Pilot project on protocols for PPR control

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Introduction

Prior to 2012, Burkina Faso's Directorate-General of Veterinary Services sponsored and conducted several studies on the prevalence of peste des petits ruminants (PPR) in Burkina Faso. The results showed a prevalence of 15-30%, revealing active virus circulation in the country's sheep and goat population.

After discussions and negotiations, the Bill & Melinda Gates Foundation signed an agreement with the OIE in October 2012 to co-finance a pilot project on PPR control protocols[1]. The funding agreement followed in October 2013. Field activities began immediately. The project, planned to last 18 months, ultimately focused on Burkina Faso and Ghana.

The aim of the pilot project was to:
– control PPR by vaccinating 100% (at least 80%) of small ruminants in the project area;
– contribute to the development of a comprehensive PPR control and eradication strategy.
The proposed scenarios had to take into account the:
– eco-climatic zone and farming system
– level of external support to the national Veterinary Service
– number of vaccination campaigns per year
– private sector involvement.

1 See the article on the regional project Vaccine Standards and Pilot Approach to Peste des Petits Ruminants Control in Africa (VSPA), pp. 56–60

Project

Geographical location

The project areas selected were in four administrative regions of Burkina Faso: Sahel; Nord; Centre-Nord and Boucle du Mouhoun (Fig. 1). This area hosts 27% of the country's sheep and goat population.

Fig. 1
Project areas

Protocols

The various protocols tested were as follows:

– P1: Control areas (no vaccination).

– P2: Vaccination (vaccine alone) + farmer participation.

– P3: Vaccination + operating costs/vaccinator + farmer participation.

– P4: Vaccination + operating costs/vaccinator + farmer participation + farmer incentives (free deworming prior to vaccination).

These four protocols were duplicated in the Boucle du Mouhoun region to test the parameter 'private operator versus public services'. The field component is illustrated in Figure 2.

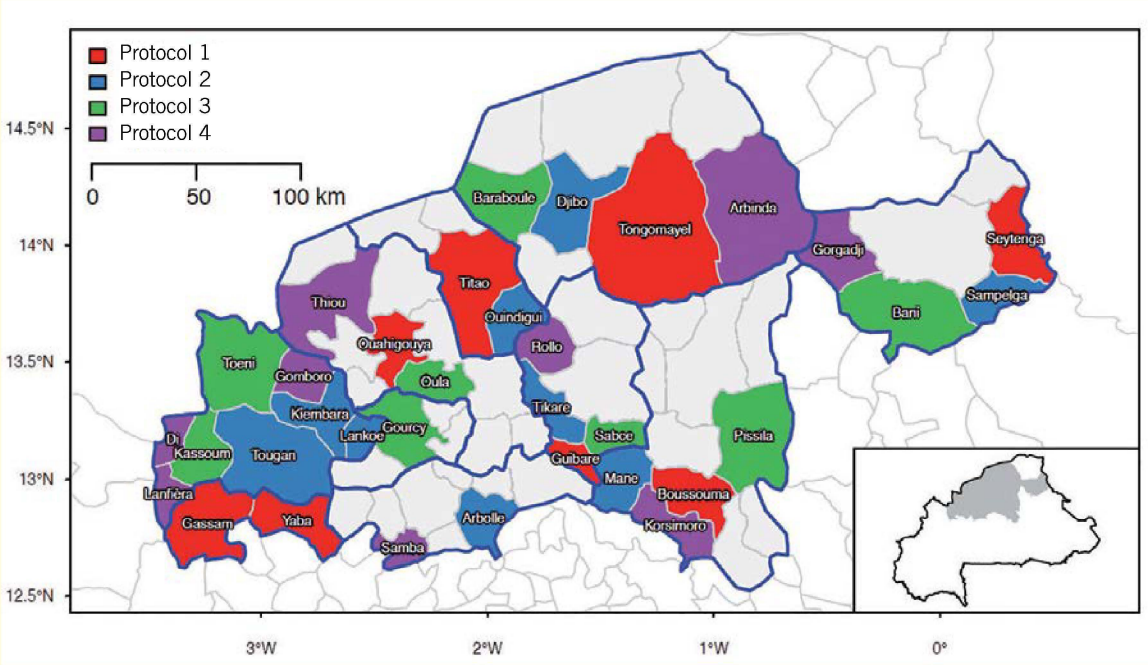


Fig. 2

Pilot field component

Tools used

Tight deadlines prevented the implementation of a comprehensive serological survey of PPR prevalence across the area. It was decided instead to conduct a comprehensive survey of participatory PPR searching throughout the regions and departments concerned in order to ensure absence of bias linked with an uneven distribution of PPR outbreaks (Fig. 3). Any outbreaks based on farmers' accounts were confirmed by serological testing of herds that had been declared positive.

The effectiveness of the vaccination campaign was verified at two levels:

– The African Union Pan African Veterinary Vaccine Centre (AU-PANVAC) conducted a study of vaccine and diluent quality starting from the central cold room and ending with the vaccinator's syringe. The titre of the vaccine and quality of the cold chain were extensively documented.

– The seroconversion of vaccinated animals was monitored by the Ouagadougou central veterinary laboratory based on more than 5,000 samples.

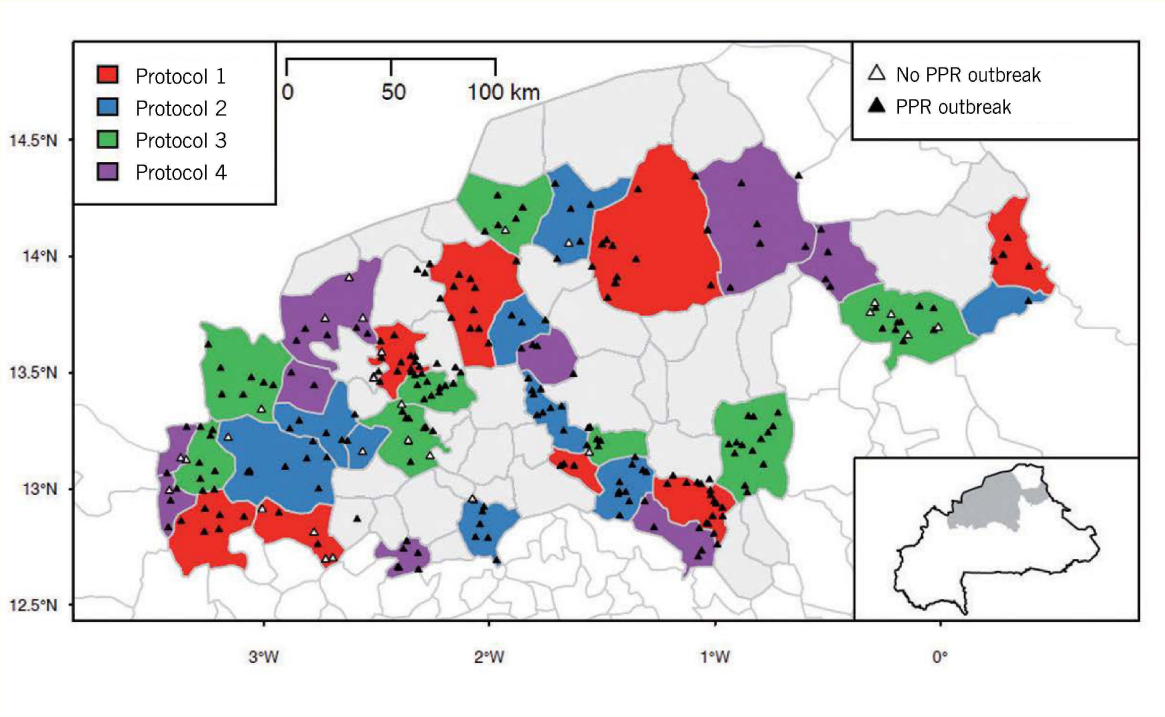


Fig. 3

Distribution of peste des petits ruminants outbreaks in accordance with the various pre-vaccination protocols

With the support of researchers from the French Agricultural Research Centre for International Development (CIRAD), sociologists conducted a survey of vaccination acceptance and perception by farmers, industry stakeholders and the Veterinary Services concerned, in accordance with a participatory survey protocol.

Meanwhile, CIRAD animal production specialists conducted a survey of pre-and post-vaccination productivity using the twelve-month method.

Results

Vaccination coverage

It was necessary to implement the field component and organise the campaign in great haste. This meant that very little awareness could be raised among stakeholders and local contact points. Nevertheless, the performance of all operators, at both central and field levels, was outstanding. By the end of 2014, a total of 1,430,000 of the estimated 1,782,700 small ruminants throughout the vaccination areas had been vaccinated: a vaccination coverage rate of 80.20%. The protocols that provide the best vaccination coverage are P3, with external support from the Veterinary Service, and P4, with the addition of farmer incentives (anthelmintics coupled with vaccination). However, the fact remains that the average coverage rate achieved was enough to block virus circulation in the vaccinated population. Figure 4 illustrates this.

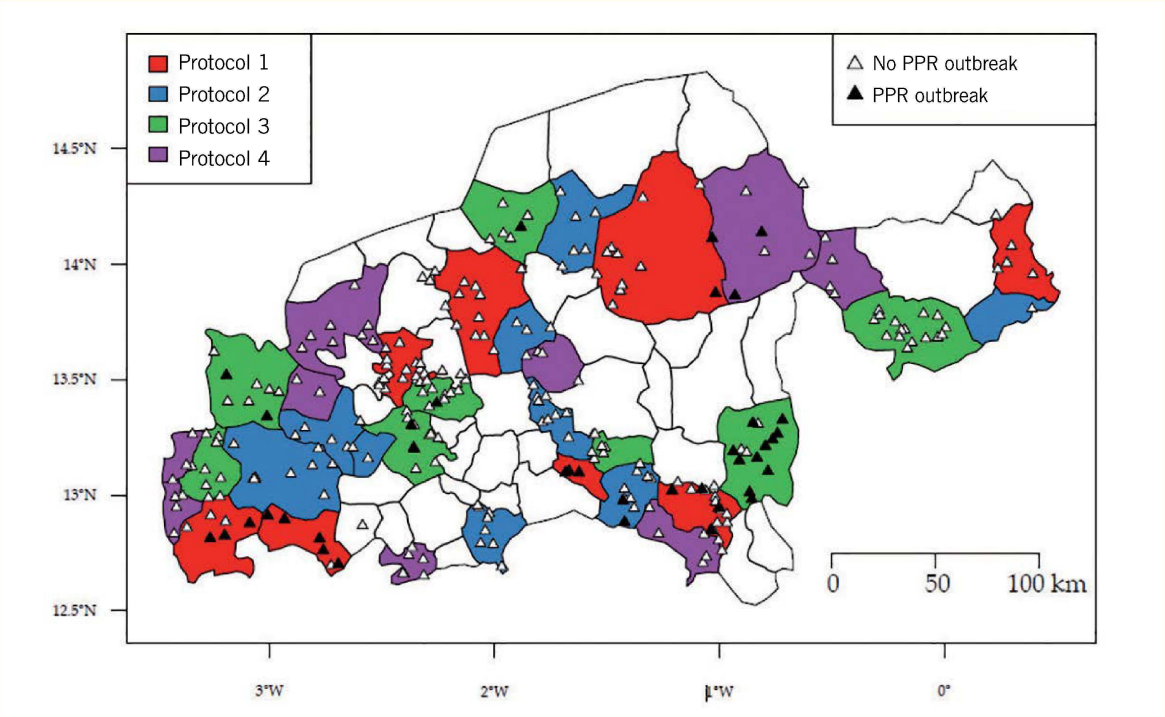


Fig. 4

Distribution of peste des petits ruminants outbreaks in accordance with the various post-vaccination protocols

N.B. The high incidence of outbreaks in the department of Pissila can be explained by a heavy bout of peste des petits ruminants just before the vaccination teams arrived, as the campaign had begun late in the season.

Prevalence and seroconversion

According to the PPR incidence rate graphs (Fig. 5), neither the agro-climatic zone nor the type of operator appear to significantly affect this marker.

The pre- and post-vaccination serological tests showed a significant increase in seroprevalence (Fig. 6). These results, coupled with the significant decrease in the number of outbreaks, show that the vaccine is highly effective.

Productivity

The productivity surveys show that PPR has a very heavy impact on the numeric productivity of herds and that vaccination provides substantial productivity gains. The following graph, compiled from surveys conducted in Ghana (Fig. 7), is very telling.

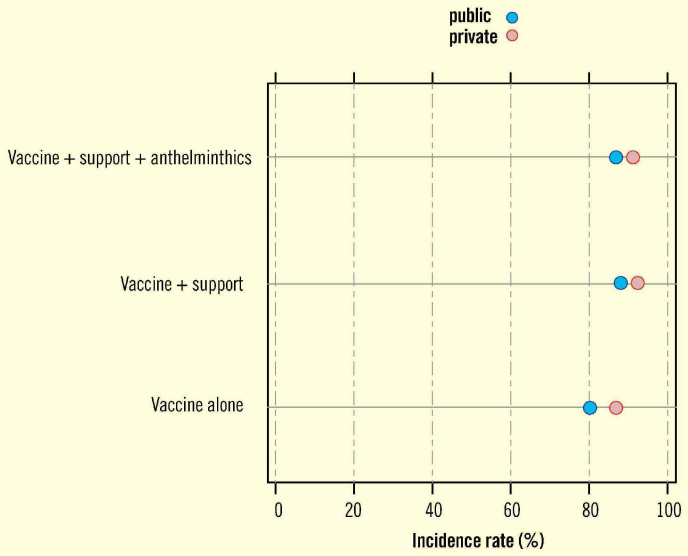
Sociological surveys

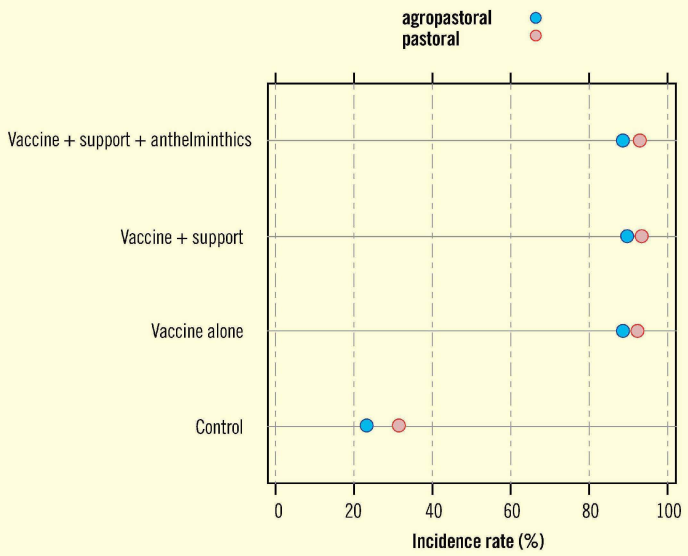
Sociological surveys were organised around two themes:

1) **The socio-technical network of sheep and goat production present in 263 villages in the project area**

The main findings of this survey are that:

– 'vaccination' is considered to mean an 'injection', whether preventive or curative (it is usually associated with a visit by the veterinarian to the villages closest to the veterinary station);





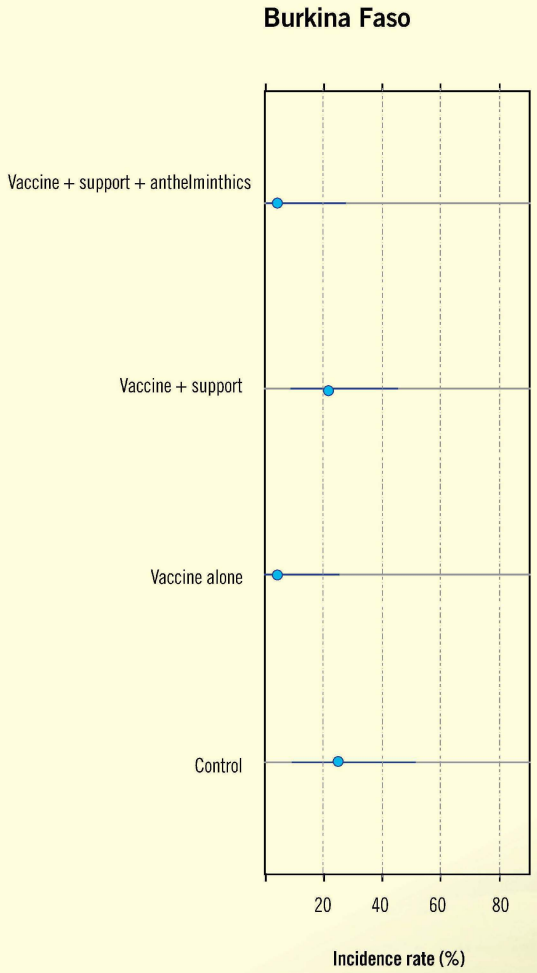
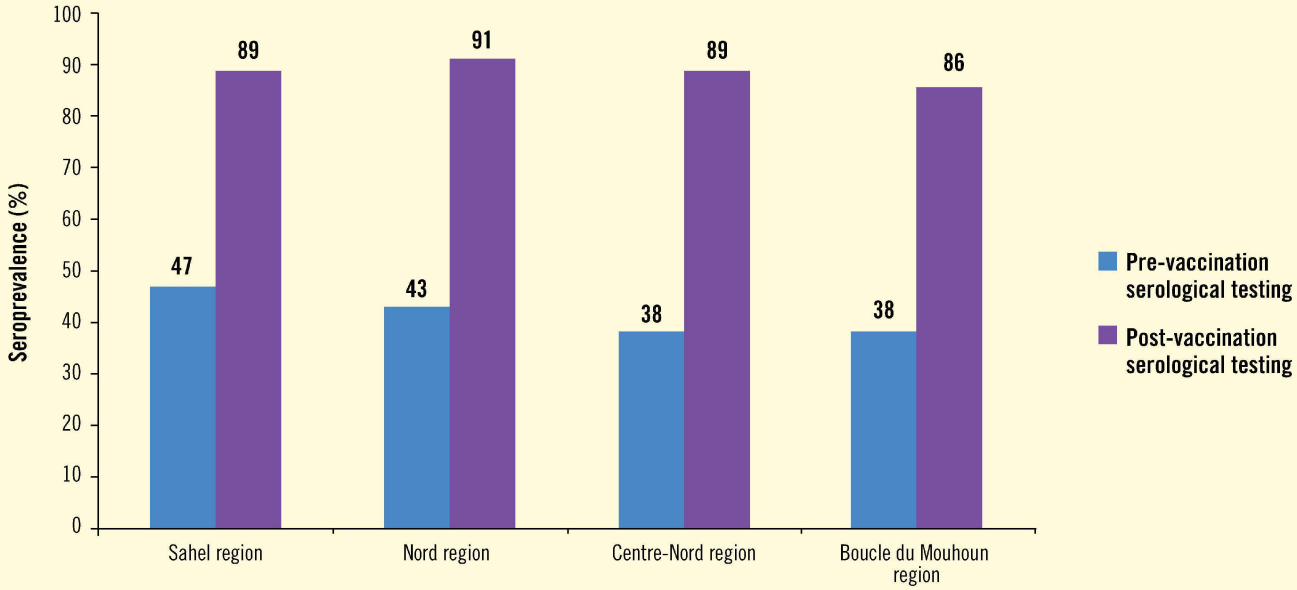


Fig. 5

Incidence rate of peste des petits ruminants



Vaccination regions in the area covered by the project Vaccine Standards and Pilot Approach to Peste des Petits Ruminants Control in Africa (VSPA)

Fig. 6

Pre- and post-vaccination serological testing

– the veterinarian's availability depends on the group to which the farmer belongs (veterinarians give preference to farmers with large herds);

– the work of community animal health workers is perceived as being that of 'illegal workers' and/or traditional healers;

– farmers are well aware of other projects underway in their area.

2) Perception of the vaccination campaign by farmers and industry stakeholders

This survey, conducted through 20 group interviews with 18 vaccinators and 549 farmers, plus 62 individual interviews with agro-pastoralists, reveals that:

– perceptions of the effectiveness of the communication tools used varied widely;

– communities attach great importance to the identity of the vaccinator and to the origin of the project;

– the perception was that neither the village counsellors nor the presidents of village associations had been informed; this was seen as a weakness of the project ('We have received no information');

– short notice was given for organising vaccination;

– numerous messages were received simultaneously: vaccination, date, animals concerned, price, etc.

Ghana

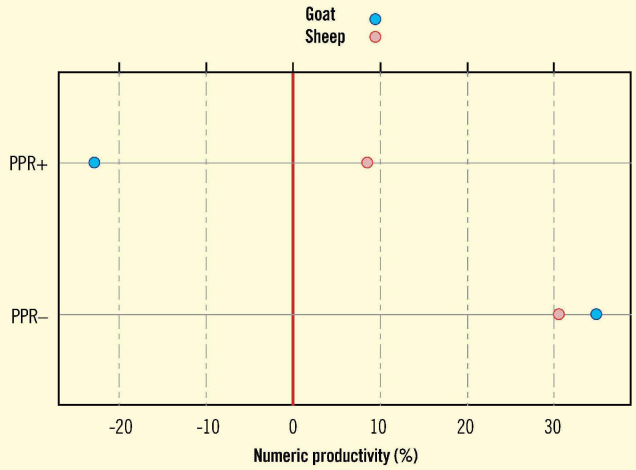


Fig. 7

Impact of peste des petits ruminants on the numeric productivity of herds (example of Ghana)

The challenges

The following two figures illustrate the main challenges facing vaccinators and farmers.

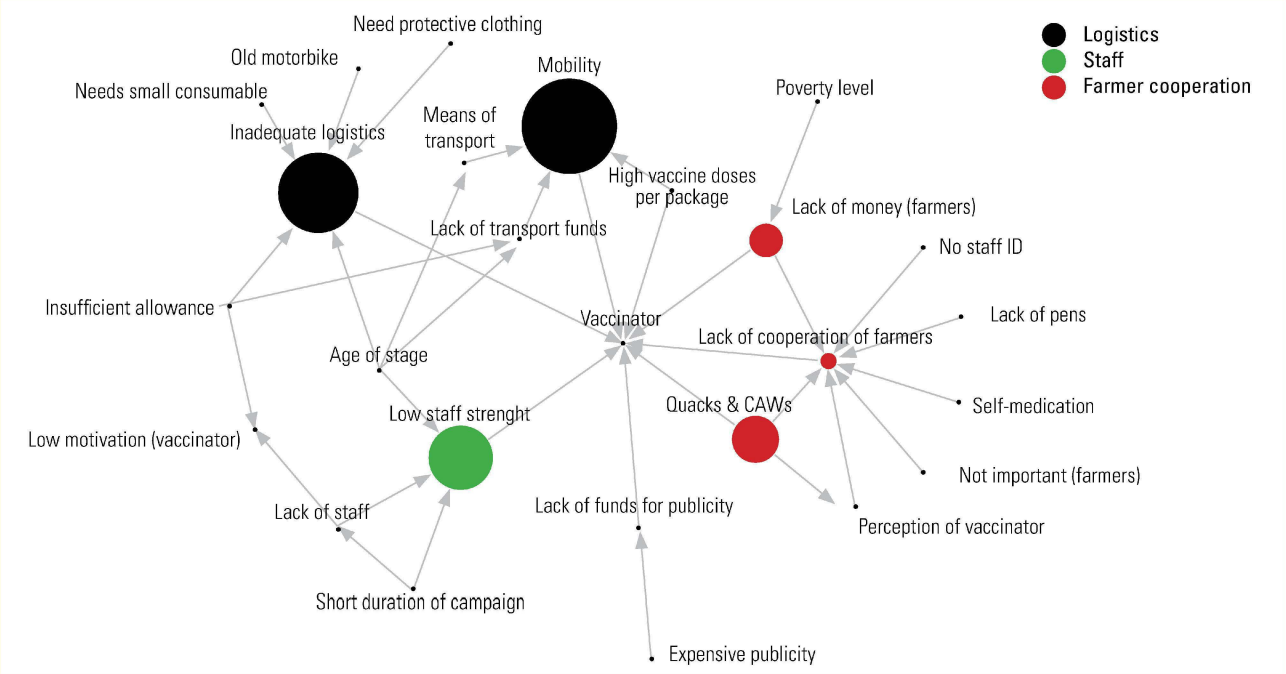


Fig. 8

Main challenges facing vaccinators

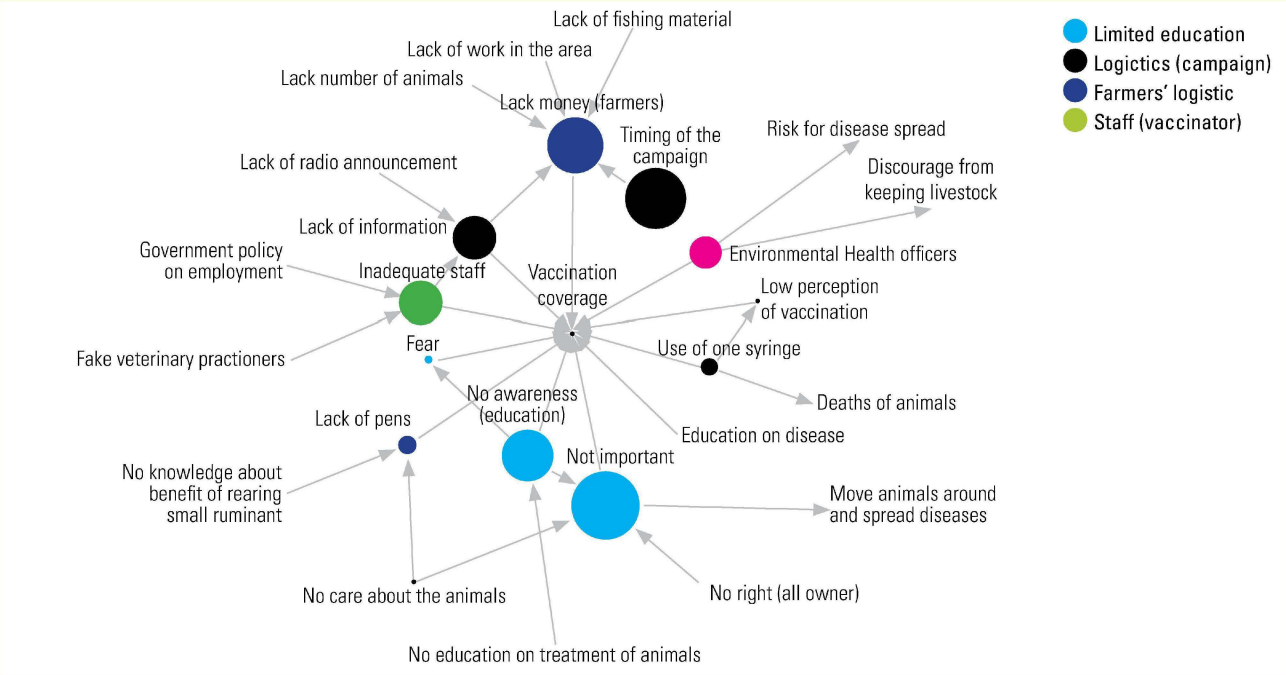


Fig. 9

Main challenges facing farmers

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Main findings

The vaccination teams encountered many problems with implementing the PPR campaign, in particular:

– far too little time was allocated to awareness-raising;

– the timeframe for implementing the campaign was so short that it was impossible to implement two vaccination rounds per village or to do a search;

– the vaccination period (March to April) was inappropriate because most of the animals were already free grazing (goats) or in transhumance;

– farmer mistrust of the first ever campaign organised specifically for small ruminants (with the result that some farmers refused to vaccinate their entire herd);

– door-to-door vaccination, which was the only option for this campaign owing to lack of enclosures in every village, was very demanding in terms of time and resources;

– few or no logistical resources (motorcycles), the defective condition of the motorcycles used by vaccinators and of some vehicles;

– packaging of the vaccine in 100-dose phials was a constraint because it led to considerable losses of unused vaccine.

Conclusions

General principles of vaccination

– Mass vaccination (all animals over the age of three months), in the Sudano-Sahelian region, in a single round early in the cold dry season, in view of the transhumant/nomadic nature of livestock farming and the impossibility of defining epidemiological units that can be studied throughout the control/eradication process.

– Any other type of vaccination (such as targeted vaccination, which is of doubtful efficacy in Africa) would require preliminary studies (incurring a high additional cost) to ascertain the epidemiological status of the disease in the country.

Organisation of the campaign

– Planning by the public services, which must be strengthened; awareness-raising among professional organisations; involvement of private veterinarians with an animal health accreditation mandate where possible.

– Organisation of the rounds, teams, cold chain and distribution of the vaccine, diluent and additional equipment to ensure fast and effective vaccination with high coverage (greater than 80%).

– Laboratories that produce PPR vaccine should always supply it with the diluent and the AU PANVAC quality label.

Vaccine bank

– A vaccine bank ensures a fast and efficient supply of top-quality vaccine and diluent (VSPA showed that excellent seroconversion rates are essential) in support of the current insufficient capability of vaccine-producing laboratories.

– The cost price of the vaccine dose (vaccine + diluent) is the fairest in the market.

Epidemiological study and vaccine efficacy monitoring

– The national PPR control and eradication campaign provides a good opportunity to rehabilitate and revive national passive and active epidemiological surveillance networks. Serological testing, in accordance with a predefined sampling design, makes it possible to monitor vaccine efficacy and the population's level of protection.