



# Biodiversity and Health

in the context of G7 - 2017 Presidency Italian

Global Strategy for the  
mitigation of  
the effects  
of Climate Change  
on Planetary Health

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# **The concerns of the third millennium** which have taken on a paramount importance

**Are global issues that affect the biosphere but  
have disturbing consequences for human life**

**Extinction of animal and plant species  
Loss of biodiversity**

**Resource penalties, expansion of ethnic violence**

**Environmental degradation and health threats**

**Planetary iniquity**

**Climate changes**

**Human health and the health of planet Earth are strictly interconnected**



# Climate changes and health

A satellite image of a tropical cyclone, showing a distinct eye and spiral cloud bands over a dark blue ocean. The surrounding landmasses are visible in shades of green and brown.

***The impact of climate change leads to an iteration process in which transport, trade, migration, urbanization, conflicts, land development, soil erosion, irrational use of water resources and of fossil fuels exert influence on human health, morbidity and mortality, but none of these factors act alone***

**Referring to this interconnection, there is a strong need for the adoption of an inclusive, comprehensive approach to protect *planetary health*, as a new concept, and on the basis of the “One Health” principle**





In the framework of the 2030 Agenda and building upon the achievements of the past Presidencies, the objective of the Italian Presidency is the formulation and launch of a **“Global Strategy for the mitigation of the effects of Climate Change on Planetary Health”**

This should define both the high priorities and policies, and translate these into practical tools according to the following two principles **“one health”** and **“health for all”**.

# METHODOLOGY

In order to develop this approach, during two meetings with the representatives of G7 Countries and International Organizations, the Italian Presidency has proposed a preparatory process relying on:

- **a Matrix**, which is a broad and cross-cutting framework, used as a tool to investigate all the available information, to share strategies and to highlight a set of possible actions
- **a Delphi questionnaire**, which is structured on the statements and actions identified in the Matrix for global experts consultation.

**This process is based on the best knowledge and collective awareness, through the use of methods for the analysis of complex systems, with the aim of identify policies and strategies to strengthen the resilience of biological, economic and social systems and to safeguard the homeostasis of the global health.**



# MATRIX

Taking into account the known climate drivers (as identified by IPCC - Intergovernmental Panel on Climate Change in its assessment reports), eight main topics have been identified in the Matrix, as follows the

<a href="#"><u>Extreme Events</u></a>
<a href="#"><u>Health effects of air pollution related to climate change</u></a>
<a href="#"><u>Vector borne diseases</u></a>
<a href="#"><u>Water access and waterborne diseases</u></a>
<a href="#"><u>Food System and Nutrition</u></a>
<a href="#"><u>Animal health at the animal/human interface</u></a>
<a href="#"><u>Migrant's flows</u></a>
<a href="#"><u>Antimicrobial resistance</u></a>

In the Matrix, each topic is discussed starting from the 'exposures' derived by the climate drivers impact through the 'health outcomes' on human and animal health in order to identify strategies ('expert statements') leading to possible corrective 'actions'.

# Biodiversity in Italy

Italy is one of the richest biodiversity in Europe, thanks to a favorable geographic position and a large geological, climatic and vegetational variety.

**The Italian fauna:** 58,000 species, of which about 55,000 species of invertebrates, mostly belonging to the class of insects, and 1,258 vertebrates

**The Italian flora:** the upper plants 6,711 species





***“the value of these parks is life in itself  
... and our participation in life itself”***

*S. Kauffman*



**The value of the Natural Parks**

# Biodiversity and invasive species

The country has an additional tool for monitoring and mitigating climate change, including the introduction of aloft and invasive species



An important problem is the invasion of allergenic plant species with a short life cycle that results in widespread pathologies with very variable seasonality, plus impacts on indigenous biodiversity

In Italy, the largest number of alien species is recorded, in all grading classifications of the living, microbial, vegetal and animal world



The Mediterranean Sea has the highest rates of invasion over all European seas; The recent enlargement of the Suez Canal, along with climate change, will result in further invasion of aloft species

***Here are some important  
notions and reflections***

# Biodiversity and medicine

"Few people realize to what extent Western medicine depends on wild organisms"

*Edwards O. Wilson*

The "miraculous" salicylic acid

**Philipendula ulmaria: plant where salicylic acid was first extracted**





# Biodiversity and human nutrition

Plants with edible parts are about 30000, but over the course of history only 7000 types have been cultivated and harvested.

**Of these, 20 species account for only 90% of the food consumed all over the world; Among these only three species, wheat, rice and maize form more than half**

We still depend on the plant species discovered and cultivated by our ancestors of the Neolithic in the regions that saw the birth of agriculture



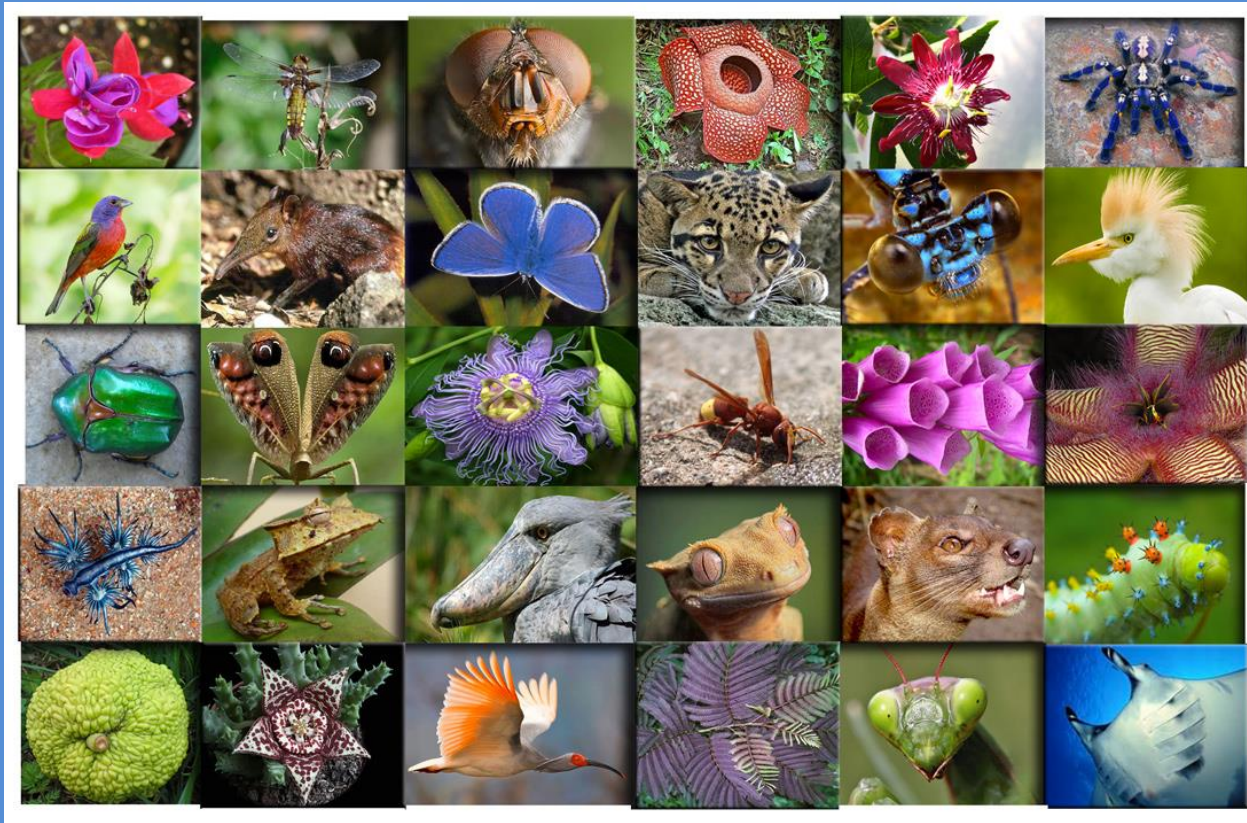
*Amaranthus tricolor*

# Biodiversity and resilience



**Ability of the ecosystem to restore homeostasis**

# Biodiversity, complexity and redundancy



**Biodiversity redundancy in an ecosystem is a factor proportional to its capacity to create new conditions for balance.**



**Systemic vision of health**



**Process of becoming**



**It implies ongoing activities and changes that reflect the creative response of the organism to environmental challenges**

# Monet poppies

## And the systemic vision of health



**Form** beauty order Emerging organizations

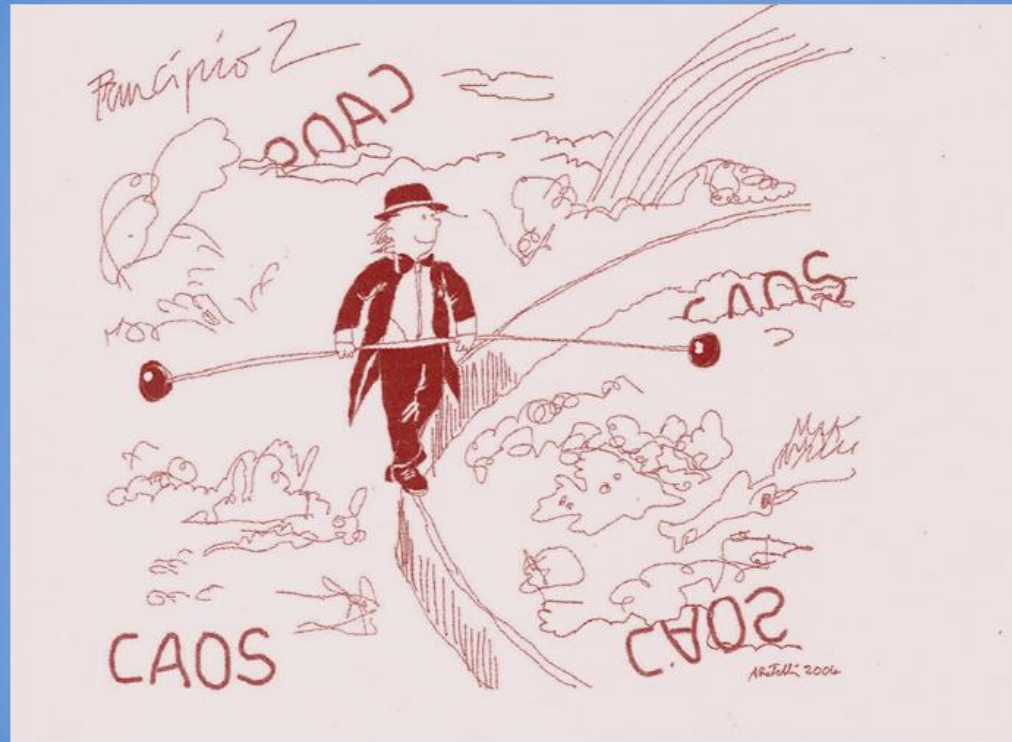
As unexpected properties not owned by the individual parts of the artistic work

Single brush strokes do not have any properties,

But something emerges at the level of the whole work, in scientific terms we would say

**the "complex system"**

# Health as a dynamic equilibrium



The concept of dynamic balancing is a useful concept for defining health, not a static equilibrium but a flexible pattern of fluctuations

# Homeostasis: a coherent key to survival

Some definitions

A unique heuristic key to understanding the physiological distinctive needs of life at every level, including mental, cultural, social

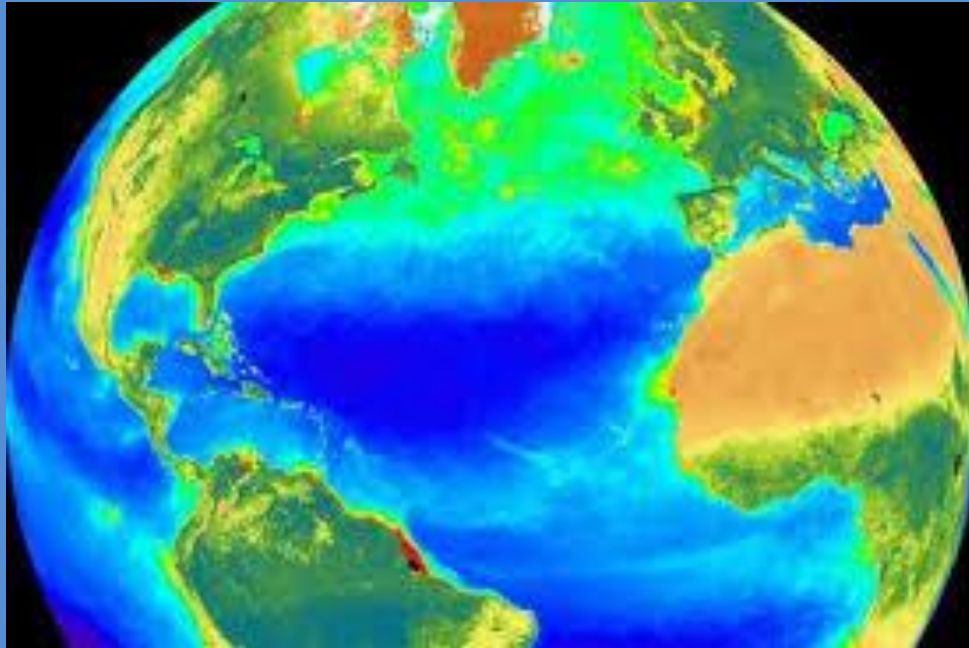


Everything that interacts with a living entity necessarily involves a homeostatic restatement activity

*Attitude to self-correct and regulate within consistent coherent limits of vital compatibility all their physico-chemical and morphological parameters, despite the unpredictable changes in the external context.*

# Homeostasis of the biosphere

The Earth's atmosphere is constrained by stabilizing, homeostatic forces, those same vital forces that formed it



Human beings and microbes have been living and interacting continuously for millions of years. Rarely, this interaction produces a new illness. Factors that disturb the homeostatic balance of the biosphere may favor this phenomenon



Conclusions:

# Health is a multidimensional process

**Systemic vision of life recognizes that in living systems living include individual organisms, parts of organisms, organism communities. Everyone shares a common set of common and common organization principles**

**We can distinguish three levels of interconnected health:  
Individual, social, ecological**

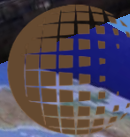
**All variables in a living system fluctuate continuously within tolerance limits: the more dynamic the state of the system is and the redundant, the greater its plasticity**

**For the system, it is essential to adapt to environmental change. Loss of complexity , biodiversity, flexibility, means loss of health**



# Planetary health

A new concept of health



The  
ROCKEFELLER  
FOUNDATION

THE LANCET



The Rockefeller Foundation–*Lancet* Commission on  
planetary health

Safeguarding human health in the Anthropocene epoch:  
report of The Rockefeller Foundation–*Lancet* Commission on  
planetary health

Aldo Di Benedetto

# Recent reflections



«This time is out of joint»  
This is the time of disjuncture, no longer know how to connect

«...My mission is to fix this disconnected world»

**W. Shakespeare**  
Amleto (Act 1, Scene 5)

# Synestanai

from the Greek – put together

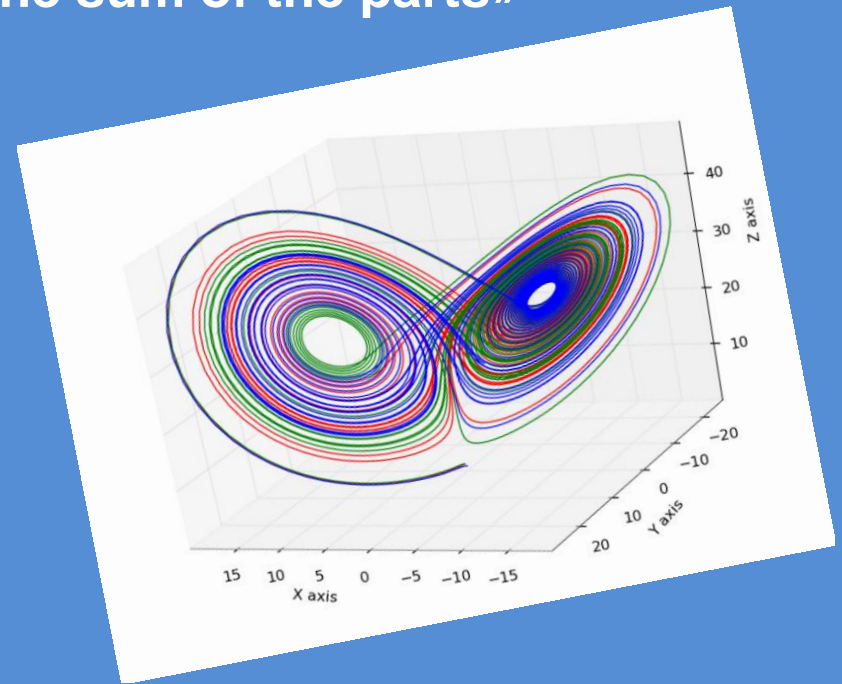
## The power of relationships

Considering the power of connections allows you to evaluate the multiple combinations of factors that, by affecting each other, give rise to and maintain the health system

***"Put together" both living organisms and social systems***

# More is different

«This is more than the sum of the parts»



That is the title of the article published in the journal Science by Philip Anderson, Nobel Prize for condensed matter physics, symbolizing the manifest of complexity.

(Science 1977)

# Final reflection

I think the integration of the disciplines is a step forward, but it is not enough, because in order to build a systemic vision, it is necessary to modify the basics of formation through a path based on the culture of complexity.

Thank you for your attention

