

Risk's Perception of Antibiotic Use in Pigs and Poultry farms in Madagascar - A Q Method Approach

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Introduction

Antimicrobial resistance (AMR) is a *One Health* issue that needs to be tackled worldwide. In Madagascar, little is known about practices related to antibiotics (AB) and AMR in breeding system. To implement effective communication strategies, practices and perception related to antimicrobial use (AMU) at smallholder farms level need to be better understood.

Our study aims at identifying patterns of practices and perception of usage of antimicrobials or their alternatives and related risks amongst pigs and poultry smallholders, and drug sellers in the commune of Imerintsiasosika, central part of Madagascar.

Materials and Methods

Study zone and population

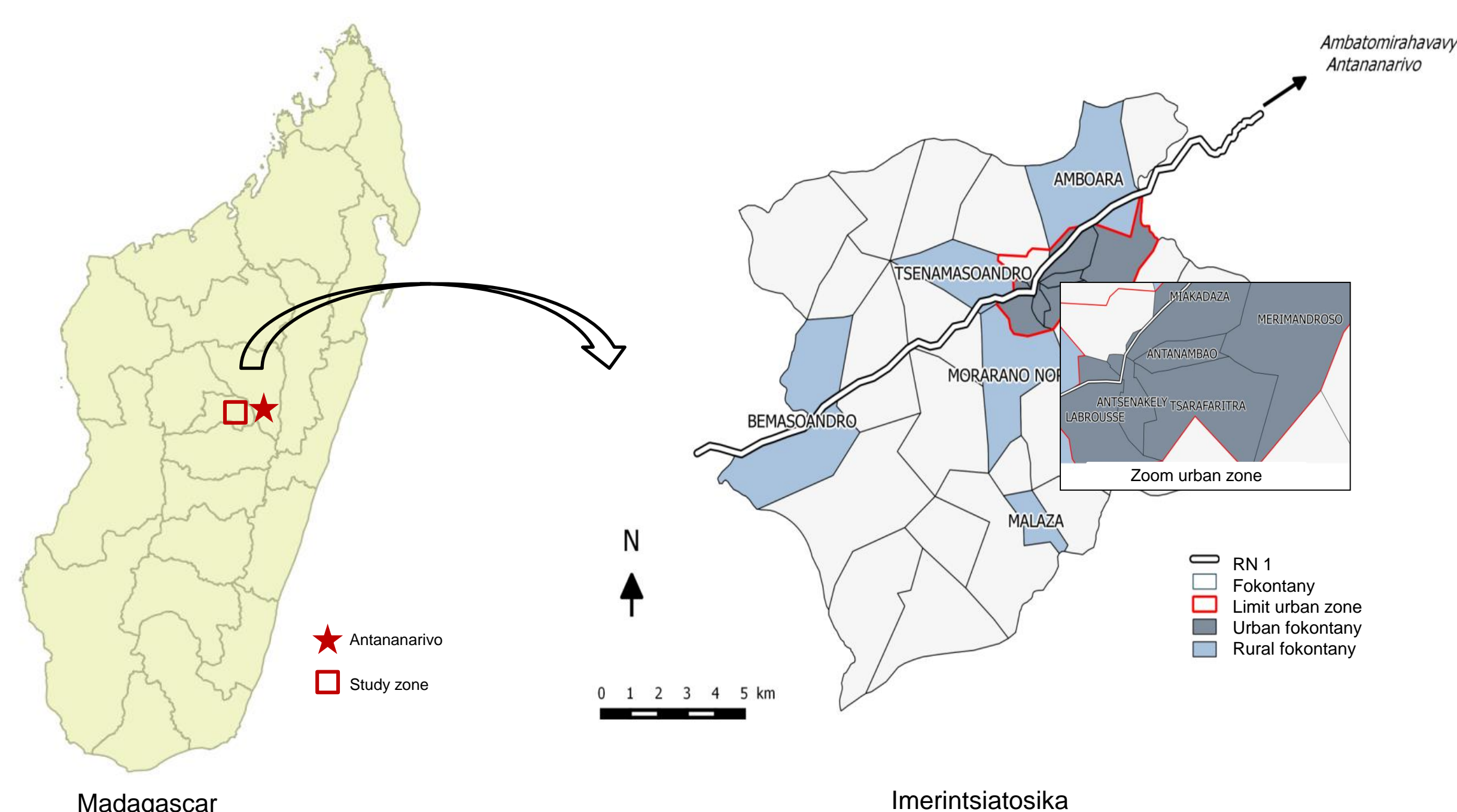


Fig. 1: Study zone (1)

The study was conducted in **Imerintsiasosika** 30km far from Antananarivo, the capital and included six urban and five rural fokontany (basic unit administration) (fig. 1).

The two populations were: **breeders** of pigs and/or poultry of the commune and **drug sellers**, including veterinarians, technicians and other salesman in connexion with the breeders.

Q Methodology

Q Methodology belong to **participatory epidemiology**. It is a semi-qualitative method that studies the subjectivity of individuals regarding a subject. The main objective is to **identify group of individuals** sharing the same **point of view** and to determine commune and distinguish opinions on a same subject (2). Q methodology follows five steps (3):

Step 1: generation of the *concourse* (list of statements) from literature review and semi-structured interview (SSI).

Step 2: construction of a set of statements (the *Q-set*).

Step 3: selection of the respondents (the *P-set*) according to socio-demographic criteria.

Step 4: ranking of the *Q-set* (the *Q-sorting*) in a 7 grades grid (forced distribution) from -3 (totally disagree) to +3 (totally agree), during a face to face interview. It is followed by a SSI about extreme statements (fig. 2).

Step 5: analysis of the factors by Principal Component Analysis (PCA) using "qmethod" package for R with respondent considered as variables and interpretation.



1) Ranking in 3 piles



2) Ranking following a forced-distribution

Fig. 2: The two steps of the *Q-sorting* (4)

Results

Q-set and P-set

The *Q-set* was built of **38 statements** for breeders and **45** for drug sellers. The *P-set* included **26 breeders** and **19 drug sellers** with various socio-demographic criteria.

Consensus statements

Consensus statements are statements shared by all respondents (no statistical differences between any pair of factors). Consensus statements with extremes values are presented in figure 3.

N°	Statements	Factor		
		F1	F2	F3
Breeders				
4	We must always ask advice to drugs sellers before using antibiotics	3	2	2
5	We must always respect the withdrawal time of the antibiotics before slaughtering an animal	3	2	2
30	Breeders should often clean the farm to have less disease	3	3	3
Drugs sellers				
27	It is important to be trained about antibiotic's risks	2	3	2
31	Everybody can sell drugs without having specific training	-3	-3	-3
39	Conditions of storage of antibiotics are not important	-3	-3	-3
40	If breeders take good care of their farm (cleaning, food...) the AMU will be reduced	1	2	2

Fig. 3: Main consensus statements

Discourses

The analysis of factors is based on the statements with extremes values (-3, -2 and +2, +3), the distinguishing statements (score value significantly different between each pair of factors), and the contents analysis of each individual interview.

Breeders – discourse A							Drug sellers – discourse A						
-3	-2	-1	0	+1	+2	+3	-3	-2	-1	0	+1	+2	+3
2	6	12	3	1	7	4	29	9	7	15	3	1	2
9	18	21	8	11	16	5	31	10	14	18	4	5	11
24	19	25	10	13	17	30	39	16	20	19	6	17	13
36	31	26	14	15	29	34	44	23	22	21	8	27	43
	32	27	22	20	38		24	36	25	12	40		
		37	23	35			30	37	26	28	41		
			28				38	33	32				
			33				45	34	35				
							42						

Fig. 4: *Q-sorting* of discourse A in breeders and drug sellers

In yellow : consensus statements; in bold : distinguishing statements, underline: statements distinguishing F1 (discourse A) from F2 and F3

Regarding AMU, AMR and alternatives the breeders and drug sellers were divided into **three discourses** following PCA, explaining respectively 57% and 60% of total variance:

- A. "confidence in antibiotics"** (13 breeders and 6 drug sellers): use of AB as preventive measure, have a poor knowledge regarding AMR and a low trust in alternatives;
- B. "belief in alternatives"** (7 and 7 individuals): preventive use of AB is perceived as a main problem for AMR and they believe in alternatives such as vaccines to be useful preventive methods;
- C. "moderate toward antibiotic use"** (6 and 6 individuals): have a fuzzy opinion regarding AMU and AMR.

Conclusions

The presence of three main point of views offers the possibility to adapt the awareness messages. The group "belief in alternatives" can be also explore as an example to reduce the use of antibiotics for the two other groups. This study showed different practices and risks perception toward AMU that need to be better characterized and precisely quantified.

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