The role of learning in the implementation of a sustainable animal-health system: a socio-technical analysis of a long-term research partnership in Morocco

Rôle des apprentissages dans la durabilité d’un système de santé animale. Analyse socio-technique d’une recherche en partenariat de longue durée au Maroc

Case study : « Peste des Petits Ruminants » (PPR) control in Morocco

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Summer School 2013, 28th-31st August 2013, Belfort
INNOVATION AND RESEARCH POLICIES FOR A SUSTAINABLE TRANSITION
Outline

1. Rationale

2. Case Study: an ongoing long-term process of thirty years of research in partnership between CIRAD and actors of public research and development in Morocco on animal health (small ruminants)

3. Method and concepts used

4. Hypotheses

5. Socio technical analysis results: outcomes and limitations

"Peste des petits ruminants" (PPR) is a highly infectious viral disease of small wild and domestic ruminants. In rearing zones affected by endemic PPR, the disease inflicts high economic losses due to the high morbidity and mortality rates. **PPR affects nearly one billion small ruminants around the world.**

Apart from the possible consequences in terms of **public health** i.e. human transmission of pathogens from animal origin, the preservation of animal health doubles as a **social and cultural dimension** especially in Muslim countries such as Morocco.

**High vulnerability** of animal health systems characterized by uncertainties / risks, and difficulties in controlling epizooties

- **Concept of sustainability**: adaptation ability
- **Concept of résilience**: ability to build and increase learning capacity and adaptation (Folke, 2006)
- **The rôle of research for development in partenrship**
A living case study

Acute crisis in 2008 ... a success story

- July 2008: PPR emerged in Morocco in the midst of preparation for Eid al Adha (Aïd el kékibir), Major Feast for Muslims worldwide

- Morocco political system is centralized and hierarchical: demonstrated its reactivity in detecting foci in a few weeks and producing vaccine by Biopharma Laboratory with a strain provided by CIRAD: veterinary services vaccinated 23 million sheep and goats before the feast, between 2008 and 2011 > 60 millions of vaccine doses were administered.

- But questions remained asked:
  How to manage the wide diversity of production systems?
  What about neighboring countries?
  Stop PPR vaccination in 2012... and after?
Distribution of PPR foci during the crisis of 2008 (Ettair, 2012)
What this long-term partnership built before July 2008?

More than thirty years of Research in Partnership between CIRAD and actors of public research and development in Morocco helped to gradually build a network of animal health stakeholders including: research, industry, government departments, associations of producers.

This organization in interconnected networks has generated training and learning of all kinds.
Recherche partenariale en santé animale au Maroc depuis 30 ans

Formation par la recherche : accueil et co-encadrement d’étudiants marocains en master et thèse

Formation continue en contrôle qualité, diagnostic et épidémiologie, en collaboration avec l’IAV au niveau national, et la FAO / OIE / AIEA au niveau régional : principales maladies infectieuses des animaux de rente, dont la PPR

Appui à Biopharma pour la production du vaccin et la mise en place de procédures de contrôle de la qualité

Appui à la mise en place du réseau national de surveillance

Aide au contrôle de la peste équine

1980
Peste équine : 1988

Cours Epivar (Cirad et IAV)

1989
Mise au point du vaccin contre la PPR

Bluetongue : 2004

PPR (2008)

TCP sur la surveillance de la rage, la fièvre West Nile et la bluetongue au Maghreb

Confirmation du diagnostic et isolement de la souche du virus PPR marocain

Cession de licence d’exploitation du vaccin contre la PPR à Biopharma

Jumelage OIE entre Cirad et Biopharma

Participation à un TCP régional PPR

2013

Échelle temporelle

Actions non spécifiques au Maroc

Laboratoire mondial de l’OIE référence pour la PPR (1989)


Bluetongue : 2004

PPR (2008)

Jumelage OIE entre Cirad et Biopharma

Confirmation du diagnostic et isolement de la souche du virus PPR marocain

Cession de licence d’exploitation du vaccin contre la PPR à Biopharma

Participation à un TCP régional PPR
Methods and concepts

Method
• Working Group Cirad /Impact : case studies selection
• Bibliography
• Postgraduate student (Master of research )
• Interview of Research and Professional in the Field

Socio-technical analysis of an ongoing research and innovation process on PPR in Morocco based on :
• Pragmatic sociology on innovation applied to case studies : Profit-sharing Model ("Modèle de l’intéressement", Akrich et al, 1988 ; Akrich, 1991) where aggregation of actors is based on their social common interest
• Organizational learning theory (Argyris et Schön, 1996/2002)
Models used (2): Organizational learning

Single-Loop Learning
- involves detecting and correcting error, focuses principally on accomplishing existing goals, and solving familiar problems; defensive strategy against epizooty

Double-Loop Learning
- involves error correction where things are not so predictable, mobilize inventivity, namely ‘the modification of an organization’s underlying norms, policies and objectives’ governance

Learning about learning: triple-Loop Learning
- capacity for an organization to weight a paradigm shift, involves actor capacity to envisage new alternatives to solve a problematic situation - Flood et Romm (1996)
Hypotheses

- The general assumption is that the nature and organization of the learning process involved in these networks is crucial in terms of **adaptability of the system of actors involved**.

- Specifically, behind the success in the 2008 crisis management, the long term partnership research has enabled to build institutional and technical arrangements **that began a force of reactivity of the ‘system’**.

- In our case, the stages of **double-loop learning** (that promote adaptability of actors) and **triple-loop /learning about learning** (which conduct reflexivity and the development of research paradigms) will be interviewed.
Learning related to animal health system PPR and its implementation into action according to the organizational learning loops model by Argyris and Schöen (1996/2002)

- **Learning in relation with:** vaccine using, monitoring, training about standards
- **Learning in relation with:** regional and international networking (REMESA, OIE)
- **Learning relation with new paradigms:** animal and human health coupling etc

- **event monitoring**
- **Mass vaccination campaign: top / down**
- **Innovation Dynamic**
  - participatory epidemiology
  - Sociology of vaccination (delivery issues)
- **PPR control: a global public good or private?**
- **Animal health and production systems development**
Outcomes

- Better understanding on how the various forms of knowledge sharing and learning generated and their organization
- The role of research is *instrumental* in the inclusion of knowledge at different scales and their organization in a learning system + *organizational experience*
- System built has limitations in terms of *sustainability*
Limitations in terms of sustainability

- Moroccan model of PPR monitoring & control is very centralized and hierarchical (top-down): effective for ‘error correction’
  but simple loop learning: veterinarians and producers as simple executors

- Epidemiology need to integrate evolution scenario. Eradication has economic, social, and environmental impacts
  if the PPR related constraint is lifted, this liberates many evolution scenario for the farming systems: increased herd size, passage from sheep to cattle etc. that have in turn novel incidences ...

- Regional approach is not considered
  Sustained effort over three years after the 2008 crisis but stop facing new diseases ==> risk of recurrence from neighboring countries.
  Sustainability ==> consider local, regional and international dimensions
  ==> need to include local and national decisions in a regional approach
Limites en termes de durabilité

Modèle Marocain ?
Surveillance & contrôle PPR : Modèle très hiérarchique ➔ apprentissages associés de type simple boucle, vétérinaires et éleveurs simples exécutants ; processus efficace d’« error correction » correspondant à la simple boucle mais … Limites :
1) Epidémiologie ➔ nécessité d’intégrer différents scénarios d’évolution

ex : éradication d’une maladie ➔ impacts économiques, sociaux et environnementaux. liés aux épidémies et à leur contrôle ex : évolution des systèmes d’élevage : accroissement taille des troupeaux, passage de la race ovine à la race bovine…)

2) Approche régionale non considérée
Effort soutenu après la crise de 2008 pendant 3 ans puis stop face à nouvelles maladies. Risques de résurgence à partir des pays voisins. Durabilité ➔ considérer les dimensions locales, régionales et internationales. ➔ nécessité d’insérer les décisions locale et nationale dans une logique régionale
Prospects: link learning system & resilience construction

Resilience construction according to Peterson (2003; 2007) is a capacity to manage unexpected situations or crisis corresponding to situation of low controllability and high uncertainty: largely unexplored frontier research.
Approaches in sustainability science

- Adaptive management
- New Models & Understanding
- Developing
- Resilience Building

Uncertainty

Controllability

Controllable
Uncontrollable

Established
Optimization
Frontier

Prospects: link learning system & resilience construction

- New models of understanding needed for these situations, may be generated from triple-Loop learning

- We can consider that the participation of Morocco in regional and international networks opens the Moroccan health system towards dynamic of innovation which falls within the adaptive management

- Role of Cirad / REMESA (mediterranean network) + reference lab of OIE,
  - Convince the states /control measures against PPR: harmonization at the sub-régional level.
  - At the short term: a twinning procedure between Cirad and Biopharma by OIE
  - Maroc contributes to the creation of a regional DB /animals move ==> monitoring and control

- Progressive opening of the Moroccan Heath network towards regional and international dynamics et internationales ➔ the beginning of double loop learning as described by Argyris et Schön
Prospects: link learning system & resilience construction

Toward a new model of collective intelligence?
Hybridation of knowledge (research & the stakeholders),
A system able to question Research

More creativity, Flexibility, Capacity of anticipation

New paradigms

To face a changing environment at the demographic, economic, biologic and social levels