

HEALTH

Sector: Vector-borne diseases	Title of the project: Set-up of an epidemiological network for monitoring the main vector-borne diseases	Intervention zone: All the country
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DESCRIPTION OF THE PROJECT

Presentation of the problem:

The parameters most affected by the climate change are temperature and humidity (floods due to extreme precipitations). CC will influence the biological systems including the vector systems and the diseases transmitted by vectors some of which may find favorable conditions like temperature and humidity to stimulate their appearance or reappearance in Tunisia. The vector-borne diseases, notably those transmitted by the bites of sandflies – mainly leishmaniasis – or culicidae (mosquitoes) – mainly malaria, West Nile fever or Rift Valley fever – are already among the main causes of morbidity and mortality of both man and animal and represent the most serious scourge for humanity.

Objectives:

Set up a surveillance network for vector-borne diseases and particularly for leishmaniasis, malaria, West Nile fever and Rift Valley fever to help early detection and surveillance of the circulation of pathogens responsible for these diseases in human and animal reservoirs.

Contribution to the adaptation to climate change:

This project contributes to increase Tunisia's capacity to adapt to the risks of proliferation of certain diseases the appearance of which might be favored by climate change. The surveillance system to be installed will help to identify the risk factors and the early warning indicators for the appearance of these diseases to better understand their epidemiological situation. This will allow introducing measures to combat and adequately prevent these diseases, to provide care and to rapidly limit the evolution of the disease in case of its appearance.

Main components of the project:

- Establish geographic data bases and appropriate software tools
- Reinforce the laboratories specialized in reagents and specific analysis kits
- Train and provide continuing education to public health officials responsible for the network
- Organize specific and random epidemiological surveys and studies
- Organize workshops and exchange platforms for the key actors

PROJECT IMPLEMENTATION

Implementation: Ministry of Public Health: Department for Primary Health Care, National Observatory on New and Emerging diseases.	Institutional partners: Department for Environmental Hygiene and Environmental Protection, Institute Pasteur, Services for Infectious Diseases, Regional Departments for Public Health, Directorate General for Animal Health and Institute for Zoonitary Control of the Ministry of Agriculture.
Implementation period: 3 years	Priority of the project: High
Monitoring indicators: functioning of the network, number of participants in the network, number of data recorded, fluidity of the information flow.	

COSTS / BENEFITS OF THE PROJECT

Project costs 0.4 MDT	Risks and vulnerability due to non-action: Return of diseases already eradicated in Tunisia such as malaria, most deadly disease worldwide. Proliferation of diseases of which only a few cases have been found in Tunisia, such as leishmaniasis, appearance of new viruses such as the West Nile virus and the Rift Valley virus.
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HEALTH

Sector: Vector-borne diseases	Title of the project: Set-up and reinforcement of a network for entomological surveillance and mosquito and sandfly control	Intervention zone: All the country
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DESCRIPTION OF THE PROJECT

Presentation of the problem:

Besides being a nuisance, several species of hematophagous insects are vectors for the transmission of pathogens, which cause serious diseases in man and animal. Among these insects, two families are particularly menacing the culicidae (mosquitoes) and the psychodidae (sandflies). Since no treatments or efficient vaccines exist against the pathologies transmitted by these vectors, combating the insects themselves remains a necessary means to interrupt the transmission cycle. However, climate change and its effects on the increase of temperature and humidity may create favorable conditions for the development of these insects. These changes may also foster the installation of new species of insects such as *Aedes albopictus* (tiger mosquito).

In Tunisia, once malaria had been eradicated, and as a consequence of the better living standards of the population and the development of tourism, efforts have been concentrated on combating the nuisance aspect of these insects. Every year highly expensive campaigns against these insects are undertaken with the intervention of different organisms (Ministry of Public Health, Ministry of Environment, municipalities, etc.) and in all the regions of Tunisia with the use of various types of insecticides. Unfortunately, these measures have sometimes been unsuccessful since the majority of the mosquito populations and in particular *Culex*, have developed resistances against the main insecticides because of their improper and unconsidered use.

Objectives:

The project aims to set up and reinforce a surveillance network on the populations of mosquitoes and sandflies in order to control their density, their geographic reappearance and on the introduction of new species. This network will provide the necessary data for the set-up of rapid and well-coordinated control measures against these vectors and for the protection of the population and notably help to introduce mosquito control campaigns, which will interrupt the transmission chain in the case of the appearance of a vector-borne disease.

Contribution to the adaptation to climate change:

Reinforce the regional unities of entomological surveillance so that they can create an efficient surveillance network. This project will help to plan and to coordinate activities to control the proliferation of mosquitoes and sandflies stimulated by the increase in temperature and humidity due to climate change.

Main components of the project:

- Reinforce the regional entomological unities
- Equip these services and train the personnel
- Develop a GIS on the habitat and the movement of the mosquitoes and the sandflies
- Develop a network to exchange information and data
- Collect data and conduct entomological studies on these insects

PROJECT IMPLEMENTATION

Implementation: Ministry of Public Health, Department on Environmental Hygiene and Environmental Protection	Institutional partners: Department for Primary Health Care, National Observatory on New and Emerging Diseases, municipalities, Institute Pasteur, Ministry of Environment and Sustainable Development
Implementation period: 3 years	Priority of the project: High
Monitoring indicators: functioning of the service, number of people trained, availability of information and functioning of the information system	

COSTS / BENEFITS OF THE PROJECT

Project costs 0.3 MDT	Risks and vulnerability due to non-action: Nuisances due to the proliferation of mosquitoes and sandflies. Epidemics of vector-borne diseases such as malaria, West Nile fever, Rift Valley fever, etc
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HEALTH

Sector: Health (prevention-adaptation)	Title of the project: Set-up of a program for the adaptation of the health system to climate change	Intervention zone: All the country
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DESCRIPTION OF THE PROJECT

Presentation of the problem:

According to WHO, the health risk related to climate changes represents “one of the scourges of the 21st century” (WHO, 2009). Considering the amplitude of the phenomenon, health protection can only be conceived by reinforcing the health system in order to preserve the present health status of the population.

Objectives:

Develop an integrated program for the health sector to adapt to the climate change to ensure a maximum protection of the population against the risks related to climate change. The program will be based on a global approach to manage the impact of CC on health. It will help to develop the knowledge, strengthen the observation tools, inform, train and raise awareness of the actors involved, promote a strategy adapted to the Tunisian context, finance the adaptation programs and use the necessary legislative and regulatory instruments.

Contribution to the adaptation to climate change:

Reinforce the capacities of the public health system in Tunisia to better integrate the impacts of climate change on health in terms of monitoring and diagnosis, care, awareness of the population to the risks, etc.

Main components of the project:

- Providing the National Observatory on New and Emerging Diseases with the appropriate working tools including an appropriate information system
- Organization of epidemiological surveys and research
- Reinforce the capacities of the regional laboratories (20 laboratories)
- Organization of multiple training cycles
- Production and circulation of educational supplies
- Preparation for emergency situations (disaster, emergency of new diseases, etc.)

PROJECT IMPLEMENTATION

Implementation: Ministry of Public Health: National Observatory on New and Emerging Diseases	Institutional partners: Organizations related to the Ministry of Public Health (DHMPPE, ANCSEP, DSSB, DMSU) Ministry of Environment and Sustainable Development
Implementation period: 5 years	Priority of the project: High
Monitoring indicators: number of executives and technicians trained, epidemiological data, registered research results, number of people receiving awareness-raising information, etc.	

COSTS / BENEFITS OF THE PROJECT

Project costs 0.6 MDT	Risks and vulnerability due to non-action: Morbidity and mortality due to the effects of climate change. High costs for the treatment and the care provided to patients and complications, economic costs such as absenteeism rate and decrease in work productivity, etc.
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HEALTH

Sector: Waterborne diseases	Title of the project: Set-up of a national protection program against waterborne diseases related to climate change	Intervention zone: All the country
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DESCRIPTION OF THE PROJECT

Presentation of the problem:

One of the effects of climate change is the scarcity of drinking water resources and the increase of the ambient water temperature. Under these conditions health risks related to the utilization modes of water may be aggravated: 1) the water supply to rural populations and the related health risks: insufficient water quantity and bad bacteriological quality due to insufficient control; 2) role of the rivers in the water cycle and exposition to related health risks: unhealthiness of the rivers may increase due to human pressure and the effects of CC (progressive warming of the waters and alternating episodes of droughts and floods); 3) the health risks for the vacationers on the beaches: the bacteriological contamination of the Mediterranean Sea might increase under the influence of the global warming, especially along the southern coasts such as those of Tunisia; 4) more frequent reuse of treated water: reuse of treated wastewater for the irrigation of crops due to the scarcity of conventional water including a risk of contamination of the population due to insufficient quality control of the water or the use of the treated water for sensitive crops (e.g. vegetable growing).

Objectives:

Develop the knowledge, consolidate the observation tools, information, training and awareness raising of the actors involved, etc. The program covers 4 axes: 1) health inspection of the drinking water supply system in rural areas; 2) adaptation to the health risks related to the interaction with river waters; 3) health protection of the vacationers on the beaches; 4) health inspection on the use of the treated wastewaters.

Contribution to the adaptation to climate change:

This project will contribute to strengthening Tunisia's capacity to combat the proliferation of water-borne diseases aggravated by the effects of climate change.

Main components of the project:

- Reinforce the control and inspection personnel: health engineers and technicians, epidemiologists and laboratory executives
- Support the regional hygiene services
- Develop continuing education courses for onsite professionals such as doctors and surveillance personnel in the districts. Visits and study grants for executives.
- Awareness-raising including the production and dissemination of educational tools to different groups of population
- Logistic means for technicians working in rural areas

PROJECT IMPLEMENTATION

Implementation: Ministry of Public Health: DHMPE	Institutional partners: ONMNE, DSSB, ANCSEP DMSU, DRSP.
Implementation period: 5 years	Priority of the project: High
Monitoring indicators: number of executives and technicians trained, epidemiological data, registered research results, etc.	

COSTS / BENEFITS OF THE PROJECT

Project costs 5.7 MDT	Risks and vulnerability due to non-action: Infant morbidity and mortality due to water-borne diseases causing diarrhea and dehydration. High costs of treatment and care for the patients and complications (typhoid, hepatitis, etc.). Economic costs such as absenteeism rate and decrease of work productivity, etc.
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HEALTH

Sector: Respiratory diseases	Title of the project: Risk evaluation and prevention of the increase of respiratory pathologies related to climate change	Intervention zone: All the country
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DESCRIPTION OF THE PROJECT

Presentation of the problem:

Chronic respiratory pathologies (asthma, COPD, rhinosinusitis, lung cancer) are constantly increasing in Tunisia and responsible for a high morbidity. The increase in temperature related to CC contributes to modify the concentration of pollutants in the ambient atmosphere and the concentration of allergens. Since longer pollinisation periods can be expected, the number of sensitive persons and the risk of allergic asthma will increase. Furthermore, the flood risks lead to the formation of moulds in buildings responsible for allergic sensitization and severe asthma.

The impact of climate change on the individuals suffering from respiratory diseases varies according to the degree of increase in temperature, the risk of very high temperatures, violent rainfalls and floods. The adaptive capacity should not be limited to reacting to extreme events but should include long term planning. Consequently, the diagnostic tools and treatments have to be adapted in time and the clinicians need to be informed about the modifications of these pathologies.

Objectives:

Surveillance of the pollution parameters, the allergens, the humidity level, the moulds, and the morbidity indicators: asthma, COPD, respiratory infections, cancers. Reinforcing the capacity for the Tunisian actors (population, doctors, public health officers, decision makers, executives, etc.) so that they will be able to cope with the accentuation of respiratory diseases enhanced by the effects of climate change.

Contribution to the adaptation to climate change:

Contribute to increase the capacity of the health structures to combat the risks of proliferation of respiratory diseases related to the increased exposition to air-borne allergens stimulated by the effects of climate change.

Main components of the project:

- Collection of epidemiological data
- Collection of climatic data and data on air quality
- Set-up of a prevention and adaptation strategy
- Training of doctors and nurses
- Awareness-raising of high risk groups
- Set-up of a health information and warning system related to the impacts of climate change.

PROJECT IMPLEMENTATION

Implementation: Ministry of Public Health, Direction for Primary Health Care, Abderrahman Mami Hospital for pneumo-phthisiology	Institutional partners: Ministry of Environment and Sustainable Development
Implementation period: 5 years	Priority of the project: High
Monitoring indicators: epidemiological data (morbidity, mortality), climatic data and pollution data (local, regional, average, peak,); report on statistical studies, preventive measurements introduced.	

COSTS / BENEFITS OF THE PROJECT

Project costs 2.1 MDT	Risks and vulnerability due to non-action: Increase of morbidity and mortality due to respiratory diseases, loss of productivity, treatment costs, handicap. At present, direct costs (drugs, care) for the treatment of COPD, bronchial carcinoma and asthma are estimated to amount to more than 5 MDT per year.
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