

USING QUALITATIVE APPROACHES TO EXPLORE THE CHALLENGES OF INTEGRATED PROGRAMMES FOR ZONOSIS CONTROL IN DEVELOPING COUNTRIES: EXAMPLE OF HYDATIDOSIS CONTROL IN MOROCCO

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ABSTRACT

Cystic echinococcosis, rabies and bovine tuberculosis are major neglected zoonoses in many developing countries, including Morocco. A common step in their control strategies is the management of slaughterhouses and/or the control of dog populations. This study used a qualitative approach to identify the barriers to the implementation of the cystic echinococcosis control programme in Morocco that focused on slaughterhouses and dog control. This approach could be used to understand the causes leading to the defective management of other zoonoses, and to go beyond the often-invoked 'lack of means' reason to explain failure in disease control in the Global South. Specifically, slaughterhouse observation and in-depth individual interviews with stakeholders involved in the cystic echinococcosis control programme were carried out in five Moroccan regions (Rabat-Sale-Kenitra, Mellal-Khenifra, Sous-Masaa, Laayoune-Sakia El Hamra and Guelmim-Oued Noun) for 3 years (from 2014 to 2016). Interviews ($n = 81$) were with agents responsible of the services managing slaughterhouses and dog population control, and also with slaughterers. Recordings were fully transcribed and narratives were analysed with the RQDA package and the R software. Triangulations and the criteria proposed by Guba and Lincoln were used to assess the approach validity. This analysis revealed that in addition to 'lack of means', zoonosis control programmes can be hindered by overlapping authority/functions among the involved authorities, conflicts of interest, lack of proper training and professional practices. Zoonosis control requires the commitment of all structures, the establishment of a national and inter-regional strategy, and the updating of the legislative arsenal.

1. Introduction

Cystic echinococcosis (CE), rabies and bovine tuberculosis are major neglected zoonoses, especially in rural and poor areas of developing countries. CE affects over a million individuals, and it is responsible for losses higher than US \$ 3 billion per year (Brunetti & McCloskey, 2016). Canids (especially dogs) are the definitive hosts of its causative parasitic agent and are contaminated by ingestion of contaminated viscera from intermediate hosts (ruminants) (Thompson & McManus, 2002). As humans are infected by ingesting contaminated food or water, this parasite is a public health problem (Toma et al., 1991). Rabies is a fatal viral disease, and domestic dogs are the main responsible species for rabies virus transmission to humans (WHO, 2020a). Around 60,000 people die from rabies each year (one person every nine minutes) (WHO-FAO-OIE, 2018). The average cost of post-exposure rabies prophylaxis has been estimated at US \$ 108 (WHO-FAO-OIE, 2018). Tuberculosis is the world leading infectious disease (WHO, 2020b). Every year, it affects 10 million individuals and kills 1.5 million people. In humans, tuberculosis is mainly caused by *Mycobacterium tuberculosis*, but the animal pathogen, *Mycobacterium bovis*, might have been the most important zoonotic agent in human history (Abalos & Retamal, 2004). Nowadays, transmission of bovine tuberculosis to humans still occurs through consumption of contaminated meat or raw milk and contributes to the overall tuberculosis burden (Farougou et al., 2011).

These three zoonoses are endemic in Morocco, like in other developing countries, despite the presence of national control programmes for CE, rabies and tuberculosis (Comité interministériel de lutte contre L'Hydatidose, 2007; Direction de l'Epidémiologie et de Lutte contre les Maladies, 2018; Ministère de la santé, 2018). Specifically, twenty cases of human rabies are recorded each year (Direction de l'Epidémiologie et de Lutte contre les Maladies, 2018), the incidence of tuberculosis is 103 cases per 100,000 inhabitants (Ministère de la santé, 2018), and 2.2 per 100,000 individuals undergo surgery for CE every year (Saadi et al., 2020). Meat control in slaughterhouses and/or the control of the dog population are common steps in the control programmes of these zoonoses in Morocco (Figure 1). The current failure of these three control programmes in Morocco also could be linked to barriers in the implementation of these two key steps. Indeed, it has been reported that defective slaughterhouse and dog management are the major causes of the persistence of these zoonoses in Morocco and in other developing countries (Aoun et al., 2009; El Berbri et al., 2015; Tebug et al., 2015; Thys et al., 2019). An in-depth analysis is required to explain the failure of such control programmes and to go beyond the often-invoked 'lack of means'. This study proposes a qualitative approach to assess this issue because this research method is considered suitable for the open exploration of questions in the form of 'how' and 'why' (Dumez, 2012).

2.1. ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study followed the Guidelines for Research Ethics in Social Sciences, Humanities, Law and Theology (Norwegian National Research Ethics Committees, 2016). In the formal interview setting, the right to informed consent was strictly observed: verbal consent was sought from respondents after giving them all possible information about the interview purpose, the estimated time required and the study objectives. Measures to safeguard the respondents'

anonymity and confidentiality were put in place during the fieldwork and also during data analysis. This study was authorized by the Department of Pathology and Veterinary Public Health Committee, Agronomic and Veterinary Institute Hassan II, Rabat, Morocco.

Impacts

- Management of slaughterhouse and control of dogs are common points in the fight against several zoonoses (cystic echinococcosis, rabies and bovine tuberculosis) in Morocco and in other countries in the Global South.
- Our qualitative approach focused on the perspective of stakeholders involved in the cystic echinococcosis control campaign in Morocco allowed highlighting that lack of means is not the only cause of disease control failure.
- Insufficient coordination among stakeholders, poor implementation or acceptability of control measures and misalignment of stakeholders' priorities with zoonosis control are also to be blamed.

2.2. STUDY AREAS

The study was undertaken from 2014 to 2016. In Morocco, the rabies and bovine tuberculosis control programmes mainly focus on the dog population (culling) and slaughterhouses (seizure of infected animals), respectively. CE control is based on both dog control and slaughterhouse management (Figure 1). Therefore, the results of a study investigating the causes of CE control programme failure can be translated also to the control programmes of rabies, bovine tuberculosis and other zoonoses in which dogs and slaughterhouses play key roles. Five Moroccan regions were chosen for this study on the basis of their geographical location (from North to South), CE incidence and representation of socio-economic differences: Rabat-Salé-Kénitra (Rabat, Bel Ksiri and Oulmes), Béni Mellal- Khénifra (Khénifra), Sous-Masaa (Agadir), Laâyoune-Sakia El Hamra (Laâyoune) and Guelmim-Oued Noun (Guelmim) (Figure 2). Rabat is the administrative capital, located in the North of the country. Khenifra is the capital of the Middle Atlas, where human CE incidence is among the highest in Morocco. Agadir is located in southwestern Morocco, and in this region, the incidence of human CE is high. Guelmim-Oued Noun, in southern Morocco, is the least affected region.

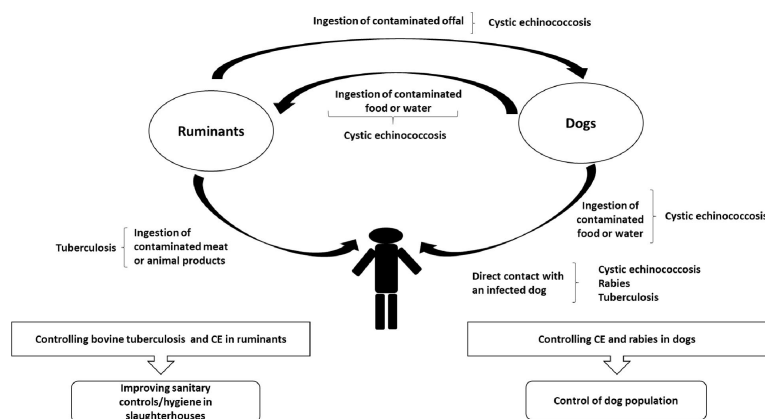
2.3. STUDY DESIGN

First, all slaughterhouses in the studied regions were visited. In each region, visits lasted between 1 and 30 days, in function of the number of slaughterhouses, to observe their infrastructures and work processes, and to get acquainted with the people working there (employees, veterinary services, slaughterers, guards...).

Then, the different structures responsible for the management of slaughterhouses and dog populations were identified. The Ministry of Agriculture, represented by the National Office of Food Safety (ONSSA), supervises zoonosis surveillance at slaughterhouses and the seizure/disposal of contaminated offal. The Ministry of the Interior, represented by the local authorities (municipal hygiene offices, MHO), is in charge of the dog population control and slaughterhouse management. Describe exactly who slaughters are.

Finally, 81 in-depth individual interviews (IDII) were carried out with representatives of the identified structures: slaughterers ($n = 34$), officials from local authorities ($n = 26$), MHO officials ($n = 5$) and officials of the ONSSA veterinary services ($n = 16$) (Table 1). IDII were carried out until data saturation that was reached when sufficient information was available and new data did not bring new additional information (Fusch & Ness, 2015).

Figure 1. Shared control measures to control cystic echinococcosis, rabies and bovine tuberculosis.



2.4. DATA COLLECTION

An interview guide was developed. The interview purpose was to identify how slaughterhouses and offal seizure were managed, and the modalities and difficulties of setting up the dog population control. A thematic analysis was carried out around the following items: slaughterhouse management/hygiene, offal seizure and control of the dog population. The interview guide was tested with a veterinary doctor working in Nourate, located in another region (Sidi Kacem) not included in the study. The aim was to determine whether the questions were easy to understand and whether the interview duration was appropriate (Schmeer, 2000). A interviews were carried out by one of the authors (SA) and a reporter took notes. All interviews were in Arabic and were performed face-to-face in a quiet room. The interviews were audio and video recorded. The interview duration varied from 20 to 45 min.

2.5. DATA ANALYSIS

Recordings and notes were transcribed and translated from Arabic into French (the common language of the study researchers). Notes and transcripts were anonymized and verified by the interviewer (SA) and reporter. To improve reliability, a third researcher (SH) reviewed the transcripts. Transcripts were then analysed with the RQDA package in R. Provisional codes (themes) were developed: strengths and weaknesses of the dog population and hygiene control in slaughterhouses. Collaboration among different structures was added as emerging theme during the analysis process. The results were then compared among respondents and study sites. Figure 3 presents the codification process for data analysis.

2.6. VALIDATION

A widespread criticism of qualitative approaches concerns data validation. Unlike quantitative research, it is difficult to prove the accuracy or falsity of an observation. The validation of

qualitative methods is the capacity to produce results that can significantly contribute to better understand the studied phenomenon. Validity in qualitative research is defined as the degree to which the results are interpreted correctly (Boudreault & Arseneault, 1994). Triangulation is a criterion of internal validity (Guba, 1981). Triangulation involves implementing multiple approaches and/or data that contribute to improve the result reliability and to achieve data saturation (Stavros & Westberg, 2009). In this study, data were obtained from the visits to the slaughterhouses (i.e. observations) and the IDIs (data triangulation), and three researchers performed the data analysis (researchers' triangulation). Moreover, Guba and Lincoln proposed four alternative criteria for judging qualitative research: credibility (internal validity), transferability (external validity), dependability (reliability) and confirmability (objectivity) (Lincoln & Guba, 1985). The qualitative data presented in this study present only the point of view of the participants in this study, thus ensuring its credibility. Transferability is ensured when the results of qualitative research can be generalized or transferred to other contexts (Proulx, 2019). As the entire study process was well explained, from the development of the research questions and data collection, to the neutral analysis and interpretation, this allows its transferability to other subjects or other contexts. Dependability is the ability to replicate a study (Lincoln & Guba, 1985). Data analysis was carried out by coding and classifying the data into categories and subcategories. Confirmability refers to the transparency of the researchers concerning their positioning. Confirmability is obtained when other researchers confirm the results. Throughout this study, data were verified by two researchers and checked by a third researcher. Figure 4 presents the different scientific criteria followed in this qualitative research. In this qualitative study, triangulation was present in data collection and analysis, data were collected to saturation, and the criteria by Guba and Lincoln were followed. The approach was neutral, and the results present the participants' perspective and the study was carried out in their natural environment. This study is within Creswell's definition of qualitative research: '... an unfolding model that occurs in a natural setting that enables the researcher to develop a level of detail from high involvement in the actual experiences' (Creswell, 1998).

Figure 2. The five studied regions in Morocco. Adapted from Wikimedia commons: https://commons.wikimedia.org/wiki/File:Morocco_Regions_2015_numbered.svg.



3. Results

3.1. SLAUGHTERHOUSE MANAGEMENT

Veterinarians and MHO officials thought that the re-structuring of slaughterhouses was the key for a successful CE control programme. They added that although this was an important point, it was far from being implemented in Moroccan slaughterhouses, and only few slaughterhouses in the country respected the hygiene standards. Representatives of municipal offices explained that the re-structuring of slaughterhouses requires a large budget; however, 40% of the slaughterhouses' income goes to orphanages (their only source of income) and 3% to the ONSSA veterinary services.

'Large part of the slaughterhouse income goes to the orphanage accounts; there isn't much money to improve the slaughterhouse' (local authority agent/Khenifra)

Officials of the ONSSA veterinary services declared that they lacked the means to neutralize and destroy the seized organs. The municipal officials said that they can provide only the equipment that is in their possession and veterinary doctors must adapt to the lack of means. Veterinarians revealed that there is an overlap of responsibility between ONSSA and MHO.

'We lack the equipment to destroy the seized organs/ animals. Their destruction is our responsibility, but the supply of the equipment is under the MHO responsibility, we are always in conflict' (veterinarian/Guelmim)

Veterinary staff also declared that they are in permanent conflict with the owners of the slaughtered animals because of the meat inspection/seizure. They said that these conflicts can escalate when they must seize an entire carcass, and that some veterinary doctors had to be transferred after they confiscated the carcasses of calves infected by bovine tuberculosis.

'We cannot work properly with slaughterers, they do not accept meat inspection/seizure, and it can become dangerous if we confiscate a whole carcass' (slaughterhouse technician/Bel Ksiri)

'One of our colleagues was transferred from this slaughterhouse after seizing a carcass of a calf with tuberculosis, and this happens everywhere in Morocco' (veterinary doctor/Guelmim)

When we visited the slaughterhouse at Laâyoune, soldiers were patrolling the slaughterhouse to avoid any conflict and ensure the smooth realization of the veterinary sanitary control, after a series of conflicts in the past.

Slaughterers were aware of the reasons leading to carcass seizures. However, they explained that they refuse to see their carcasses confiscated because of the associated financial loss. Normally, after the seizure of a whole carcass, they are compensated by the state, but at a rate that is much lower than the carcass market value. Moreover, this compensation takes several months.

The value of the seized carcasses is three or four times higher than the state compensation. In addition, you have to wait months and months to receive the money!!! How can we live if they seize our carcasses? (slaughterers/Khenifra)

The veterinary services declared that for some zoonoses (such as cysticercosis), carcasses can be consumed if they are stored in a refrigerated room. However, the majority of slaughterhouses did not have the equipment. During the visits to slaughterhouses, we observed that some slaughterhouses had refrigerated rooms. However, most of them were not functioning and were used for equipment storage or as changing rooms.

We also noticed a large number of dogs around slaughterhouses. When we asked why dog access to the slaughterhouse was not prevented, the answer was always 'due to the absence of walls and closures to protect the slaughterhouse'. Yet, several of the visited slaughterhouses had a wall to prevent the access of dogs. However, doors were often left open, and dogs were inside. Moreover, dogs seemed to be familiar with the people working at the slaughterhouses, because they did not run away when approached, and they were chased only after our arrival.

Table 1. In-depth individual interviews carried out for this study.

City	Category	Structure	Number of interviews	Period
Bel Ksiri	Slaughterer	Slaughterhouses	5	2014
	Official	Local authorities	4	2014
	Veterinarian	ONSSA	1	2014
	Veterinarian	MHO	1	2014
Guelmim	Veterinarian	ONSSA	1	2015
	Official	Local authorities	3	2015
	Slaughterer	Slaughterhouses	4	2015
Laayoune	Veterinarian	ONSSA	2	2015
	Official	Local authorities	5	2015
	Slaughterer	Slaughterhouses	6	2015
Agadir	Official	Local authorities	5	2016
	Veterinarian	ONSSA	4	2016
	Slaughterer	Slaughterhouses	4	2016
	Official	MHO	2	2016
Khenifra	Veterinarian	ONSSA	3	2016
	Officials	Local authorities	6	2016
	Slaughterer	Slaughterhouses	4	2016
	Official	MHO	1	2016
Oulmes	Official	Local authorities	2	2016
	Veterinarian	ONSSA	1	2016
	Slaughterer	Slaughterhouses	6	2016
Rabat	Veterinarian	ONSSA	4	2016
	Slaughterers	Slaughterhouses	5	2016
	Official	Local authorities	1	2016
	Official	MHO	1	2016
Total			81	

Note: Abbreviations: MHO, Municipal hygiene office; ONSSA, National Office for Sanitary Safety of Food Products

Figure 3. Codification process.

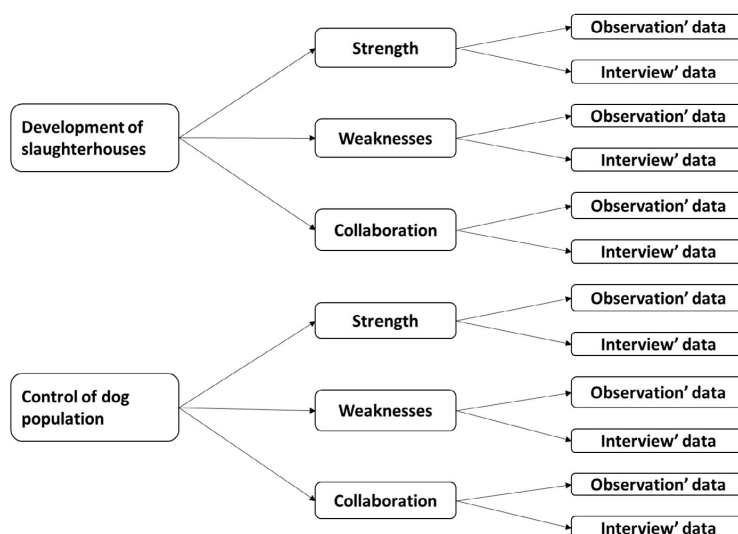
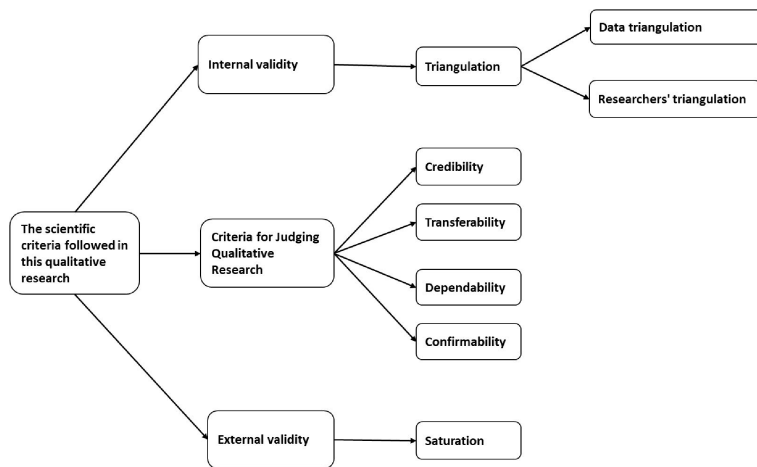


Figure 4. Criteria followed in this qualitative research



3.2. DOG POPULATION CONTROL

Veterinary doctors and representatives of local authorities highlighted the lack of a national strategy to control the dog populations. Moreover, MHO officials said that the canine populations were controlled by culling using firearms (in Belksiri and Rabat) or strychnine (in Laâyoune, Guelmim and Tan-Tan). However, animal protection associations and the civil society are against this practice, especially because most of these animals are free-roaming owned dogs.

'When we carry out the culling campaigns of stray dogs, the associations criticize us, but we cannot do otherwise, we do not have kennels' (local authority official / Rabat)

MHO agents said the dog-slaughtering campaigns are carried out only when the local population complains about the high number of dogs in the area. Municipalities do not have a specialized team.

In the southern region (Sahara), stray dogs have a different profile than in the rest of Morocco. Veterinarian doctors reported that some free-roaming dogs are becoming wild. They explained that these were dogs abandoned by some people who left the region after having lived there for a limited period, thus creating a population of wild dogs that attack livestock and humans.

'We are facing a serious problem: wild dogs! When they quit this region, people abandon their dogs, and these dogs attack camels, and sometimes people' (veterinarian/Laâyoune)

4. DISCUSSION

In Morocco, CE, rabies and bovine tuberculosis are important public health problems because the programmes to control these zoonoses are not meeting their objectives, as observed also in other developing countries (Brunetti & McCloskey, 2016; WHO, 2020; WHO- FAO-OIE, 2018). The causes of the persistence of these zoonoses are multiple, including practices and beliefs of the populations, poor understanding of the pathogen life cycle, and poor

management of slaughterhouses and dog population (Bardosh et al., 2016; El Berbri et al., 2015; Khan et al., 2018). For example, stray dogs are a major contributor to the persistence of CE and rabies in Pakistan, (Khan et al., 2020, 2019) and also in Morocco, Tunisia and the other endemic countries (Amarir et al., 2020; Aoun et al., 2009; Brunetti & McCloskey, 2016; Wandeler et al., 1988).

The common point in the control of these three zoonoses is slaughterhouses and/or dog populations. Using a qualitative research method, we collected the point of view of people working in the structures responsible for the management of slaughterhouses and dog population. The information gathered in the interviews completed the data collected during the slaughterhouse visits.

Slaughterhouse management and dog population control are considered a major step in the fight against zoonoses in Morocco (Bardosh et al., 2016; El Berbri et al., 2015). While the 'lack of means' is often the first-presented answer, this study allowed highlighting more accurate explanations. Specifically, almost half of the slaughterhouse incomes go to orphanages, although the need of investment is obvious. Moreover, municipalities directly manage the slaughterhouse budget, which constitutes a major debate with the ONSSA veterinary services, particularly concerning the different priorities of the managing stakeholder and of the veterinary services that are more focused on veterinary public health matters, but are in a weaker position. As the money from slaughterhouses represents the only financial source of orphanages, municipalities are faced with the dilemma of how to improve the hygiene of slaughterhouses, which affects public health and is a social problem, without reducing the orphanage income or introducing politically sensitive taxes on other economic activities. The study also revealed that the lack of equipment may also include a lack of rigour in using the available equipment, particularly concerning refrigerated rooms and protecting fences.

Answers on the question of budget management highlighted an overlap of responsibility between ONSSA and municipalities. The slaughterhouse management and the destruction of seized meat are the responsibility of municipalities, while the sanitary control is supervised by ONSSA (Comité interministériel de lutte contre l'Hydati- dose /Echinococcose, 2007). This can create tensions, especially in the absence of proper legislation, while intersectoral collaboration could improve knowledge and reduce the material gaps of each institution (Marcotty et al., 2013). For example, in the fight against AIDS in Cameroon, overlapping responsibilities created a competition between institutions (Tantchou Yakam, 2008). Conflicts also exist between veterinary services and slaughterers. Insecurity of veterinary services is a big obstacle to strengthening sanitary controls in Morocco and in other developing countries. This study revealed the origin of these conflicts, which cause insecurity: the insufficient and delayed compensation for the seized carcasses. The Moroccan law requires 'full or partial' reimbursement (Le ministre de l'agriculture du développement rural et des eaux et forêts, 2001). However, these compensations were considered inadequate by recipients because they do not represent the market value of the seized products. As long as this problem exists, the safety of veterinarian doctors is not ensured, and this will directly affect health controls at slaughterhouses.

To control the canine population, the municipalities are eliminating dogs by gunshot or strychnine poisoning, with no general strategy at the national or inter-regional level. Dog culling is ineffective in the long term, because new dogs from other neighbouring communities replace

the killed ones (Smith et al., 2019). The management of the dog population by respecting animal welfare is not incompatible with human health protection (RAPAD Maroc, 2016). For example, CE control programmes in Argentina, Chile and Uruguay have been successful without compromising animal welfare, by relying on treating dogs with praziquantel (Moro & Schantz, 2007). In addition, the vaccination of dogs against rabies has allowed its control in South America (LarghiJ et al., 1988). In Jaipur (India), a rabies control strategy, based on the sterilization and vaccination of dogs while respecting their well-being, led to the elimination of human rabies in the programme area (Reece & Chawla, 2006).

Planning a dog control campaign requires collecting and analysing epidemiological data, involving the local population and training a specialized team (Carter, 2008). On the other hand, our interviewees indicated that dog culling campaigns were initiated on request by citizens and were carried out by unqualified personnel. Dogs in Morocco are 'semi-stray dogs' because often they have an owner (El Berbri et al., 2015; Thys et al., 2019). However, a new phenomenon begins to gain momentum in the Sahara: wild dogs. In addition to the risk of zoonotic transmission, wild dogs attack native animals, livestock and the population and could also entail wider ecological consequences (Moutou, 1993).

5. CONCLUSION

A qualitative approach, including interviews and on-site observation, allowed understanding the subtleties of the overall dysfunction of zoonosis control through the management of slaughterhouses and dog populations. The study revealed that in Morocco, financial problems are not the only reason of control failure, and that insufficient coordination among stakeholders, poor implementation or acceptability of control measures, and misalignment of stakeholders' priorities with zoonosis control are also to be blamed.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.

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References

- Abalos, P., & Retamal, P. (2004). Tuberculosis: ¿una zoonosis reemergente? *OIE Revue Scientifique Et Technique*, 23(2), 583–594. <https://doi.org/10.20506/rst.23.2.1502>
- Aoun, K. et al (2009). Les facteurs actuels d'endémicité de l'hydatidose en Tunisie. *Revue Teledetection*, 8(1), 17–34.
- Bardosh, K. L., Berbri, I. E., Ducrotoy, M., Bouslikhane, M., Ouafaa, F. F., & Welburn, S. C. (2016). Zoonotic Encounters At the Slaughterhouse: Pathways and Possibilities for the Control of Cystic Echinococcosis in Northern Morocco. *Journal of Biosocial Science*, 48(S1), S92–S115. <https://doi.org/10.1017/S0021932015000486>
- Boudreault, C., & Arseneault, A. (1994). La recherche qualitative : Une méthode différente, des critères de scientificité adaptés. *Recherche Qualitative*, 10, 121–137.
- Brunetti, E., & Mccloskey, C. (2016). Cystic Echinococcosis. *Journal Of Clinical Microbiology*, 54(3), 518–523. <https://doi.org/10.1128/JCM.02420-15>
- Carter, E. (2008). Humane dog population management guidance. *Animal Welfare*, 17(3), 321–322.
- Comité interministériel de lutte contre l'Hydatidose /Echinococcose. (2007) Lutte contre l'hydatidose / Echinococcose Guide des activités de lutte.
- Creswell, J. (1998). *Qualitative Inquiry and Design: Choosing Among Five Traditions*, London: Sage Publi.
- Direction de l'Epidémiologie et de Lutte contre les Maladies. (2018). 'Programme national de lutte contre la rage', in Ministère de la Santé (ed.) Journée mondiale de la rage.
- Dumez, H. (2012). Qu'est-ce que la recherche qualitative ? *Le Libellio D'aegis*, 7(4), 47–58. <https://doi.org/10.1073/pnas.0703993104>
- El Berbri, I., Ducrotoy, M. J., Petavy, A.-F., Fassifihri, O., Shaw, A. P., Bouslikhane, M., ... Dakkak, A. (2015). 'Knowledge, attitudes and practices with regard to the presence, transmission, impact, and control of cystic echinococcosis in Sidi Kacem Province, Morocco'. *Infectious Diseases of Poverty*, 4, 48. <https://doi.org/10.1186/s4024-9-015-0082-9>
- Farougou, S., Am, L. G., & Aplogan, L. G. (2011). 'Fréquence de la tuberculose bovine dans le lait et la viande dans le département du borgou au Bénin', Acte du 3e Colloque des sciences, cultures et technologies de l'UAC-Bénin (309–322), (December 2013).
- Fusch, P. I., & Ness, L. R. (2015). 'Are We There Yet ? Data Saturation in Qualitative Research'. *Qualitative Report*, 20.
- Guba, E. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Technology Research and Development*, 29(2), 75–91. <https://doi.org/10.1007/BF02766777>
- Khan, A. (2018). Knowledge, attitudes and practices related to cystic echinococcosis endemicity in Pakistan. *Infectious Diseases of Poverty*, 1–15. <https://doi.org/10.1186/s40249-017-0383-2>
- Khan, A. (2020). Spread of Cystic Echinococcosis in Pakistan Due to Stray Dogs and Livestock Slaughtering Habits: Research Priorities and Public Health Importance. 1–6. <https://doi.org/10.3389/fpubh.2019.00412>
- LarghiJ, O. P. et al (1988). Control of Urban Rabies. *Rabies* (pp. 407–422). Kluwer Academic Publishers.

Le ministre de l'agriculture du développement rural et des eaux et forêts. (2001). Arrêté du Ministre de l'Agriculture, du Développement Rural et des Eaux et Forêts n°1410-01du 5 jourmada I 1422 (26 juillet 2001) relatif à la conduite à tenir en matière de cysticerose bovine. Retrieved from <http://www.onssa.gov.ma/images/reglementation/reglementation-sectorielle/Animaux-et-produits-dorigine-animales/Produits-dorigine-animales/Viandes/ARR.1410-01.FR.pdf>

Lincoln, Y. S., Guba, E. G., & Pilotta, J. J. (1985). *Naturalistic Inquiry*. Publications. Newbury Park. Edited by S.

Marcotty, T., Thys, E., Conrad, P., Godfroid, J., Craig, P., Zinsstag, J., & Boelaert, M. (2013). 'Intersectoral collaboration between the medical and veterinary professions in low-resource societies: The role of research and training institutions', *Comparative Immunology, Microbiology and Infectious Diseases*. Elsevier Ltd, 36(3), 233–239. <https://doi.org/10.1016/j.cimid.2012.10.009>

Ministère de la santé. (2018) Plan stratégique national pour la prévention et le contrôle de la tuberculose au maroc 2018–2021.

Moro, P. L., & Schantz, P. M. (2007). Echinococcosis: Historical landmarks and progress in research and control. *Annals of Tropical Medicine & Parasitology*, 100(8), 703–714. <https://doi.org/10.1179/136485906x112257>

Moutou, F. (1993). Déplacements d'espèces animales par l'homme: conséquences écologiques et sanitaires. *Anthropozoologica*, 19, 3–8.

Norwegian National Research Ethics Committees. (2016). *Guidelines for Research Ethics in the Social Sciences, Humanities, Law and Theology*. Retrieved from www.etikkom.no

Proulx, J. (2019). Recherches qualitatives et validités scientifiques. *Recherches Qualitatives*, 38(1), 53–70. <https://doi.org/10.7202/1059647ar>

RAPAD Maroc. (2016). *Gestion de la population canine au Maroc*. .

Reece, J. F., & Chawla, S. K. (2006). Control of rabies in Jaipur, India, by the sterilisation and vaccination of neighbourhood dogs. *Veterinary Record*, 159(12), 379–383. <https://doi.org/10.1136/vr.159.12.379>

Saadi, A., Amarir, F., Filali, H., Thys, S., Rhalem, A., Kirschvink, N., ... Antoine-Moussiaux, N. (2020). 'The socio-economic burden of cystic echinococcosis in Morocco: A combination of estimation method', *PLOS Neglected Tropical Diseases*. Edited by P. R. Torgerson. Public Library of Science, 14(7), e0008410. <https://doi.org/10.1371/journal.pntd.0008410>

Schmeer, K. (2000). *Stakeholder Analysis Guidelines*, <https://doi.org/10.1093/heapol/15.3.338>

Smith, L. M. (2019) 'animals The Effectiveness of Dog Population Management: A Systematic Review', pp. 1–30.

Stavros, C., & Westberg, K. (2009). Using triangulation and multiple case studies to advance relationship marketing theory. *Qualitative Market Research*, 12(3), 307–320. <https://doi.org/10.1108/13522750910963827>

Tantchou Yakam, J. C. (2008). Les Nouveaux acteurs de la lutte contre le VIH / SIDA : Chevauchement et revendication d'utilité au sein des structures existantes. *Médecine Tropicale*, 68(3), 300–305.

Tebug, S. F., Kamga-Waladjo, A. R., Ema, P. J. N., Muyeneza, C., Kane, O., Seck, A., ... Lo, M. (2015). Cattle Farmer Awareness and Behavior Regarding Prevention of Zoonotic Disease Transmission in Senegal. *Journal of Agromedicine*, 20(2), 217–224. <https://doi.org/10.1080/1059924X.2015.1010068>

Thompson, R. C. A., & McManus, D. P. (2002). Towards a taxonomic revision of the genus *Echinococcus*. *Trends in Parasitology*, 18(10), 452–457. [https://doi.org/10.1016/S1471-4922\(02\)02358-9](https://doi.org/10.1016/S1471-4922(02)02358-9)

Thys, S., Sahibi, H., Gabriël, S., Rahali, T., Lefèvre, P., Rhalem, A., ... Dorny, P. (2019). Community perception and knowledge of cystic echinococcosis in the High Atlas Mountains, Morocco. *BMC Public Health*, 19(1), 1–15. <https://doi.org/10.1186/s12889-018-6372-y>

Toma, B. (1991). *Glossaire d'épidémiologie animale*. 94700 : Editions du Point Vétérinaire.

Wandeler, A. I. (1988). Dog Ecology and Dog Rabies Control. *INFECTIOUS DISEASES*, (10(December)).

WHO. (2020). Rabies. Retrieved from <https://www.who.int/en/news-room/fact-sheets/detail/rabies>

WHO. (2020). Tuberculosis. Retrieved from https://www.who.int/health-topics/tuberculosis#tab=tab_1

WHO-FAO-OIE. (2018). WHO | Zero by 30: the global strategic plan to end human deaths from dog-mediated rabies by 2030, Who. Retrieved from <http://www.who.int/rabies/resources/9789241513838/en/>