the SEGA - One Health Network. This is essential for maintaining the effectiveness of vector control efforts, as it allows for the adjustment of control strategies and helps prevent outbreaks.



FETP and training

Among the modules of the Field Epidemiology Training Program (FETP) Master's offered by the SEGA - One Health Network is Ethics. Why? Because it ensures that field interventions respect the rights and dignity of affected populations. It also guarantees transparency and accountability in data collection, decision-making and implementation of measures.



Border surveillance



Border surveillance was integrated into the SEGA - One Health Network in 2019. The sharing of health information between countries and contact tracing are essential to prevent the regional spread of diseases.

Laboratories



The laboratory is one of the main capacities that countries must develop for implementing the International Health Regulations. About 40 laboratories in the region receive support from the SEGA - One Health Network, including training and equipment.

FIGHT AGAINST RABIES

+120,000 dogs and cats vaccinated.

Vaccination is a key component of prevention of rabies. This viral disease, which is fatal once symptoms appear, can be effectively controlled by vaccination. The vaccination initiative aims to immunize the main vectors, dogs and cats. Thus, mass vaccination, coupled with increased awareness among local communities, helps reduce the risks of transmission.

What can we learn from these vaccination campaigns?

Several campaigns have been conducted over the last three years in several districts of Madagascar (Arivonimamo, Manjakandriana, Analalava and Ambatondrazaka, etc.). As part of the health security of tourist destinations, the islands of Nosy Be and Sainte Marie have also been included in the list of beneficiary areas of the program. Dr Nivohanitra Razafindraibe, consultant veterinary epidemiologist, gives his testimony.

Doctor, can you introduce yourself in a few words?

My name is Nivohanitra Perle Razafindraibe. I am a veterinary epidemiologist. For several years, I was a member of the staff of the Ministry of Agriculture and Livestock of Madagascar, notably as a scientific researcher in the Department of Zootechnical, Veterinary and Piscicultural Research. Since 2015, I have contributed to the establishment of the human and animal rabies surveillance system in Madagascar. This period was also marked by the beginning of the collaboration between the ministry in charge of Agriculture and livestock and its counterpart in Health. Thanks to the SEGA - One Health Network of the IOC, I was able to follow several training courses including the FETP Frontline and today, I work as an intervention epidemiologist. Currently,



Taking into account the campaigns carried out before 2022, the total number of vaccinations exceeds 120,000.

With the aim of protecting human and animal life, Madagascar is at the heart of rabies vaccination campaigns. More than 120,000 dogs and cats have been vaccinated through campaigns conducted by the SEGA - One Health Network.

I am also the official point of contact for the SEGA - One Health Network of the IOC in Madagascar.

How do you assess the contribution of the IOC SEGA - One Health Network to the fight against rabies in Madagascar and the region?

Before 2014, data on rabies did not exist in Madagascar. However, many cases were observed in different regions of the island and the country was classified among the red zones in the global list of countries affected by human rabies. Since 2016, the SEGA - One Health Network has been supporting Madagascar towards the elimination of rabies. In this

context, a surveillance and data collection system has been set up, a national strategy to fight rabies has been developed and the strengthening of intersectoral coordination has been enacted. But equally important is the implementation of vaccination campaigns led by the SEGA- One Health Network. These campaigns are not limited to the administration of vaccines. On the ground, ministry agents also raise awareness among local communities about the importance of vaccination and the application of preventive measures.

Can you provide some figures on the results obtained?

More than 70,000 dogs and cats have been vaccinated against rabies over the last two years thanks to the four vaccination campaigns carried out with the SEGA - One Health Network of the IOC and the Malagasy Ministries of Agriculture and Livestock, and Public Health. In 2022, 50,338 dogs and cats have already been vaccinated in the districts of Arivonimamo, Manjakandriana and Analalava. In Sainte-Marie, in 2023, 2,738 animals were protected. In 2024, 7,850 vaccinations were carried out in Nosy Be, followed by a new campaign in Arivonimamo, where 9,750 dogs and cats have already been vaccinated. This campaign in Arivonimamo continued until October 9, reaching approximately 11,000 vaccinations. The campaign has also been extended to other localities, such as Ambatondrazaka.

If we take into account the campaigns carried out before 2022, the total vaccination exceeds 120,000. This has made it possible to significantly reduce the health risks linked to rabies in the Madagascar. The support of the SEGA - One Health Network of the IOC allows us to continue our efforts within the framework of the joint program to combat animal and human rabies which aims to vaccinate at least 70% of

the dog population. The objective is to achieve the goal of eliminating human rabies transmitted by dogs by 2030 in Madagascar.



The vaccination initiative aims to immunize the main vectors of rabies, dogs and cats.

"These campaigns are not limited to administering vaccines."

Dr Nivohanitra Razafindraibe, consultant veterinary intervention epidemiologist.



FOOT-AND-MOUTH DISEASE

Effective inter-island management.

Thanks to the intervention of teams from the SEGA - One Health Network, Mauritius's Division of Veterinary Services, and Malagasy veterinarians, the virus strain was identified, and 20,000 doses of vaccines along with serological test kits were purchased and delivered. In May 2021, the Indian Ocean Commission (IOC) also facilitated

Foot-and-mouth disease is a highly contagious viral disease. Mauritius faced an outbreak, first detected in 2016, which primarily affected livestock in Rodrigues. The SEGA - One Health Network has taken this on board in Mauritius, as well as in other IOC Member States, such as the Comoros recently.

the delivery of 182,200 vaccine doses to the Ministry of Agro-Industry and Food Security in Mauritius and the Agriculture Commission of the Rodrigues Regional Assembly.

This vaccine supply was made possible through support from the Agence Française de Développement (AFD) and the European Union, provided to SEGA - One Health Network under the Regional Health Security and Epidemic/Pandemic Mitigation Project (RSIE4). The IOC calculated that without the Network's assistance, the 2016 outbreak would have caused 27 million euros in losses for the Mauritian economy, while the intervention of the SEGA - One Health Network cost 2.5 million euros.

Karen Onai Samoisy, a veterinarian in Rodrigues, shares her perspective on the effectiveness of the network: "I have gained various experiences in animal health surveillance, parasitology, anaesthesia, vaccines, and animal welfare. I hold a Bachelor's degree in Veterinary Science from the Faculty of Veterinary Science at the University of Zimbabwe, an MBA from the Management College of Southern Africa (MANCOSA), and a Master's degree from the Department of Veterinary Tropical Diseases at the University of Pretoria. Since 2016, I have contributed to the fight against foot-and-mouth disease in Rodrigues and Mauritius. I have been a key witness to the significant contribution of the SEGA - One Health Network in the program to combat this health threat in the Indian Ocean. I recall that foot-and-mouth disease was first identified nine years ago in Rodrigues. We then requested Mauritius to conduct tests, and subsequently, other veterinarians came to assist us. In 2021, a major vaccination campaign



It is clear that the efforts to contain, control, and manage foot-and-mouth disease have been successful.

"The level of circulation should decrease over time until it reaches zero."

of vaccine doses provided by the IOC. After that, various vaccine booster shots were conducted. There was also an enhancement of epidemiological surveillance to detect any animal affected by the disease, as well as sero-surveillance, which involves regular biological sampling from a portion of the animal population and laboratory analyses to check the virus circulation levels. With the effectiveness of the vaccine used and other biosecurity measures, the level of circulation should decrease over time until it reaches zero. Monitoring the immunity level of animals after vaccination has also proven effective. This involves sampling vaccinated animals and measuring the antibody levels induced by the vaccination."



against foot-and-mouth disease was launched. On June 24, a videoconference was held to assess the progress of the vaccination campaign. More than 75% of the livestock in Rodrigues had received the first dose of the vaccine. This field action, in favor of animal health, was made possible by a significant donation

disease in Comoros. According to the farmers, previous actions taken and the recently initiated vaccination campaign significantly reduce the threat of disease resurgence. This gives them much more confidence in their livestock activities, which play a key socio-economic role.

Comoros

Compelling Testimonials

"Foot-and-mouth disease affects cows, goats, and sheep. It's an extremely contagious disease, but it does not transmit to humans. As the saying goes, prevention is better than cure. People aren't used to others taking care of their animals. Some may initially be skeptical of this initiative, fearing it might aim to cull their livestock when, in fact, we're trying to help them. We try to explain that vaccination is essential to ensure the health of their animals," explains Azali Mdroipvili, vaccinator (left in the photo during the September 2024 campaign in the Comoros). A farmer interviewed during the same campaign shared, "We are very grateful for the work done as part of this campaign. We're pleased because it meets an urgent need, our herds are often affected by diseases, especially given that the vaccine is free. Our animals are our greatest wealth, and our economic health is tied to the health of our herds."

Azali Mdroipvili (with hat on), vaccinator - September 2024 campaign in the Comoros.



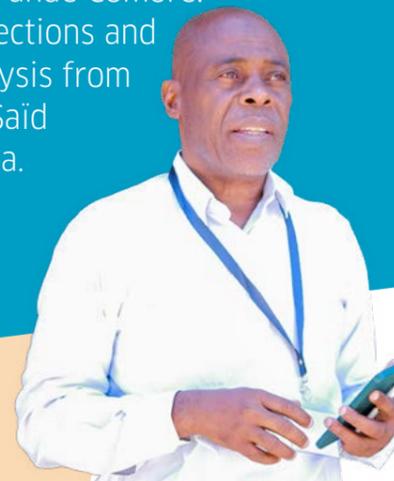


Protecting livestock is vital, both for animal health and food safety.

CHOLERA IN THE COMOROS

A full-scale test for the teams.

The cholera outbreak that struck the Comoros in early 2024 took everyone by surprise, except the members of the SEGA - One Health Network, who are prepared for such events. Starting from a boat docking in Moroni, it spread like wildfire but was quickly contained to Grande Comore. Reflections and analysis from Dr. Saïd Bedja.



A boat from Tanzania arrived in Moroni on February 2, carrying several passengers sick with cholera, with one death already reported. "The infection could have been contained on the boat", explains Dr. Saïd Bedja, "if some passengers had not gone ashore, despite the authorities forbidding travelers to disembark. The outbreak spread from there, with another death occurring in Mohéli, where the individual



The Comoros FETP team on the ground.

was buried without secure burial practices. The cholera vibrio is much more virulent in a deceased person than in a living one. To eliminate any risk of transmission related to burial, it is imperative to apply specific procedures in the hospital to prepare the body, in a special facility, with a trained and informed team."

The Cholera Treatment Center (CTC) of El Maarouf, urgently opened to accommodate passengers, did not meet the necessary conditions, and while transferring them to an appropriate facility, several infections occurred in the hospital... Nevertheless, health services quickly managed to contain the epidemic in Grande Comore, which recorded 635 cases out of the country's total of 10,342. The highest number of cases was reported in Anjouan, resulting in 4 to 5 outbreaks over several months... In total, 149 deaths were reported across the three islands.

National... and regional emergency plan.

"As soon as the epidemic was declared," explains Dr. Bedja, "we held an ad hoc meeting between the CDC-OH-IO One Health and the Comoros, followed by another with all the countries in the

region to prepare them for a potential cholera outbreak in their territories. Once one country is affected, the possibility of transmission to another is very high. Our response plan ensures that everyone is prepared." Dr. Saïd Bedja, epidemiologist from the CDC OH IO immediately joined his counterpart on-site to help reorganize the epidemic response, particularly with contact tracing in the field. By quickly identifying the most contagious hotspots, teams in Grande Comore managed to stop the outbreak sooner than in other areas. In this crisis, the SEGA - One Health Network team was involved at all levels of the response, except in the direct care of patients. Upon arrival, daily meetings were held with the national coordination of the Comoros, and around forty people trained in FETP were immediately operational. Two types of training were provided urgently, to better equip field actors in Rapid Intervention and Prevention and Control of Infections. The laboratories were equipped with additional PCR testing machines, but slow supply of inputs like reagents caused issues. Additionally, the availability of potable water reserves proved insufficient, as did the supply of camp beds for patients. Dr. Bedja is very confident: "Technically, the healthcare staff are equipped to deal with this kind of epidemic. In the past, decision-making was often slow. This time, the response time was quick. In the future, communication with the public will need to be intensified."

CYSTICERCOSIS

A disease managed effectively.

Cysticercosis is a disease caused by a parasite called *taenia*, which can affect humans through the consumption of infected and undercooked pork. The impact of this disease is significant for the pig market, particularly for small-scale farmers, as well as for public health.

in line with the "One Health" concept, the main challenge of the initiative is to promote synergy between development stakeholders (control, surveillance) and research entities.

120,278 pigs and 120,000 people vaccinated.

The SEGA - One Health Network of the Indian Ocean Commission (IOC) is actively contributing to the fight against this disease by promoting the application of the "One Health" approach. This support comes through the project "Taeniasis / Cysticercosis - Validation of an evolving and sustainable control method based on pig vaccination" which aims to reduce the incidence or even eliminate porcine cysticercosis and reduce the incidence of human neurocysticercosis. The project is funded by the International Development Research Centre (IDRC) and the Livestock Vaccine Innovation Fund, and coordinated by the University of Melbourne. The World Health Organization's Department of Neglected Tropical Diseases and experts from the University of Melbourne requested the CDC-OH-IO, which coordinates the SEGA - One Health Network, to join the project's implementation to share its expertise and engage all relevant stakeholders. As a result, veterinary services, the Ministry of Public Health of Madagascar, and the National Center for Applied Research in Rural Development (FOFIFA) of Madagascar have been involved in the project. The initiatives carried out under this project have notably resulted in the vaccination and treatment of 120,278 pigs and 120,000 people in Madagascar. The prevalence rates have decreased from 31% to 8% ($p < 0.001$) for porcine cysticercosis and from 1.25% to 0.63% ($p > 0.05$) for taeniasis. In July 2023, a week-long workshop dedicated to cysticercosis was held in Madagascar. The meeting provided an opportunity to review the actions taken and to outline future perspectives in the fight against cysticercosis.



Cysticercosis is a neglected tropical disease that represents a significant economic burden for the pork industry and a serious public health issue in Madagascar.

For years, Madagascar has been one of the global hotspots for cysticercosis. This has prompted the country's authorities to position themselves as stakeholders in the intensified strategy for controlling and eliminating cysticercosis, supported by the WHO since 2012. The seroprevalence of human cysticercosis was estimated at 16% in Madagascar at that time. In 2013, 5,891 suspected cases of cysticercosis were reported by the public health authorities. In pigs, recent studies revealed a slaughterhouse prevalence of 4.7% and seroprevalences of 15% in peri-urban farms and 23% in rural farms. To address the disease, a coordination

platform committed to implementing the "One Health" concept against cysticercosis has been established. The goal is to coordinate research, R&D and field actions. Activities include defining a preventive chemotherapy protocol (for humans and pigs), health and hygiene education, improving pig farming systems, evaluating vaccination in pigs, and controlling the supply chain (meat inspection, processing, etc.). Regarding the beneficiary areas, three districts were selected according to their demographic, epidemiological, agro-ecological and socio-economic contexts. In addition to the interaction between human health and animal health actors,

MADSUR

A model for the epidemio-surveillance of animal diseases in Madagascar.

The MADSUR (Madagascar Animal's Diseases SURveillance) network is an epidemiological surveillance network for animal diseases in Madagascar, created in 2014 under the impetus of the IOC and CIRAD.

The IOC, through its SEGA - One Health Network, continues to support the MADSUR network, which contributes to the improvement of surveillance, prevention, and response to epidemic risks. This surveillance network now brings together all sanitary veterinarians and veterinarians in charge of animal health at the regional directorates to cover animal health surveillance in the country. The network has enabled the Malagasy State, in terms of animal health, to maintain the country's status free from absent diseases, implement control measures, and guide control and prevention activities. Various training sessions have been provided to help veterinarians strengthen their capacities in animal disease surveillance (investigation, protocols, alerts, laboratory analyses, etc.), share information and experiences, focus on diseases affecting ruminants, poultry, pigs, etc., as well as on new topics of regional and international importance. According to Naltiana Rakotondrabe, a veterinarian and head of the surveillance and control service for animal diseases in Madagascar: "A timely response to an epidemic is a determining factor in the impact of its burden on the country. In this context, the collection and sharing of information are essential to effectively contain epidemic risks. Hence the need to establish a One Health

The MADSUR network plays a leading role in Madagascar in the epidemiological surveillance of animal diseases.



The MADSUR network also facilitates the integration of public health, animal health and laboratory surveillance...

platform supported by an electronic surveillance system." For animal health, the Madagascar Animal's Diseases SURveillance (MADSUR), has been established with the support of the SEGA - One Health Network. More

than 114 districts and 250 sites are operational, and the five Member States of the Indian Ocean Commission (IOC) are interconnected. For public health, the DHIS 2 system has been implemented under the guidance of the World Health Organization. Over 17 regions and 67 districts, with more than 1,650 health facilities, are utilizing



More than 114 districts and 250 sites are operational and the 5 Member States of the Indian Ocean Commission (IOC) are interconnected.



Investigation and response mission against bovine skin disease (Madagascar, May 2024)

e-surveillance, which represents 59% of health facilities in the country, with the goal of reaching 90% coverage by 2024. The average timeliness is 58%, with a target of achieving 80% by 2024, and completeness stands at 80%. The MADSUR network plays a leading role in Madagascar in the epidemiological surveillance of animal diseases. However, it also facilitates the integration of public health, animal health, and laboratory surveillance for the effective functioning of the One Health platform. Excellent coordination among stakeholders is key to success.

RIFT VALLEY FEVER

An appropriate response in high-risk areas and sites.

Rift Valley Fever (RVF) is an emerging viral disease that threatens public health and has significant economic impact. Studies conducted in Madagascar reveal that livestock trade is the main trigger for epidemics. These studies have also helped identify the most vulnerable populations and improve human and animal surveillance networks.

Madagascar has experienced a re-emergence of the disease since March 2021. Malagasy veterinary services reported it to the Health Surveillance Unit of the IOC as well as to the World Organisation for Animal Health. In addition to infected animals, some human cases have been recorded. With technical and financial support from the SEGA - One Health Network, measures have been put in place to establish an appropriate response in high-risk areas and sites. Interventions are coordinated by the CDC-OH-IO. To date, four investigation-response missions have been conducted in the regions of Alaotra Mangoro, Vakinankaratra, Ihorombe, and Diana. Surveillance is strengthened through a series of training sessions targeting over 500 actors from both sectors, animal health and human health.

In collaboration with the Institut Pasteur of Madagascar and the WHO.

Support also includes coordination and regular dissemination of situation reports, in collaboration with the Institut Pasteur of Madagascar and the WHO. In addition, the SEGA - One Health Network conducted a large awareness campaign in partnership

Investigative, awareness, and prevention actions have been carried out and have produced tangible results.



Dairy cattle are more susceptible to the disease, and the economic consequences are significant.

with the FAO. Furthermore, training modules on the risks and measures against RVF were prepared. It is important to note that the fight against Rift Valley Fever is not limited to Madagascar; it also concerns other islands like the Comoros.

TRIBUNE

Dr Raniaritiana Dany Bakoly
Directorate of Health Surveillance and Epidemiological Surveillance and Response, Ministry of Public Health of Madagascar.

Rift Valley Fever (RVF) is a zoonotic arboviral disease primarily affecting domestic ruminants and causing severe epizootics (abortion, increased mortality in young ruminants). This disease is named after the Rift Valley in Kenya, where the first cases were reported. Humans can be infected through mosquito bites or direct contact with products from infected animals (aborted foetuses, secretions). The vectors of the RVF virus (RVFV) are numerous. In Madagascar, RVFV has caused epidemics and epizootics in 1990-1991, 2008-2009, and 2021. Numerous studies have been conducted in Madagascar to better understand the conditions and factors of viral emergence, persistence, and dissemination in different ecosystems. The virus persists in certain regions while manifesting as recurrent circulations or even epizootics in other regions. In 2021, a survey was conducted and confirmed the circulation of the RVF virus in humans in Mananjary. The findings concluded that the epidemic, preceded by heavy rainfall, lasted about nine weeks. The main exposure for cases was direct contact with a sick or dead animal. Enhanced and targeted awareness activities for the population within the "One Health" concept contributed to the rapid containment of the epidemic. The SEGA - One Health Network of the IOC has provided valuable support to the ministries responsible for Health and Agriculture and Livestock in Madagascar to implement the response program against this disease. Once again, the SEGA - One Health Network has demonstrated its expertise and continues to play a central role in regional cooperation in public health.

DENGUE AND LEPTOSPIROSIS

Two health risks for the region.

The consortium brought together by CC-RIO is notably diverse. Why are so many different experts involved?

Co-construction is crucial in operational research because it needs to have practical applications in the field. Given the context of climate, demographic, and environmental changes, an approach involving all stakeholders is essential for better prevention and control of vector-borne and zoonotic infectious diseases. These diseases can be vector-borne, like dengue transmitted by *Aedes* mosquitoes, or environmental, like leptospirosis, primarily carried by rats and transmitted to humans through contact with contaminated environments. Addressing these diseases requires ecologists, epidemiologists, and even sociologists who can find solutions adapted to specific contexts and lifestyles.

Why were dengue and leptospirosis chosen?

Both diseases are climate-sensitive and have recently affected all IOC countries. In Reunion, dengue became well-known after its resurgence from 2018 to 2021. It has also impacted Mahajanga in Madagascar, the Seychelles, and Mauritius and Rodrigues in 2023 and 2024. Human mobility facilitates the introduction of the disease into these regions via viremic travellers. In tropical areas, mosquito vectors flourish near humans, with their activity increasing as temperatures rise, promoting virus replication.

And what about leptospirosis?

Its prevalence is increasing in Reunion and probably in Mauritius as well. Leptospirosis survive for extended periods in warm, humid environments. People in contact with contaminated water and muddy soils—not only farmers, livestock handlers, and sewer workers but also freshwater fishers and sports enthusiasts in rivers or canyons—are exposed. In the Seychelles, where temperatures are constantly warm, leptospirosis is active year-round, while it tends to peak in summer in other IOC



Thierry Baldet is a researcher at CIRAD in La Réunion. In tropical settings, mosquito vectors flourish near humans, with their activity intensifying as temperatures climb.

As part of the SEGA -One Health Network, the CC-RIO project* brings together an interdisciplinary research collective studying and forecasting the impact of climate change on two emblematic infectious diseases in the region: dengue and leptospirosis. Thierry Baldet, a researcher in emerging diseases at CIRAD in Reunion Island and the project coordinator, explains the scope and significance of this work.

countries. My colleague at the University of La Réunion, Prof. Pablo Tortosa, has shown that transmission chains vary from island to island, with different bacteria and animal reservoirs.

How do environmental specialists contribute to this project?

The CC-RIO project, supported by the SEGA - One Health Network, has enabled the integration of predictive tools initially developed by CIRAD into a new tool, ArBoCarto, incorporating additional features now transferred to the Vector Control Service of ARS Reunion and the Vector Biology and Control Division of

the Mauritian Ministry of Health. By cross-referencing meteorological data across finely mapped areas, it estimates mosquito populations based on active or potential larval habitats during rain and temperature rises. Predictions extend to 2100 for mosquito populations, using various climate evolution scenarios. Last August, researchers and vector control operators from Mauritius and Reunion island compared their practices.

*CC-RIO project: Climate Change and Emerging Infectious Risks in the Indian Ocean. This project is supported by the SEGA - One Health Network seed fund and is co-financed by the PRERISK-OI project, which is supported by the European Union and the Réunion Region.

ENTOMOLOGICAL SURVEILLANCE

How the study of insects helps prevent vector-borne diseases.

Entomological surveillance (medical or veterinary) is a system for collecting and tracking data over time and space regarding vectors. It serves as a tool for detecting anomalies in the evaluation of entomological parameters.



Training in entomological surveillance (Institut Pasteur of Madagascar - November 2022).

© Institut Pasteur de Madagascar

The Center for Disease Control and Prevention - One Health of the Indian Ocean (CDC-OH-IO), which coordinates the SEGA - One Health Network, is particularly active on the ground in identifying and preventing vector risks and climate change. This has led to various initiatives to standardize entomological surveillance protocols and, consequently, strengthen epidemiological surveillance in the Indian Ocean region.



Dr Diana Pillay Iyaloo, Head of the Division of Biology and Vector Control, Ministry of Health and Wellness, Mauritius.

Can you introduce yourself in a few words?

Dr. Diana Pillay Iyaloo: I am the head of the Vector Biology and Control Division (VBCD) at the Ministry of Health and Wellness in Mauritius. I joined this organization as a laboratory technician in 2007 and then went to Sweden to pursue a Master's degree in biology. I returned to the VBCD as a scientific officer in 2010. In 2012, the International Atomic Energy Agency (Vienna) offered me a scholarship for a part-time PhD in entomology. In 2022, I became head of the VBCD after the retirement of the former head. Entomology is a branch of zoology that deals with the scientific study of insects. In Mauritius, the responsibilities for studying, monitoring, and recommending control strategies for vectors of public health importance are assigned to the VBCD. The main objective is to enable Mauritius to be free from resurgent/emerging vector-borne diseases and to effectively combat the existing vectors of these diseases in the country.

Guillaume Dupuy: In 2007, I was recruited by the Anti-Vector Control Service of the Regional Directorate of Health and Social Affairs as an anti-



Guillaume Dupuy, Entomologist Technician at Agence Régionale de Santé, Reunion Island.

vector agent during the management of the Chikungunya epidemic in Reunion. For more than ten years, I have carried out prevention and control actions against vector mosquitoes. In 2018, I joined the medical entomology laboratory of the Regional Health Agency (Agence Régionale de Santé, ARS) of Reunion. I currently hold the position of entomologist technician, and my main areas of intervention are monitoring the various species of mosquitoes present in Reunion Island (biology, ecology, associated vector risk), with enhanced surveillance at the island's entry points (ports and airports) as part of the International Health Regulations (IHR), monitoring mosquito resistance to insecticides, and participating in projects evaluating complementary methods of vector control (trapping, sterile insects). At the ARS, we use the term medical entomology because our targets are insects that can impact human health, particularly through the transmission of pathogens.

How do you assess the role played by the SEGA - One Health Network in entomological surveillance in the Indian Ocean region?

Dr. Diana Pillay Iyaloo: The SEGA - One Health Network has greatly assisted the islands of the region (Comoros, Mauritius, Madagascar, Seychelles, Reunion) in strengthening their capacity to monitor, manage, and respond to vector-borne diseases. For example, regarding vector-borne diseases in Mauritius, the VBCD received support from the IOC in 2019 through the SEGA - One Health Network for an entomological expedition carried out in Rodrigues to investigate the incidence of mosquitoes and the risk of transmission of vector-borne diseases. The results of this expedition proved very useful during the 2023 dengue epidemic.

I can also testify that during the 2024 dengue epidemic, adult mosquito traps were lent by the ARS Réunion to the VBCD through the IOC, and batteries to operate these traps were also purchased by the IOC. Additionally, two missions, to Mauritius and to Rodrigues, led by experienced field teams from the ARS Réunion, were organized through the SEGA - One Health Network to assist the Republic of Mauritius in its fight against the 2024 epidemic. During the mission to Mauritius, the VBCD and ARS Réunion optimized an aerial application method of Bti (a biolarvicide) using foggers. This techno-

"One of the great successes of the SEGA-One Health Network is that it has allowed professionals from various fields and different countries in the region to get to know each other, share ideas and experiences, and in some cases, collaborate to achieve common goals."





Regional training in entomology (Institut Pasteur of Madagascar - June 2023)



Merna Armade, FETP learner and responsible for the public health vector control unit in Seychelles.

In my career, I had the opportunity to work on projects directly related to vector control, including the project titled "Deployment of Seychelles of the incompatible insect technology based on the Wolbachia bacteria," where I developed skills in mosquito surveillance techniques. Moreover, I had the honour of being trained, notably by Dr. Diana Pillay Iyaloo, through the SEGA - One Health Network of the IOC, in mosquito surveillance, as well as in the use of tools necessary for conducting this surveillance and applying GIS (Geographic Information Systems) for mapping. Today, we are better equipped for preparing our field missions. We are capable of conducting risk assessments that consider not only human factors but also interactions with animals and the environment. We can also formulate our work plans more effectively and adopt a multidimensional approach to data collection. We also consider the importance of properly preserving samples collected in the field, as well as the handling of equipment/tools used in the field.

logy was utilized during the 2024 epidemic in areas with a high incidence of mosquitoes. In addition to logistical support, training workshops, and expert missions, I believe that one of the other great successes of the SEGA - One Health Network is that through its annual Regional Technical Committee meetings, Steering Committee, and thematic seminars, it has allowed professionals from various fields and different countries in the region to get to know each other, share ideas and experiences, and in some cases, collaborate to achieve common goals.

Guillaume Dupuy: The SEGA - One Health Network facilitates the connection of different experts in medical and veterinary entomology across the

Indian Ocean islands through quarterly meetings on vector risk themes and regional workshops. I particularly benefited from the training workshop on monitoring mosquito vector resistance to insecticides at the Institut Pasteur of Madagascar in 2017. Regarding management and response to health issues, the SEGA - One Health Network has shown great responsiveness in 2024 by organizing two support missions from the ARS to Mauritius and Rodrigues in the context of managing the dengue epidemic. I participated in the mission to Mauritius to propose a method for testing the effectiveness of insecticide treatments and to evaluate the feasibility and effectiveness of a complementary technique for controlling mosquito larvae in an epidemic context.

EXAMPLES OF CLIMATE-RELATED HEALTH RISKS



Heat-related illnesses and symptoms such as **dehydration, heat stroke, respiratory and cardiovascular complications, etc.**



Water-related illnesses and symptoms, such as **diarrhoea or typhoid**



Injury and death due to extreme weather events



Malnutrition and food-borne diseases



Vector-borne diseases & zoonoses, such as **dengue fever, malaria, etc.**

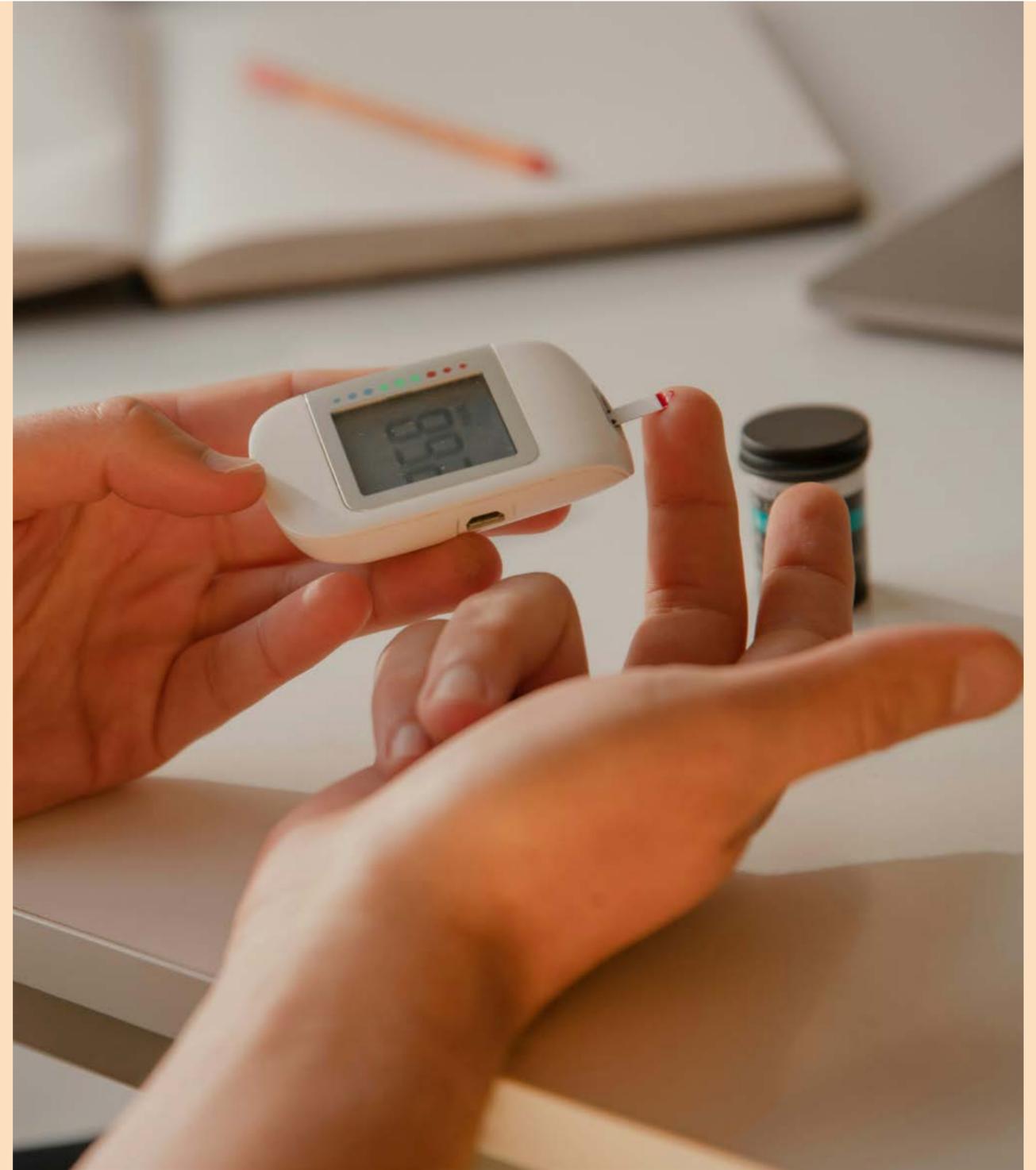


Psychological distress, **anxiety, depression, ..**

THE SEGA - ONE HEALTH NETWORK IN PICTURES

Climate- health

The climate-health connection is one of the four focus areas in the new Indo-Pacific health security strengthening program. Supported by the Agence Française de Développement (AFD), this initiative will build on the SEGA - One Health Network and bring together three epidemiological surveillance networks: the SEGA - One Health Network, the Pacific Community's Oceanic Public Health Surveillance Network, and the ECOMORE program led by the Institut Pasteur in Southeast Asia.



Non-communicable diseases

Among the highly prevalent non-communicable diseases in the region is diabetes. Beyond operational research, the SEGA - One Health Network highlighted the challenge of Type 2 diabetes prevention in the Indian Ocean during the symposium organized by the University Hospital of Reunion Island in November 2022.

THE “CLIMATE – HEALTH” NEXUS

The Network's strategy to address the issue.

Since 2018, the SEGA – One Health Network has programmed interventions related to climate change and its impact on health, regarding the vulnerability of the Indian Ocean islands to climate change.

In 2021, three years after deciding to integrate climate change into its system, the SEGA – One Health network implemented integrated surveillance for climate-sensitive syndromes and diseases, along with monitoring the impacts of climate change on health. For IOC Member States, a literature review was conducted on:

- Socio-demographic profiles;
- Health and epidemiological profiles;
- National climate change action plans;
- National plans for disaster response/coordination;
- Research and impact assessments of climate change in terms of climate, meteorology, health, migration, and economy;

- Food dependency of IOC Member States.

A scientific seminar on climate change and infectious risks in the Indian Ocean was held in Mauritius on September 12-13, 2024. The goal of this meeting was to strengthen the region's response and adaptation capabilities through operational research.



Gina Bonne, IOC Environment and Climate Officer, believes that while our islands have contributed little to climate change, they are nevertheless the most vulnerable. Hence the need to present solutions that are adapted to the terrain and have proven their usefulness and effectiveness in the face of the challenges of conservation, natural and health risks and climate change. The RDRM project, led by the Indian Ocean Commission and supported by the European Union in partnership with PI-ROI and UNDRR, focuses on disaster risk reduction, including climate-aggravated health risks. The active participation of its coordinator in the thematic 'climate-health' teleconferences organised by the SEGA - One Health Network bears witness to a strong commitment to collaborative working. These regular exchanges illustrate the importance of not working in silos, but rather favouring an integrated approach. By pooling expertise and sharing experiences, we are strengthening our collective resilience and our ability to respond in a coordinated way to climate and health challenges.



Juliette Janin, Head of Education, Culture, Vocational Training, Entrepreneurship, Gender and Health at the IOC, highlights the strategic importance of the link between climate and health, a fundamental issue for our region. In a context where climate change is increasing health risks, the IOC's SEGA - One Health Network has adopted an integrated approach to better understand and mitigate these impacts. A dedicated thematic cluster was created in 2018 to structure this approach and meet the region's needs. She also points out that this link between climate and health is at the heart of the SSIP programme, supported by the Agence Française de Développement. Indeed, it is one of the 4 pillars of this programme, which aims to strengthen health security in the Indo-Pacific region. Building on the expertise and actions of the SEGA - One Health Network, the SSIP programme will also capitalise on the experience of ROSSP (Pacific) and ECOMORE (South-East Asia), two other regional epidemiological surveillance networks. By mobilising the knowledge and resources needed to protect our communities, this programme

will create a real synergy between these three networks, to ensure a more agile and proactive response to health risks.

IOC accredited by the Green Climate Fund

It should also be noted that the Green Climate Fund (GCF), the UN's financial mechanism dedicated to funding projects that enhance climate resilience, adaptation, and mitigation, has granted accreditation to the Indian Ocean Commission (IOC). This accreditation marks a pivotal milestone for the IOC and its Member States, offering new opportunities to secure funding (up to USD 50 million) and thereby strengthen resilience to climate-related hazards. The IOC will be able to propose projects in key areas, including health. The next step will be to sign a framework agreement with the GCF. The objective is to develop a portfolio of mitigation and adaptation projects. The IOC Secretariat will initiate national consultations to identify and formulate the first projects to be submitted to the GCF for funding. This achievement is an acknowledgement to hard work and the result of an institutional transformation undertaken by the IOC. According to Gina Bonne, this success was made possible through the dedication of the entire Secretariat team and the continued support of Member States.

OPERATIONAL RESEARCH

Barriers, hypotheses, and methodology.

For about ten months, Jean-François Étard worked with the SEGA - One Health Network, focusing on operational research, which was integrated as a thematic pillar in 2021. This collaboration culminated with a project development workshop in May 2023 that emphasized applying for international funding calls from major donors.



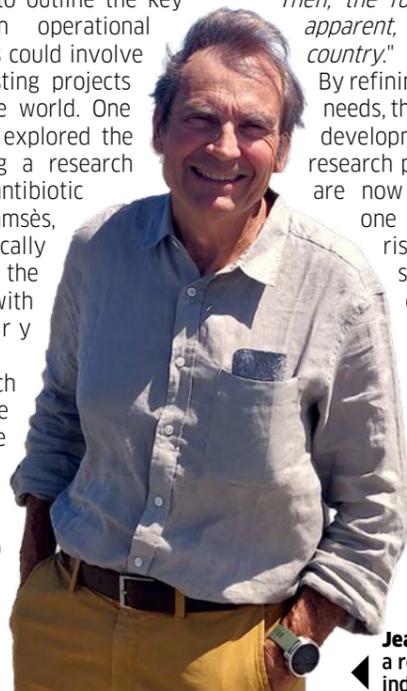
field teams about the difficulties they encounter to formulate research hypotheses. Experienced in evaluating such projects, Jean-François Étard emphasizes the importance of methodology: "This is often where things fall short. The design and protocols are at the core of developing these projects; they are evaluated as a priority. That's why we focused heavily on this aspect. Once the hypotheses are formulated, it is equally important to apply the most appropriate methodology to verify them. Then, the funding needs become apparent, depending on each country."

Research director and independent expert Jean-François Étard describes the workshop he led in May 2023, alongside a colleague from ARS Réunion, as the culmination of everything that had been done in the preceding months. "Our aim," he explains, "was to bring together operational research projects conceived with the IOC partner countries. We identified research themes and concerns and developed a work plan that highlighted one of the main needs: knowing how to respond to international calls for proposals that can finance these projects..."

These calls for proposals focus on major themes aligned with One Health: emerging diseases, vector-borne diseases, the influence of climate change on health, and antibiotic resistance. About thirty specialists from the region participated in this week-long workshop, which focused on the art and method of responding to these calls. "We first outlined the steps for preparing a proposal for these calls through examples of research. Then we reviewed various bibliographic research tools and monitoring mechanisms for calls for projects."

Practical work...

Afterward, the participants were divided into groups of four to outline the key components of an operational research project. This could involve co-funding with existing projects in other parts of the world. One working group even explored the possibility of joining a research program on antibiotic resistance, titled Ramsès, by geographically expanding it to the Indian Ocean with complementary proposals. As operational research aims to accumulate knowledge to improve the effectiveness of a disease control program, it is essential to identify the barriers that it could help overcome. This requires sufficient feedback from



Jean-François Étard is a research director and independent expert.

NON-COMMUNICABLE DISEASES

Operational research, a source of knowledge.

Farid Boumédiène (University of Limoges, Research Referent in the partnership with the Université des Mascareignes) is the lead for the AMONT* project on Non-Communicable Diseases (NCDs) in the Mascarene archipelago.



In 2021, operational research was integrated into the SEGA - One Health Network of the Indian Ocean Commission (IOC). Farid Boumédiène (University of Limoges, Research Coordinator in partnership with the Université des Mascareignes), the lead of the AMONT* project on non-communicable diseases in the Mascarene archipelago, explains the rationale behind this project.

projects on non-communicable diseases and to position them for project calls by organizing support and exchange workshops, making useful resources accessible, assisting with writing and submitting responses to project calls, and facilitating the promotion and enhancement of these projects. These meetings between academic actors, NGOs, and members of health ministries fostered the establishment of a common research culture, which also resulted in the emergence of 4 additional projects.

A seed fund has been mobilized to drive consortium work to support the development of research proposals. What is the significance of this type of research?

Operational research aims to produce knowledge based on scientific evidence to contribute to the evolution of public health policies by facilitating informed decision-making by institutions. Our team is currently working on non-communicable diseases: cardiovascular diseases, diabetes, cancers, chronic respiratory diseases, mental health, and neurology. Given the epidemiological transitions in the region, it is essential to focus on these pathologies, which represent the most significant burdens for Member States.

What is the purpose of the AMONT project, one of the beneficiaries of the seed fund?

The objective of the project was to establish four operational research

The 8 projects are :

- 1 SIRSAM Regional Health Information System in the Macarene archipelago
- 2 OSIECS Tools and Strategy for Information, Education, and Communication in Health
- 3 EISaCoM
Design and evaluation of an e-Health solution for the surveillance, screening, and management of epilepsy (Mauritius, Seychelles, and Comoros).
- 4 IoT HD Internet Of Things for Hypertension and Diabetes
Evaluation of the effectiveness of an evolving multi-component intervention utilizing connected devices to facilitate self-monitoring for the specific management of hypertension and/or diabetes.

- 5 FindRisk Questionnaire
Evaluate the rate of identification of individuals at risk of diabetes.
- 6 Med-Life
Evaluate the safety of the circuit for antidiabetic medications.
- 7 CCCdiabhyp : Climate Change & Diabetes and Hypertension
- 8 Mental Health E-Learning Platform

This initiative is led by Farid Boumédiène from the Inserm U1094 IRD UMR 270 Epidemiology of Chronic Diseases in Tropical Areas (EpiMaCT) team, which has established a consortium that includes the Université des Mascareignes and University of Limoges, the University of Technology of Mauritius, French, Malagasy, Mauritian, and Comorian ministries and health stakeholders, as well as several NGOs... These research efforts will enable the SEGA - One Health Network to contribute to improving the screening and management of patients, support health systems in their transformation to adapt to epidemiological transitions, and increase the life expectancy of populations in the Mascarenes archipelago.

* AMONT : Ateliers de Montage appliqués à des projets de recherches Opérationnelles sur les maladies Non Transmissibles dans l'archipel des Mascareignes. (Workshops for Developing Operational Research Projects on Non-Communicable Diseases in the Mascarene Archipelago)

ANTIMICROBIAL RESISTANCE

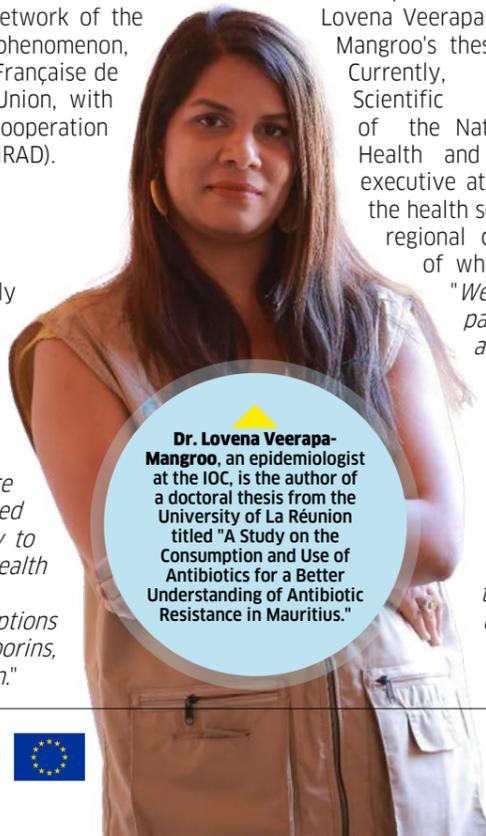
Mobilization in the Indian Ocean Islands.

Aiming to improve the surveillance of antibiotic resistance levels of certain pathogens and to develop recommendations on antibiotic usage, the SEGA – One Health Network deploys and connects human, scientific, and technical resources tailored to the local context on the islands of the IOC Member States.

Epidemiological Surveillance and Alert Management, which is the origin of the name of the SEGA – One Health Network of the Indian Ocean Commission (IOC) perfectly reflects the nature of the work carried out by some of its teams whose missions aim to control antimicrobial resistance (AMR). As in many parts of the world, in the islands of the region, this complex phenomenon results from the excessive or inappropriate use of antibiotics, both in medical, veterinary, and agricultural fields. This compromises the effectiveness of current treatments against certain pathogenic microorganisms that evolve to become resistant to previously effective medications. This cross-cutting threat underscores the need for a coordinated approach to preserve the effectiveness of antimicrobials. For this reason, the SEGA - One Health Network of the IOC pays particular attention to this phenomenon, benefiting from the support of the Agence Française de Développement (AFD) and the European Union, with assistance from the Centre for International Cooperation in Agricultural Research for Development (CIRAD).

\$100 trillion in spending and losses.

AMR currently accounts for approximately 700,000 deaths per year worldwide. By 2050, this figure could rise to 10 million, resulting in estimated total costs and losses exceeding \$100 trillion. "Regarding the use of antibiotics in hospitals," says Dr. Lovena Veerapa-Mangroo, "it has been observed that more than 60% of operated patients received multiple doses over several days, contrary to the guidelines recommended by the World Health Organization (WHO). Furthermore, around 75% of all prescriptions consisted of third-generation cephalosporins, amoxicillin, metronidazole, and ciprofloxacin."



Dr. Lovena Veerapa-Mangroo, an epidemiologist at the IOC, is the author of a doctoral thesis from the University of La Réunion titled "A Study on the Consumption and Use of Antibiotics for a Better Understanding of Antibiotic Resistance in Mauritius."

Towards an improvement of the regulatory framework.

"This research work offers relevant perspectives in the Mauritian context for the effective improvement of the regulatory framework. This approach is also intended to be adopted in other islands in the region," states Éric Cardinale, who supervised



Lovena Veerapa-Mangroo's thesis. Currently, the Scientific Director of the National Agency for Animal Health and Welfare (ANSES), this former executive at CIRAD continues to advocate for the health security strategy of the IOC and the regional coordination of health activities, of which he was one of the pioneers. "We are all exposed to the same pathogens and we all use the same antimicrobials. By recognizing the interconnection between human, animal, and environmental health, the "One Health" approach becomes essential for integrating AMR as a priority axis of the health cooperation platform of the IOC. It is crucial for optimizing the outcomes of initiatives to strengthen the technical capacities of Member States, share experiences and expertise, and train professionals."

Regional Health Security Strategy.



ALIGNING WITH GLOBAL CHALLENGES

- Antibiotic resistance
- Neglected tropical diseases
- Emerging diseases in human and animal health, with the potential to spread across borders and develop into epidemics or even pandemics (e.g. avian influenza, haemorrhagic fevers, etc.).
- Protecting human and animal populations from natural disasters, particularly those caused by the impact of climate change.

For a healthier Indian Ocean.

A CONCRETE CONTRIBUTION TO THE SUSTAINABLE DEVELOPMENT GOALS

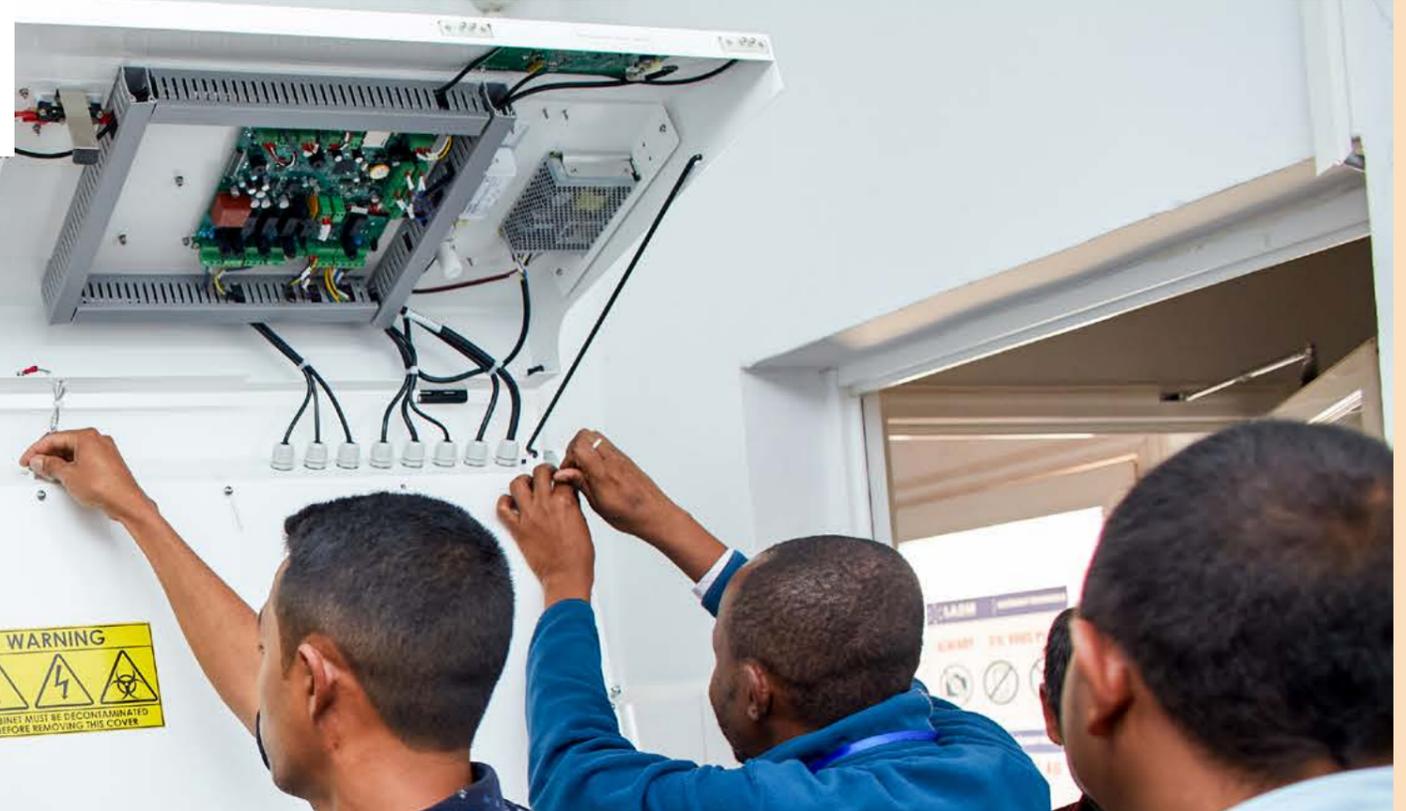


THE SEGA - ONE HEALTH NETWORK IN PICTURES



Training in equipment maintenance

Beyond equipment provision, laboratory technicians in the region benefit from training in the maintenance of small equipment. A training session took place at LA2M in October 2024.



National One Health platforms

The establishment of national One Health platforms was approved during the Steering Committee in 2021. In April 2024, the memorandum of understanding for setting up the national platform was signed by Ms. Peggy Vidot, Minister of Health, and Mr. Flavien Joubert, Minister of Agriculture, Climate Change, and Environment.

BIOSECURITY

A P3 Laboratory in Mauritius.

A critical component in managing vector-borne disease risks and border surveillance, the laboratory falls within the SEGA - One Health Network's primary objectives. Preparedness, surveillance, and response largely depend on the capacity for researching and analyzing dangerous pathogens, though such investigations are sometimes constrained by the settings in which they are conducted. Providing the Mauritian health services, particularly Dr. A.G. Jeetoo Hospital in Port Louis, with a biological safety level 3 (BSL-3) container lab—often called a P3 lab (with a safety level of 3 on a 4-level scale of hazard)—represents a major step forward for Mauritius and the region at large. The lab was inaugurated in early December 2023, and, ten months later, is used approximately twice a week. "This laboratory is not simply a building equipped with sophisticated instruments. It represents our shared commitment to tackling the evolving health challenges that demand our continued vigilance," noted Professor Velayoudom Marimoutou, then Secretary General of the IOC, at the lab's inauguration. By early October 2024, nearly 1,700 samples had already been cultured for tuberculosis. However, this P3 lab is not exclusively for tuberculosis; it can also be used for analyzing other samples that may contain infectious agents posing handling risks, such as Rift Valley Fever and rabies. "The staff is pleased with the P3 lab and happy

Dr Mohammad Iqbal Issack



With support from the Agence Française de Développement and the European Union, the Indian Ocean Commission's SEGA - One Health Network has enabled Mauritius, and by extension, other islands in the region, to strengthen epidemiological surveillance and response capabilities through a dedicated laboratory for studying potentially dangerous pathogens in a controlled and secure environment.



"This BSL-3 laboratory significantly improves pathogen analysis capabilities while ensuring the safety of the experts working within," explains Dr. Mohammad Iqbal Issack, an infectious disease specialist at the MoH.

to work in safer conditions," explains Dr. Mohammad Iqbal Issack, infectious disease specialist. "Previously, cultures were prepared in conditions that did not meet international safety standards."

For handling high-risk bacteria

The P3 laboratory is a high-security facility where negative air pressure controls airflow direction. Access

requires passage through an airlock system with doors that cannot open simultaneously. There is also a shower for personnel decontamination in case of an accident. Access to the laboratory is strictly regulated: entry requires a magnetic card, and no one works alone in the lab. Staff must wear protective clothing, and all sample handling is conducted in a safety cabinet. All waste is autoclaved internally and then removed from the exterior.

CANCER

How to improve surveillance.

As countries develop, the prevalence of non-communicable diseases (NCDs) rises. Mauritius, Réunion, and the Seychelles are undergoing an epidemiological transition, though they have not yet reached the levels seen in European countries. By contrast, the Comoros and Madagascar, with their younger populations, are beginning to see a rise in NCDs.

«Societies are so focused on infectious diseases and the crises they cause," observes Harena Rasamoelina, SEGA One Health IO Coordinator, "that we tend to overlook how chronic diseases quietly kill... An NCD thematic cluster was added to the network in 2021, as the SEGA - One Health Network is ideally positioned to enhance prevention and management efforts." NCDs encompass complex medical fields, ranging from cardiovascular diseases—the world's leading cause of death—to

cancers, diabetes, mental health disorders, and chronic respiratory diseases. The first regional workshop, held in 2021, focused on the "big four": cancer, stroke and cardiovascular diseases, diabetes, and chronic respiratory diseases. "Many synergies were identified, such as when Mauritius developed foot-care training for diabetic patients, significantly reducing amputation rates. This knowledge is life-changing and must be shared widely!"

Fragmented cancer surveillance

Doctor Arlette Saint-Pierre Drack recommends standardizing and expanding national cancer registries.



NCD-related training modules have been incorporated into short courses and the FETP (Field Epidemiology Training Program) Master's program. A community public health physician in Rodrigues and head of the NCD unit for five years, Dr. Arlette Saint-Pierre Drack presented a case study in September 2024 on cancer surveillance in IOC countries, as part of her FETP Master's coursework. Her study highlights the disparities in cancer registries. While national cancer registries exist

in Seychelles, Réunion, and Mauritius, they are only now being established in Madagascar and remain absent in the Comoros and Rodrigues. In Rodrigues, data is embedded within Mauritius's national registry, preventing a clear understanding of health trends specific to the Rodrigues population, whose lifestyle and genetic background differ from those of the Mauritian population. Additionally, cancer screening availability, medical specialties, and treatment options vary considerably from one country to another. Dr. Saint-Pierre Drack recommends standardizing and expanding national registries across all countries, enhancing existing ones and establishing information collection systems where none exist. Data sources for these registries could include hospitals, death certificates, and screening data. Risk factors such as tobacco use, alcohol consumption, obesity, and pollution exposure—often missing from current registries—should also be integrated. Beyond resource sharing and best practices exchange, the study's author suggests creating a regional committee to oversee surveillance, sending expert teams to evaluate each country's situation, providing technical support, and building capacity. These measures would go hand-in-hand with strengthening diagnostic and treatment capabilities in countries with fewer resources.

A MOBILE VETERINARY CLINIC

A first in Mauritius.



Mauritius's first mobile veterinary clinic was inaugurated in July 2024 following an investment of €189,000. This acquisition was made possible through the SEGA - One Health Network of the Indian Ocean Commission (IOC), with support from the Agence Française de Développement (AFD) and the European Union (EU).

"I'm very pleased to have access to this mobile veterinary clinic because it provides many veterinary services, like ultrasounds, surgeries, and more. There are a lot of veterinary services we didn't have access to before. Now, the veterinarians are equipped and can travel to assist, for example, if one of my animals has a health issue," says Adesh Ramloghun, a livestock farmer.



With this mobile clinic, it's now possible to make ultrasounds, thereby reducing stress related to transport.



08 July 2024, the clinic's first patient



The clinic is equipped to all stages of the intervention. Here, it's time for mowing to be able to carry out the ultrasound.



The goal of this mobile veterinary clinic is to provide convenient, local veterinary care, reducing the stress and risks associated with transporting animals. This mobile unit is equipped with a modern surgical environment, a microscope, and ultrasound equipment, enabling precise diagnostics and on-site interventions. A GPS system and mobile app will further facilitate the management of veterinary services, allowing farmers to locate the clinic's exact position, thereby optimizing care scheduling.

KEY FIGURES OF THE SEGA - ONE HEALTH NETWORK

15 years

serving health security in the Indian Ocean region (established in 2009)



Over 500 health professionals in the region are members of this network



Implementation of the One Health approach: human, animal, and environmental



8 thematic areas

surveillance and response, FETP and training, laboratory network, vector risk, climate-health, border surveillance, non-communicable diseases, operational research



Over 3300

individuals trained



273

certified field epidemiologists



SEGA ONE HEALTH
NETWORK

Over 40

laboratories benefiting from capacity strengthening



More than 40 disease/syndrome surveillance systems established



Over 400 teleconferences held



Hundreds of health alerts shared



Over 300

Indian Ocean monitoring bulletins published



Strong partnerships

AFD, EU, Institut Pasteur de Madagascar, Regional Health Agency of La Réunion, CIRAD, PIROI, Santé Publique France, Mauritius Institute of Health, National Institute of Public Health and Community, University of the Comoros, etc.





In 1982 in Port Louis (Mauritius), the Foreign Ministers of Mauritius, Madagascar and Seychelles adopted the Port Louis Declaration which created the IOC. Two years later, on 10 January 1984, the organisation was institutionalised in Seychelles by the General Cooperation Agreement, known as the Victoria Agreement. Since 1986, the IOC has brought together five Member States: the Union of the Comoros, France for Reunion Island, Madagascar, Mauritius and Seychelles. As the only regional organisation in Africa that is exclusively made up of islands, the IOC promotes the specificities of its Member States on the continental and international scenes. With the active support of a dozen international partners, the IOC embodies regional solidarity through cooperation projects covering the 17 Sustainable Development Goals. This experience accumulated over many projects has enabled the IOC to develop recognised expertise and gain attractiveness as evidenced by the creation of a status of observer members benefiting China, India, Japan, the European Union, the United Nations, the International Organisation of the Francophonie and the Order of Malta. Invited on several fronts, the IOC for four decades has been leading the collective action of the Indianoceanica which is a naturally vulnerable region choosing to be ambitious.

AVEC LE SOUTIEN DE



Agence Française de Développement (AFD) implements France's policy on international development and solidarity. Through its financing of NGOs and the public sector, as well as its research and publications, AFD supports and accelerates transitions towards a fairer, more resilient world. It also provides training in sustainable development (at AFD Campus) and other awareness-raising activities in France. With our partners, we are building shared solutions with and for the people of the Global South. Our teams are at work on more than 4,000 projects in the field, in the French Overseas Departments and Territories, in 115 countries and in regions in crisis. We strive to protect global public goods – promoting a stable climate, biodiversity and peace, as well as gender equality, education and healthcare. In this way, we contribute to the commitment of France and the French people to achieve the Sustainable Development Goals (SDGs). Towards a world in common.



The European Union is an economic and political union of 27 European countries. It is founded on the values of respect for human dignity, freedom, democracy, equality, the rule of law and respect for human rights, including the rights of persons belonging to minorities. It acts globally to promote sustainable development of societies, environment and economies, so that everyone can benefit.