Preliminary results of the IZS-Teramo project on the

“Development of risk indicators for disasters impact assessment on animal health and welfare”

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Istituto Zooprofilattico Sperimentale dell’Abruzzo e del Molise G. Caporale (IZSAM)
https://www.izs.it/IZS/Engine/RAServePG.php/P/250010010603/L/1

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Who we are and where we work

A Veterinary Public Health (VPH) Institution operating **as a technical and scientific arm of the State - Ministry of Health-MoH,** and the **Abruzzo and Molise Regions**

The Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise "Giuseppe Caporale" is a **public health institute** with administrative and managerial autonomy, **which operates as a technical and scientific arm of the state and the Abruzzo and Molise Regions**, performing analytical work for the public veterinary services and providing the technical and scientific collaboration necessary to enable them to carry out their functions in the field of **veterinary public health**.

The Institute offers high added-value services backed up by in-depth knowledge and innovation in the areas of animal health, veterinary public health and environmental protection, in the interests of safeguarding animal and human health.

The number of employees has grown from around 100 at the end of the 1980s to **today's total of about 500**. It was in 1990, 49 years after its foundation, that the Institute decided to make its mark in the international context. Over the course of the years, this has proved to be a successful move, so much so that the Institute has become a ceaseless exporter of know-how in the field of research, training, risk analysis, food safety and animal welfare, and in the organization, implementation and management of data banks for registering animals.

News

OUR RESEARCH

ARTIFICIAL INTELLIGENCE: A NOVEL APPROACH IN BATTLING FOODBORNE INFECTIOUS DISEASES

LISTERIA MONOCYTOGENES AND THE ROLE OF PROTEOMICS: DELVING DEEP INTO A FOODBORNE PATHOGEN

A RARE OUTBREAK CAUSED BY AN EMERGING PATHOGEN: INTERDISCIPLINARY COLLABORATION IS CRUCIAL

Archive

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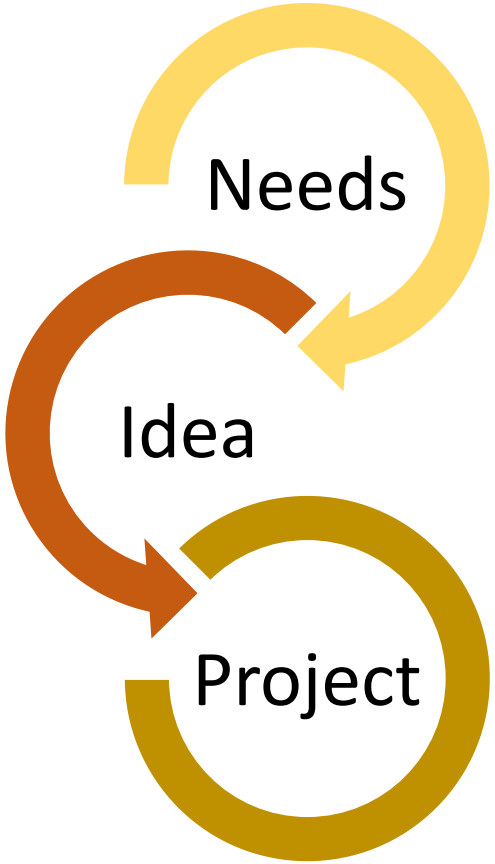
Among others Centres :

- **IUVENE:** National Reference for Veterinary Urban hygiene and **Non-Epidemic veterinary emergencies (NEVE).**
- **EmVetNet Member**. A WOAH CC's network with IIAD-Texas and CENSA-Cuba.

https://www.woah.org/en/what-we-offer/emergency-preparedness/collaborating-centre-network-for-veterinary-emergencies/

The key points that led to the development of the project's idea



- Non-epidemic veterinary emergencies (NEVE) caused by major adverse events, like earthquakes, can have immediate and long-term impacts on animal health and welfare as well as on humans representing a VPH issue.
- Before any catastrophic event, Veterinary Services are called upon to play an active role in **prevention and mitigation** activities which, together with **preparedness**, constitute essential phases of the Disaster Management Cycle (OIE, 2016).
- In order to intervene and undertake effective and efficient actions, it is necessary to know exactly what are the "hazards" related to health, animal welfare and VPH, where the main elements subject to seismic risk exist in a given geographical area and **which/how** many resources are needed to allocate. To be prepared…

The key points that led to the development of the project's idea

- In an improved disaster risk management system, **INDICATORS** should be used to collect and gather information on each phase of the disaster management cycle (pre-disaster, response and recovery, post-disaster) for building less vulnerable and more resilient communities. From an operational perspective, they represent the most important priority setting tools for decision making about resources allocation, and for engaging different stakeholders in implementing coordinated interventions.

To date, there have been almost no studies for the definition of useful indicators for the above mentioned purposes and literature is still very scarce. Therefore, the aims of this pilot project were:

a) to estimate **the impact of an earthquake on animal health and welfare** through the identification **of all related hazards** as prerequisite for targeting interventions and quantifying human, instrumental and financial resources;
b) to **define relevant indicators** for risk mitigation as relevant tools for national and local Veterinary Public Health Authorities involved in the management of NEVE, with a focus of seismic events.

Additional considerations

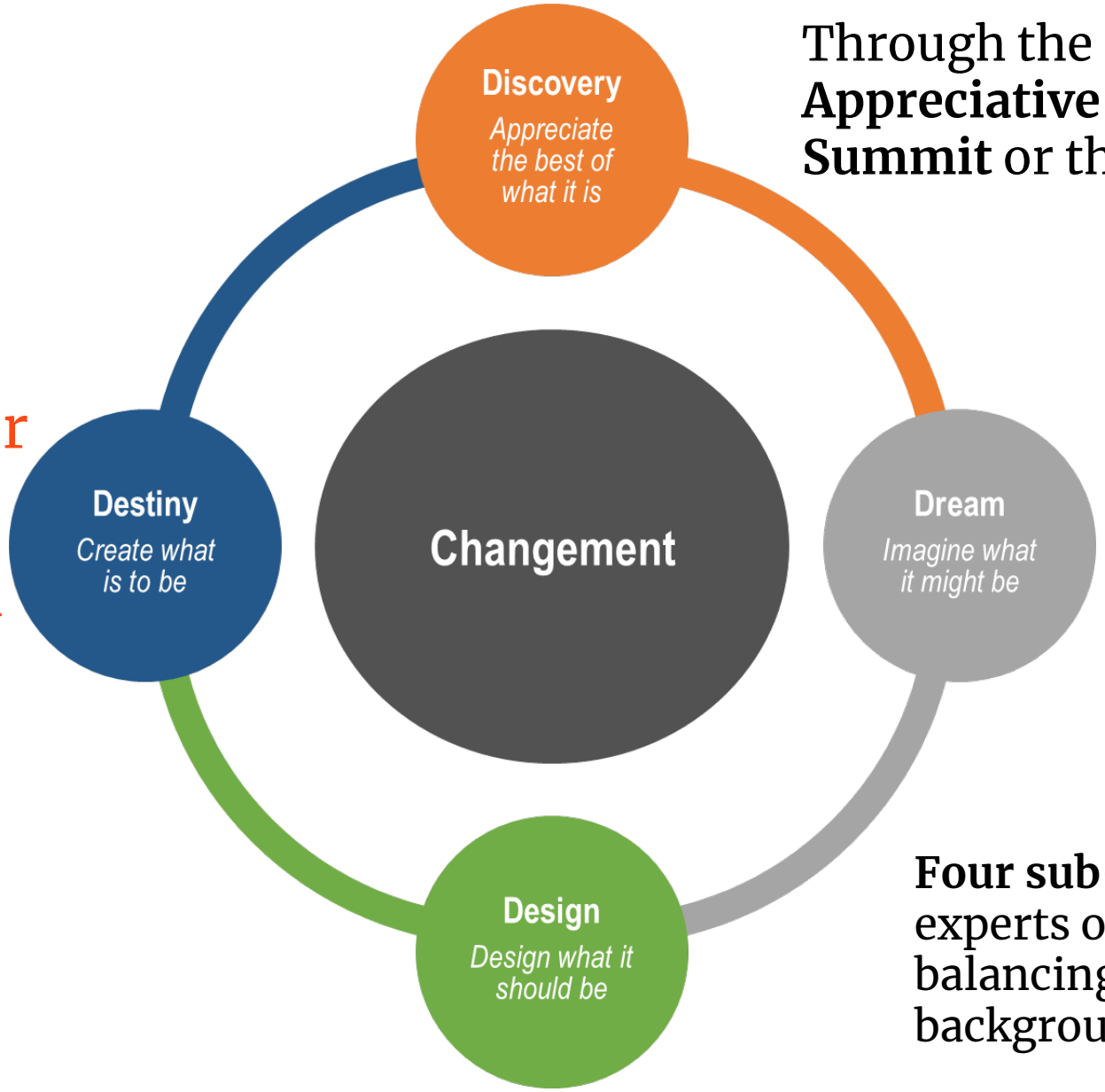
- The new Civil Protection (CP) Code (Legislative Decree n.1, January 2th 2018) predicts that rescue activities and assistance of animals affected by natural disasters are in the tasks of the Italian Civil Protection, just as it is for human populations.
- CP and IZSAM already made an agreement for the interoperability of their respective information systems:

SIGE (CP)  **SIVENE** (National information system for the management of NEVE developed by IZSAM under the mandate of the MoH)

Need for Indicators for risk maps development and management of post earthquake phases.

The **Method** for indicators' **definition**:

1 EKE SESSION



Through the **Appreciative Inquiry Summit** or the **4D model**

Ad hoc enrolment of **31** experts from the:

- ❑ **Italian Veterinary Public Health system** (including the National Reference Centre for Non – Epidemic Veterinary Emergencies and Urban Hygiene-Italy, IZSAM)
- ❑ **Academia**
- ❑ **Civil Protection**

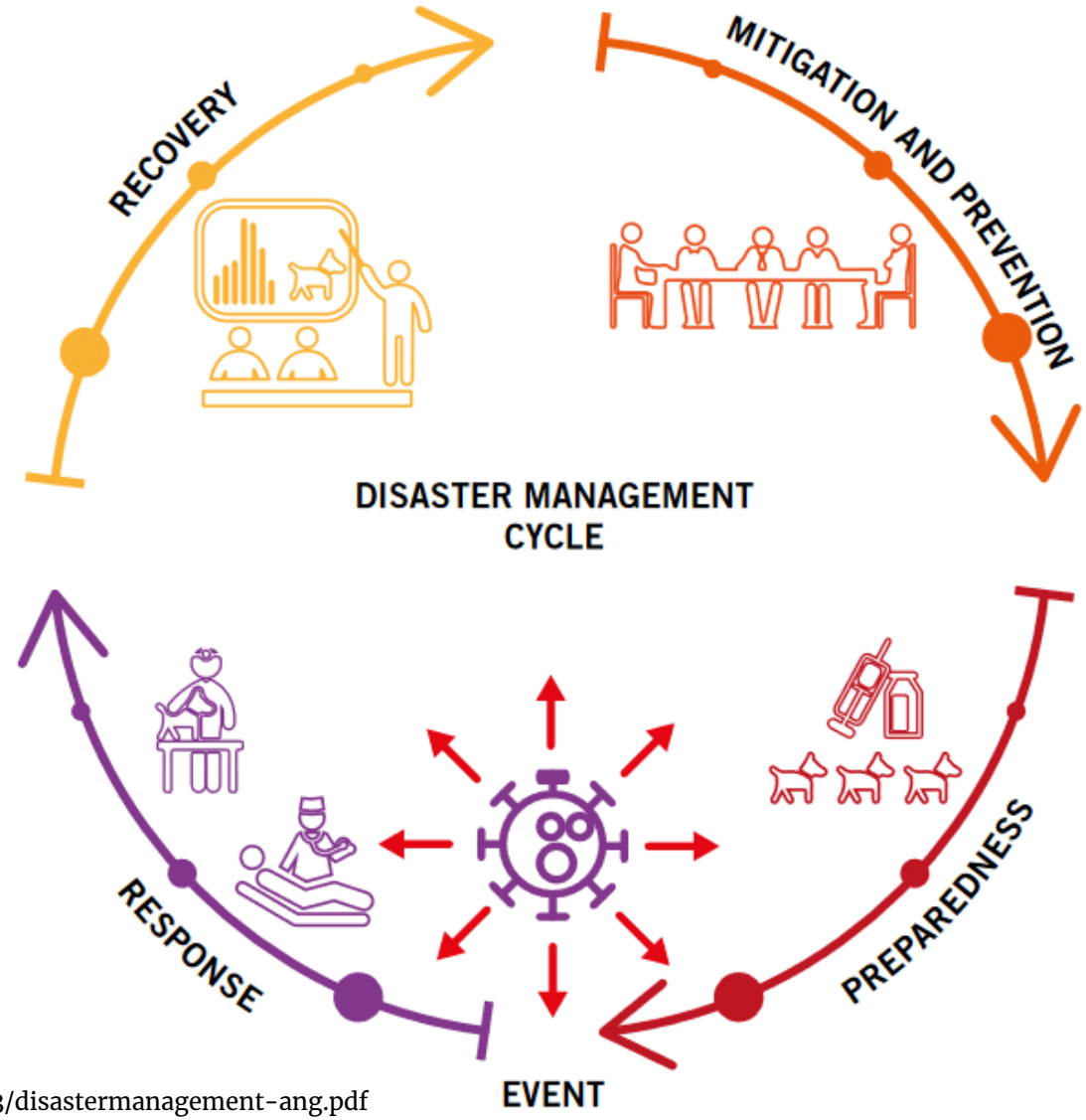
Four sub-groups made of eight experts on average, suitably balancing their professional background and affiliation.

The Working Group of Experts

From the 1 session results to the final output.

- Categorization of indicators through the WOAH "*Guidelines on disaster management and risk reduction in relation to animal health and welfare and veterinary public health*"

and their **description**



Group1: Useful indicators in "peace time" or during the phases of **mitigation, prevention** and **preparedness**:

PRE-EARTHQUAKE INDICATORS

Group2: Useful indicators in **response** and **recovery** phases:

POST-EARTHQUAKE INDICATORS

https://www.woah.org/app/uploads/2021/03/disastermanagement-ang.pdf

Group1:

Pre-earthquake indicators (P)

ID	Indicator	Description
P.1	% farms within the seismic risk zones per farmed species and farming practised (milk/meat/ mixed/wool/eggs/backyard)	N. farms within the seismic risk zones per farmed species and farming practised/N. of farms in the municipality
P.2	% farms with animals raised outdoors/extensively, transhumant, stabled in areas of different seismic risk	N. farms by type of farming that fall in each seismic risk zone/Tot. N. of farms in the municipality
P.3	% animals raised in areas with different seismic risk zones per farmed species and farming practised (milk/meat/mixed/wool/eggs/backyard)	N. animals within the seismic risk zones per farmed species and farming practised/N. of animals in the municipality
P.4	% animals raised outdoors/extensively, transhumant, stabled in areas with different seismic risk	N. animals raised outdoors/extensively, transhumant, stabled in areas of different seismic risk/Tot. N. of animals raised in the municipality
P.5	% vulnerable farms in different seismic risk areas	N. vulnerable censused farms that fall in each seismic risk zone/Tot. N. of farms in the municipality
P.6	% farms with autonomies in different seismic risk zones	N. of farms with autonomies that fall in the seismic risk zones /Tot. N. of farms in the municipality
P.7	% of geo-referenced farms (and correctly geo-referenced)	N. of geo-referenced farms that fall in the seismic risk zones/Tot. N. of farms in the municipality
P.8	% post-primary processing activities attached to the farm	N. of farms with post-primary processing activities attached to the farm/Tot. N. of farms in the municipality
P.9	N. of post-primary processing activities not attached to the farm	N. of post-primary processing activities not attached to the farm in the municipality
P.10	N. other facilities (sanitary kennel, long-term shelter, gattile cattery, keeping exotic species, recovery center, zoo)	N. of other facilities by scope (sanitary kennel, long-term shelter, gattile cattery, keeping exotic species, recovery center, zoo) in the municipality
P.11	% municipalities with a contingency plan including the veterinary component in a specific chapter	N. of municipalities with a contingency plan including the veterinary component (and their periodic updating)/Tot. N. of municipalities
P.12	% farms with a specific earthquake contingency plan	N. of farms with earthquake-specific contingency plan (and their periodic updating)/Tot. N. of farms in the municipality
P.13	Resourced-based Indicators	- % official veterinarians trained in earthquake emergency management: N. official veterinarians trained in earthquake emergency management/Tot. N. of official veterinarians of the municipality
		- Availability and location of empty spaces (of the farms and not) to be occupied with temporary modules to be used for the shelter and care of animals as well as for the storage of hay and feed; presence of spaces already occupied
		- Vehicles (normal and 4x4), containment catch equipment, shelters (fixed and mobile), consumables (drugs, medical devices, euthanasia equipment)
P.14	Communication routes between farms and the road network	Average distance from the main roads (state, regional, provincial, municipal, local)

Group2:

Post-earthquake indicators (R)

ID	Indicator	Description
R.1	% farms that require intervention	N. of farms that require veterinary intervention (by type of assistance indicated in the SIVENE's check-list) /N. of farms in the municipality
R.2	% processing activities linked to companies that need intervention	No. of farms having a processing activity attached/N. of farms in the municipality
R.3	N. post-primary processing activities not attached to the farms in the municipality that need intervention	N. of post-primary processing activities not attached to the farms in the municipality that require intervention
R.4	N. other facilities (sanitary kennel, long-term shelter, gattile cattery, keeping exotic species, recovery center, zoo) that require intervention	N. of other facilities sanitary kennel, long-term shelter, gattile cattery, keeping exotic species, recovery center, zoo) that require intervention
R.5	% dead animals	N. of dead animals (by species)/N. of animals of the same species in the municipality
R.6	% injured animals (by species) (Animal-based indicator)	-N. of injured animals (different severity according to triage codes) to be recovered/Tot. N. of injured animals
		-N. of injured animals to be sent for emergency slaughter/Tot. N. of injured animals
		-N. of injured animals to be killed and disposed of/Tot. N. of injured animals
R.7	% animals not injured but requiring assistance for production continuity (Animal-based indicator)	N. of animals to look after (by species and farming practised)/ No. of uninjured animals in the municipality
R.8	Indirect and direct damage (structures and production)	Production downtime after the earthquake event. Comparison of previous years data on: incoming and outgoing movements, milk/meat/egg production, repopulation
		% of farms having suffered direct structural damage to buildings and equipments: N. of farms that have suffered structural damage by extent of damage (complete, partial failure)/Tot. N. of farms in the municipality
R.9	Effectiveness and efficiency of the response	% interventions provided by species: - N. of interventions provided according to different triage codes/Tot N. of interventions requested per triage code
		- Average distance from the main roads (state, regional, provincial, municipal, local)
		% replacement facilities installed for animals' temporary housing: - N. of replacement facilities installed for temporary housing of animals/N. of modules required by species

The **Method** for indicators' **assessment** :

2 EKE SESSION

- Questionnaire sent to experts to:

➢ Estimate the **RELEVANCE** of each indicator in order to evaluate the impact of an earthquake on animal health and welfare in farms and facilities in a given area. Scale from 0 to 5.

0=null response; 1=very irrelevant, 2=irrelevant, 3=neither irrelevant nor relevant; 4=relevant, 5=very relevant

➢ Estimate the **CLARITY** and **COMPLETENESS** of each indicator in a qualitative scale:

low, medium, high

➢ Collect expert's suggestions for any amendments to indicators considered not sufficiently clear or complete.

P indicators

List in ascending order within the group of «very relevant»

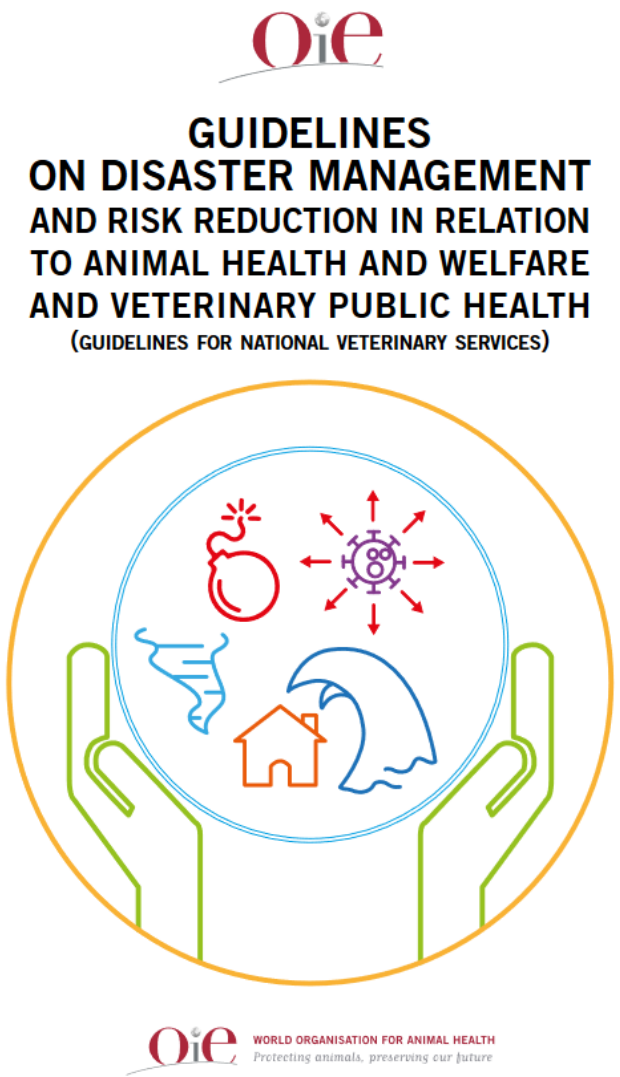
Relevance degree	Indicator	Score=5
1	P.7 : % of geo-referenced farms (and correctly geo-referenced)	77,78%
2	P.1 : % farms per farmed species and farming practised (milk/meat/ mixed/wool/eggs/backyard)	73,68%
3	P.5 : % vulnerable farms	68,42%
4	P.6 : % farms with autonomies	63,16%
5	P.3 : % animals raised in areas per farmed species and farming practised (milk/meat/mixed/wool/eggs/backyard)	57,89%
6	P.10 : Number of other facilities (shelter and health shelters, shelters, exotic animals, recovery centers, zoo)	57,89%
7	P.11 : % municipalities with an emergency plan including the veterinary component in a specific chapter	52,63%
8	P.12 :% farms with a specific earthquake contingency plan	42,11%
9	P.14 : Communication routes between farms and the road network	42,11%
10	P.2 : % farms with animals raised outdoors/extensively, transhumant, stabled in areas of different seismic risk	36,84%
11	P.4 : % animals raised outdoors/extensively, transhumant, stabled in areas with different seismic risk	33,33%
12	P.8 : % post-primary processing activities attached to the farm	33,33%
13	P.9 : N. of post-primary processing activities not attached to the farm	31,58%
14	P.13 : Resourced-based indicators	26,32%

R indicators

List in ascending order within the group of «very relevant»

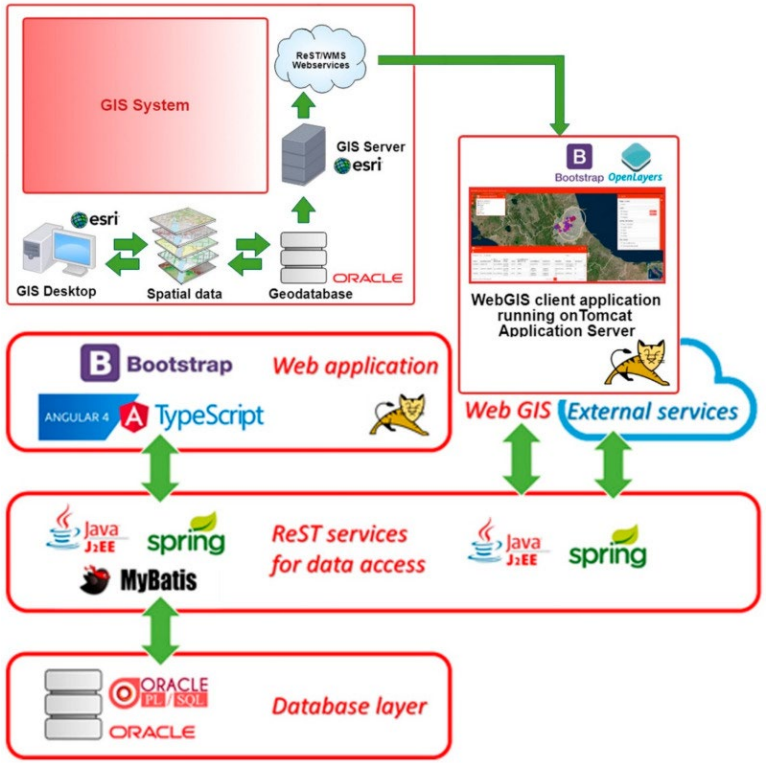
Relevance degree	Indicator	Score=5
1	R.1 : % farms that require intervention	88,89%
2	R.4 : N. other facilities (sanitary kennel, long-term shelter, gattile cattery, keeping exotic species, recovery center, zoo) that require intervention	77,78%
3	R.6 : % injured animals (by species) (Animal-based indicator)	77,78%
4	R.7 : % animals not injured but requiring assistance for production continuity (Animal-based indicator)	66,67%
5	R.9 : Effectiveness and efficiency of the response	66,67%
6	R.8 : Indirect and direct damage (structures and production)	61,11%
7	R.2 : % processing activities linked to companies that need intervention	58,82%
8	R.5 : % dead animals	55,56%
9	R.3 : N. post-primary processing activities not attached to the farms in the municipality that need intervention	38,89%

Conclusions



- This is **the first study** aiming at identifying and describing relevant **indicators according to** the disaster management cycle of the WOAH "Guidelines on *disaster management and risk reduction in relation to animal health and welfare and veterinary public health*",
- They reflect **the view of a representative selected group** of **national experts** and represent a **valuable tool for National, Local Veterinary Public Health Authorities** for **contingency plans**' and **technical operating procedures** to be adapted to local systems for the allocation of proper instrumental, human and financial resources,
- They are essential to map local and national management strengths and weakness and to outline strategies and decisions to achieve greater resilience,

Conclusions



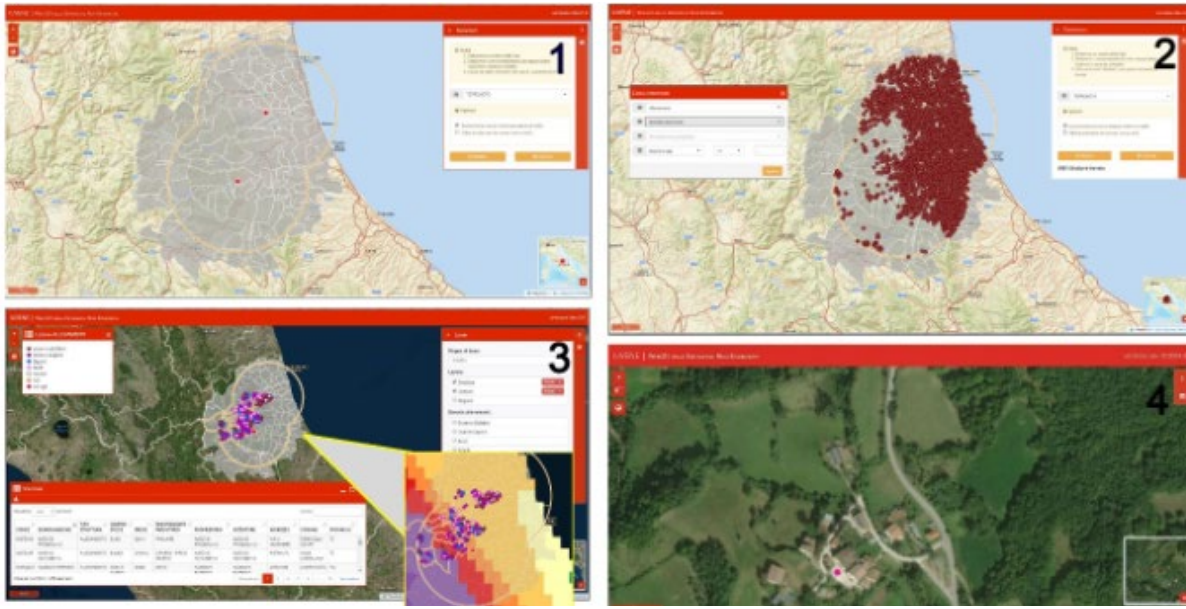
- SIVENE is able to provide users with different administrative and operational emergency management levels by providing a spatial and decisional tool to be used in the aftermath of catastrophic events.
- The indicators are useful also for feeding SIVENE in "peacetime". In fact, they will be used to process risk maps (statistical model was designed and run to release a preliminary **risk map**). Also for the "response and recovery" management phases in the aftermath of an earthquake, through the detection and visualisation of the geographical extent of the damage and the type of requests for assistance.
- The pilot project was focused on seismic risk. However, most of experts agreed that the indicators are suitable also for other types of disasters. Suitable for multi-risk scenarios.

SIVENE architecture from: Possenti L. *et* al., 2020.
A New Information System for the Management of Non-Epidemic Veterinary Emergencies
Animals 2020 Jun; 10(6): 983. doi: 10.3390/ani10060983

Conclusions

- Weakness to think and design a more comprehensive “better” system:
  - ➢ some of these indicators are built with data that are either still not available in veterinary information systems or even not recorded at all. If one side this determine a limit in their application, on the other hand it may inspire stakeholders to start gathering and making available the missing figures.

➢the concept of **SESMIC RISK** is a known concept, studied and deepened in the field of CP, in the context of the protection of human lives. The seismic risk measures the expected damage of an earthquake, in probabilistic terms, in a certain time interval given by the combination of seismic hazard (P), vulnerability (V) and exposure (E)=> **R= PxVxE.**



➢in the veterinary field “V” and “E” have never been defined as well as coefficient to be attributed to the types of vulnerable and exposed elements. Efforts have been done during this project. Another EKE? Need of in-depth studies.

Dissemination

GEOVET 2023
September 19th - 21st 2023
Silvi Marina, Teramo, Italy

First preliminary attempt for the development of risk indicators for earthquake impact assessment on animal health and welfare: operational tools for the preparation of contingency plans and the implementation of SIVENE, the Information System for the Management of Non-Epidemic Veterinary Emergencies

IZS TERAMO / ISTITUTO ZOOPROFILATTICO SPERIMENTALE DELL'ABRUZZO E DEL MOLISE "G. CAPORALE"

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Introduction

Non-epidemic veterinary emergencies (NEVE) caused by major adverse events, like earthquakes, can have immediate and long-term impacts on animal health and welfare as well as on humans. In an improved disaster risk management system, indicators should be used to collect and gather information on every phase of the disaster management cycle (pre-disaster, response and recovery, post-disaster), building less vulnerable and more resilient communities. From an operational perspective, they represent the most important priority setting tools for decision making about resources allocation, and for engaging different stakeholders in implementing coordinated interventions.

In this vein, mention should be made to the new Civil Protection Code which provides that rescue activities and

Materials and methods

A first Expert Knowledge Elicitation (EKE) session was carried out thanks to the *ad hoc* enrolment of 31 experts from the Italian Veterinary Public Health system, the Academia, and the Civil Protection. The EKE was conducted according to the rules of the ***Appreciative Inquiry Summit (AIS),*** a widely recognised methodology commonly used to promote organizational development and change management. The AIS peculiarity is to stimulate the **positive thinking** instead of the problem solving. It is based on a structured and guided approach that sets the scenario to explore and beats the rhythm for achieving consensus-based outcomes within groups of people who pursue the same objectives. The AIS model flows through the so-called **4D process**, characterised by four distinct and consequential phases: **D**iscovery, **D**ream, **D**esign and **D**estiny (Figure 1) that progressively follow one after the other. With the adoption of

GEOVET2023: International Conference of Spatial Epidemiology, Geostatistics and GIS applied to animal health, public health and food safety

Thank you

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