ACCELERATING THE UPTAKE OF NON-ANIMAL METHODS (NAMs) USING SYSTEMS THINKING:
Outline of a work in progress

Celean Camp | FRAME | celean@frame.org.uk

Fund for the Replacement of Animals in Medical Experiments

FRAME
WWW.FRAME.ORG.UK

What is systems thinking?

- A *system* is a set of interconnected components, making up a whole mechanism or network, designed for a particular purpose.
- Systems thinking is a means of understanding the behaviour of a system by examining the *relationships* between its component units (*elements*).
- It is sometimes described as the opposite of *reductionism*, which seeks understanding by breaking an entity down to its simplest components and understanding these in isolation.

How does systems thinking apply to replacing animal research?

- Funded research is a system with multiple component elements. The system is designed to output new academic knowledge.
- Inputs include funds and dissemination mechanisms (journals); outputs include new knowledge and publications. Other elements include, available methods, institutions, regulation and others.
- By understanding how these relate to one another, we can see where there is the potential to intervene for change.
- We can also understand some of the underlying *mental models* that influence the behaviour of elements in relation to one another.
- It is clear that decisions over what to study, and what method to use are not only driven by the highest quality science. They are influenced by multiple interrelated factors.

How have we developed the system map of animal research so far?

1) Review of the literature
2) Checking and iteration
3) Conversations with stakeholders
4) Identification of elements and relationships

We used kumu.io which is a free systems mapping tool to create an initial map. We then threw that out and created another. And another.

Below is the simplest iteration. It is neither finished nor correct. Yet.

"How do we increase uptake of NAMs?"

"We need more of them, more methods that we can use that are as good or better. The change will follow the science."

"Right, but we know that in some cases NAMs exist but aren't being used because of regulatory requirements, or people don't know about them or how to use them. So the science can't be all there is to it."

"Yeah, true…"

THE MAP (so far)

The diagram uses causal loop mapping conventions whereby plus sign (+) on a connection indicates a positive correlation (*not in a quantitative statistical sense) ie that as one element increases, so does the other, and conversely as one decreases so does the other. A minus sign (-) indicates an inverse correlation, ie that as one factor increases, the other decreases, and vice-versa.

For example, increased **Funding for NAMs**, increases the number of **Researchers using NAMs**, which in turn increases the demand and provision of **Training on how to use NAMs**. The provision of additional **Training in how to use NAMs** itself also increases the number of **Researchers using NAMs**.
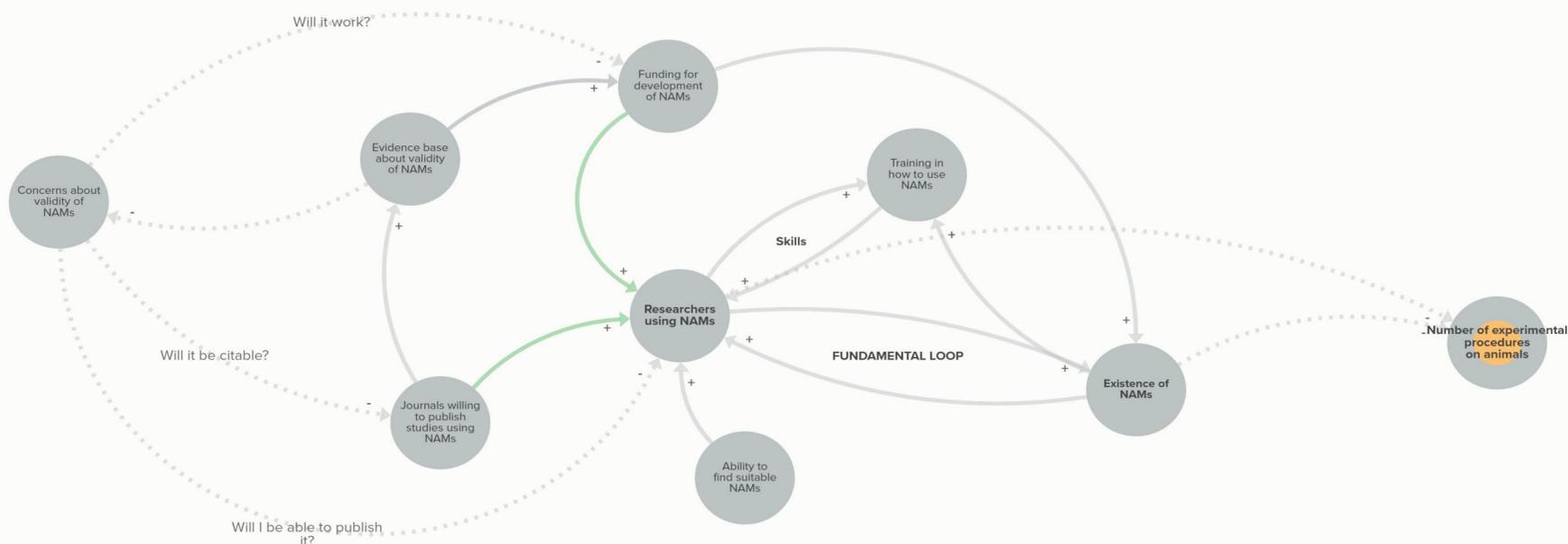
What next for the project?

The map has already evolved from this point following further stakeholder discussions. Next steps will include:
1) Addition of detailed loops around publishing, funding, institutions, regulation, and public attitudes. For example, increases in Researchers using NAMs, causes increased Submissions, which can cause increases in animal procedures as a result of reviewers requesting additional validation (part of the Publishing subsystem).
2) Sharing and discussion with stakeholders and partners.
3) Identification of levers for change and intervention.

Acknowledgements and references

Meadows, D.H., (2008), *Thinking in Systems: A Primer*, Earthscan, https://wtf.tw/ref/meadows.pdf
Stroh, D., (2015), *Systems Thinking for Social Change*, Chelsea Green USA