Health of human populations, domesticated animals and wildlife as a component of the Integrated Coastal Zone Management approach
INTRODUCTION

News and mass media
Brittany beaches hit by toxic algae
36 dead boars washed up on shores point to lethal hazard of poisonous gas and water pollution from algal slime

Gouessant estuary, Brittany, France, July 2011
One Health
One Medicine

A holistic integrated approach to human health
One Health
One Medicine

Schwabe C. (1964) Veterinary Medicine and Human Health. Williams and Wilkins, Baltimore

- Pivotal role of strengthened health systems to achieve the Millenium Development Goals (MDG)
- Health systems research to include broader societal dimensions
- One such extension includes a closer interaction between human and animal health
ICONZ – Integrated Control of Neglected Zoonoses

- Large collaborative project involving 22 research establishments both in Europe and Africa
- Funded by EU under FP7
- “Improve human health and animal production through scientific innovation and public engagement”

ICONZ africa.com/
The NZs or Neglected Zoonoses

Anthrax, rabies, brucellosis, bovine TB, zoonotic trypanosomiasis, echinococcosis, cysticercosis and leishmaniasis

- Major causes of ill health in the poorest communities in developing countries in Africa, Latin America and Asia
- Also affect livestock, causing lowered productivity or death
- Attack people’s health, but also their livelihoods
To improve and develop integrated control and prevention strategies promoting the concept of ‘one health’. This involves dealing with health problems in people, their livestock and other domestic and wild animals they depend on for their livelihoods through the development of integrated ‘intervention packages’.
Emerging Infectious Diseases (EID)

**Linkages Among Wildlife, Domestic Animals, and Humans?**

- Fundamental forces are driving new infection disease threats for livestock
- Avian influenza poses especially large potential risks
- Emerging diseases are causing significant economic disruptions

INTEGRATED COASTAL ZONE MANAGEMENT

The ecosystemic approach
The Sato-Umi concept
The Water Framework Directive (WFD) and the EU Marine Strategy Directive

Reference conditions / Quality assessment

- The WFD requires a water body to be compared against a reference condition and then its ecological status designated
  - if the water body does not meet good or high ecological status, i.e. it is in moderate, poor or bad ecological status
  - then remedial measures have to be taken (e.g. pollution has to be removed, restoration of habitats to be implemented...)

- Quality is assessed through the production of quantitative indices giving a grade (mark out of 5)
**Indices**

- Indices were developed from benthic work
  - are therefore often thought fit to purpose.
  - Based on the *successional model* proposed by Pearson and Rosenberg (1978)
  - Established for soft sediment benthos

- Most indices were developed in the framework of the WFD and were derived from work on the subtidal
  - Difficult to use in the intertidal and in transitional waters
  - Derived from work on organic pollution
  - No or little evident link with chemical and physical pollution
- The estuarine fauna and flora do not show recovery to maintain a full k-strategist complement.
- Large individuals (both fauna and flora) are not present.
- There is a naturally lower biomass/abundance ratio and higher abundance/species richness ratio, and
- The trophic system is dominated by organic/detritus-responsive invertebrates and nutrient reflecting algae.
THE SYNTHESIS

The « whole picture »

A tribute to Bengt Owe Janson
Climate change and alien species

- Breakdown in geographical barriers
  - Deliberate and inadvertent transport of species
  - Shifts in distribution area due to changes in climate
- Establishment of « emerging » biotopes
  - Unknown functional characteristics
  - Impossible to freeze or return backward

To consider changes in species' ranges
  - Need to better understand shifts in ecological niches
The ecosystemic approach

- The scientific debate to be promoted, reviving fostered awareness, based on a robust scientific approach (both theoretical and practical) of complex systems
  - quantitative and qualitative linkages to be demonstrated from a molecular to a population level.

- Systemic interactions to be placed in a context influenced by resources, governance, end-users and stakeholders
  - in a given social, economic and political setting
Crises are looming with regards to the use of natural resources (biological and mineral) and, in particular, water.
The need to consider human health

- The eco-systemic approach requires understanding of social, political, economic and
- Ecological structures and functions fundamental to health care provision for growing populations of humans and livestock and other domestic animals

Ecology stands out as a key component to understanding the instrumental factors to decision-making bottlenecks and to identify weaknesses in the socio-economic system
A human centered approach

- Prioritisation of human “well-being”
  - To focus on pressures and impacts inflicted to ecosystems
  - To attain suboptimal health of ‘natural systems’, including human and animal life

- Understanding of
  - social, political, economic and,
  - ecological structures and functions fundamental to health care provision for humans and livestock and animals

Ecology:
a key component to understanding instrumental factors to decision-making bottlenecks and to identify weaknesses in the socio-economic system
Conclusion

Challenges
Perspectives
A dynamic view of ecosystems

- Ecosystems are dynamic
- Quality to focus on ecosystems not species
- Need to consider species as adapting to new biophysical conditions
- Aim of European and national legislation to protect « habitats »
  - WFD
  - Are species based
  - Risk to consider ecosystems as "fossilised"

Need to consider humans and animals in the context of global change
Calvin Schwabe’s “one medicine”

as general medicine of humans, domestic and free-living animals in a socio-ecological context

(adapted from Schwabe, 1984)
One World-One Health-One Environment
ICZM / One Health / One Medicine

- diagnosis, monitoring, surveillance
- epidemiology
- control & prevention of zoonoses
- food safety
- biomedical research
- management of wildlife populations
- management of public health emergencies
One-Health Rationale

- Dual ‘burden’ of NZs and EIDs in health and economic terms in both animal and human populations
- Added value of
  - ‘Holistic’ health and intervention packages (consideration of ‘animal/human health’ in broad terms rather than single species and disease focus)
  - Targeting ‘communities’ inclusive of humans, their livestock and the wildlife disease reservoirs
  - Collaboration of human medics, vets, ecologists and economists to determine impact of disease on communities
- Intersectoral, integrated approach allows maximisation of benefit to cost ratio of intervention packages (i.e. cost-effectiveness)