

**Project Evaluation Series**

**Final evaluation of Pursuing Pastoralist  
Resilience through Improved Animal  
Health Service Delivery in Pastoralist  
Areas of Ethiopia**

**Project code: GCP/ETH/083/EC**

**Annex 10. Three case studies:  
understanding the epidemiology**



## Case Studies

- 1: Numbers of confirmed PPR events during the life of the Project
- 2: Maps
- 3: PDS and risk-based vaccination versus blanket vaccination

### Case study 1: Numbers of confirmed PPR events during the life of the Project

The evaluation team attempted to understand how many confirmed PPR events had occurred during the life of the PPR Project by examining Bi-Annual Reports. It then compared this data for South Omo and compared it to what we had been told in the field and found there were incompatibilities. Field reports from other areas suggested similar disparities in understanding. This highlights the need for greater attention to common understanding on the meaning of a PPR outbreak.

The July-December 2017 Bi-Annual Report had data from the start of the Project to end 2017.

**(NB Table numbers are from the original report.)**

Table 7 shows all confirmed PPR events for the Project up to the end of 2017. Table 7 shows 24 PPR events, assuming each confirmed woreda was a single event.

Table 8 shows the results of NADHIC investigations. Table 8 appears to show confirmation of PPR in 4 woredas whose names (in red) do not appear in Table 7 (the two results from Mille, Afar were the same investigation but using different types of test). However, following the explanations provided for 2018 data below, the evaluation team assumes there were 24 PPR events from the start of the project to end of 2017.

#### from PPR Project Bi-Annual Report July-December 2017

**Table 7: Results of the PDS surveys conducted or outbreak investigated (until Dec 2017)**

Region/ project area	Number of PDS exercises reported	Number of woredas covered	Woredas where PPR is confirmed	Woredas where PPR was absent	Remark
<b>Afar</b>	8	11	7 (Kuneba, Teru, Telalak, Ada'ar, Chifra, Erebt, Dalifage, Berhale)	4 (Bidu, Afdera, Dalol, Gelea'alo)	VSF
	4	12	4 (Semirobi, Argoba, Dulecha, Hadealela)	Asayta, Dubti, Mille, Awra, Ewa, Kelewan, Yallow, and Dawe	BCO
<b>Somali</b>	9	9	3 (Moyale, Gorobabaksa, Guradhamole, Chireti,)	6( Mubarek; Adadile, Berano, Abaqora, Danana)	VSF
	2	10	5 (Aysha, Ma'ayso, Afdem, and Erer, Babile)	5( Fif, Hamaro, Qabirdahar, Kudunbur, Lehelow-yub)	BCO
<b>South Omo +</b>	8	8	4 (Malle, Nangatom, Dasenech, Ubadebretsehay)	Salamago, Hammer, Konso	BCO
<b>Borana</b>	1	5	Moyale (introduction from Kenya)	Miyo, Dhas, Wachile, Dire	BCO

**Table 8: Summary PPR outbreak investigations conducted and samples processed by NAHDIC (part Table)**

Regions	Zone/district/kebeles	Date of sampling	Result
Oromia	N.Shewa: District:Dera, kebele: Koro	24/09/2016	All swabs are positive for PPRV antigen
Oromia	Borena/ Moyale District	10/01/2017	Three of them were positive for PPRV antigen
Afar	Mille District	16/05/2017	9 of them were positive for PPRV antigen
Afar	Mille District	16/05/2017	7 of them were positive for PPRV
Somali	Jiggiga District	22/06/2017	All of them were positive for for PPRV antigen
Oromia	Borena/ Moyale District	08/06/2017	All of them were positive for PPRV antigen
Afar	Zone 03: Districts: Awash Fentale, Herhale, Semurobi, Hedelale. Kebeles: Doho, Dear, Aftewa, Fentigega	19/09/2017	All of them were positive for for PPRV

(Woreda names in green in Table 8 also appear in Table 7; woreda names in red don't.)

A similar comparison was made with the equivalent tables in the July-December 2018 Bi-Annual Report. In the 2018 Report, Tables 7 & 8 (below) show the PDS/ Outbreak Investigation (OI) data for January-June and July-December respectively, and Table 9 shows the NAHDIC data.

#### from PPR Project Bi-Annual Report July-December 2018

**Table 7: Results of the outbreak investigation and PDS surveys conducted (Jan-June, 2018)**

Region/ project area	Number of PDS exercises reported	Number of woredas covered	Woredas where PPR is confirmed	Woredas where PPR was absent	Remark
<b>Afar</b>	11	12	Kuneba	11 (Afambo, Asayta, Elida'ar, Hadele'ela, Semurobi, Dalifage, Dewe, Chifra, Awra, Gulina ,Yallo)	VSF-G
<b>Borana</b>	1	3		3 (Moyale, Taltale, Dillo)	BCO
<b>Somali</b>	2	2	Dakasuftu, Bokolmayo		VSF-s
<b>South Omo +</b>	2	2	Hamer, Ngangatom		BCO

**Table 8: Results of the outbreak investigation and/or PDS surveys conducted (July-December, 2018)**

Region/ project area	Number of PDS exercises reported	Number of woredas covered	Woredas where PPR was confirmed	Woredas where PPR was absent	Remark
Bale	1	4	4 (Raytu, Sewena, Guradhamole, Dawa Kechen)	-	VSF-G
Borana	1	3		3 (Moyalle, Taltale, Dilo)	BCO
West & East Hararge	2	8	7(Chiro; Guba Koricha; Chinaksen, Kubi Bordode, Meiso, Midega Tola; Dawa harawa)	1(Anchar)	BCO
Somali	2	12	6 (Amaro, Lagahidha, Garbo, Segeg, Dhun, Shekos)	6(Elwayu, Kebredahar, Kudunbur, Kubi, Salahad, Wangay)	BCO
Gamo Gofa, Segen, and Bench Maji Zones	4	4	2 (Kamba, Konso)	Ubadebretsehay; Maji	BCO
N & S Wollo; Oromia Sp.	4	4	2 (Harbu, Raya kobo, Worababu, Bati)	-	BCO
Tigray	2	5	4 (Saestsamba, Gulo mekeda, Enderta, Hintalo Wajirat)	1( Eurob)	BCO

**Table 9: Summary PPR outbreak investigations conducted and samples processed by NAHDIC from July to December 2018**

Region	Zone	Woreda	Sample types	No of samples	Teseted for	Result
Amara	North Wollo	Harbu	Swab	20	PPR antigen	6 positive & 14 Neg
SNNP	South Omo	Dasenech	Swab	6	PPR antigen	2 positive & 4 Neg
	South omo	Hammer	Swab	5	PPR antigen	0 positive & All Neg
Tigray	Easter zone	Tseda Amba	Swab	4	PPR antigen	4 positive & No Neg
	Easter zone	Gelamekda	Swab	6	PPR antigen	4 positive & 2 Neg

When asked about these 2018 data, the PMU gave the following comprehensive clarification:

- Tables 7 and 8 present OI & PDS activities combined. This was because most OI activities are followed by PDS and some PDS activities lead to OI, if the PDS team encounters suspected PPR. To explain this more, when the PDS team encounters suspected PPR while searching for the disease, it has to do OI (which basically means testing suspected cases using pen-side test kit). On the other hand, if the BCO or RVL receives reports of suspected PPR outbreaks, it sends a team to the area to do OI and if the cases react positive for PPR, the team has to do PDS to determine the risk of spread of the diseases and then delineate an epidemiological unit for vaccination. Originally, the plan was for BCOs or VSFs to implement and report the activities separately, but, practically, in most of the cases, they do both activities at a time and was difficult for them to report the activities separately. Another issue with reporting the two activities separately is the risk of double counting one event as two separate events.
- T 9 represents OI activities by NAHDIC based on reports of suspected PPR outbreaks by BCOs or RVLs to take appropriate laboratory specimen to confirm the cases by serological tests and do virus isolation for characterization. Therefore, the reports are already included in Ts 7 & 8.

- Regarding confirmed cases of PPR, they represent separate events. But, if a suspected PPR case is confirmed at one place, the follow up PDS activity will identify areas (including neighbouring woredas or regions) at risk of spread of the virus and that need to be covered by vaccination response. If the outcome of the PDS is negative, it means that specific area is assumed to be free of the disease temporarily and the same practice has to be repeated regularly for some time (2-3 years) before claiming the area PPR free.
- The number of PPR positive cases in each table represent the total of positive reports/events in that specific period of time across all the project areas. i.e. 5 Jan-Jun, 25 Jun-Dec 2018.
- Regarding dates of OI reports, the dates are available at BCO level and the reports are not compiled at date level in the Ministry. However, the PMU receives updates on OI, PDS and vaccination activities every week and uses the update to plan next steps in consultation with BCOs and if the need arises PMU consults BCOs to get actual dates of OI.

**Table 2019: Results of Outbreak Investigation and/or PDS surveys conducted Jan-Jun 2019**

Region/ project area	Number of PDS/OI exercises reported	Number of woredas covered	Woredas where PPR was confirmed	Woredas where PPR was not confirmed	Remark
<b>Afar</b>	2	9	1 (Chifra)	8 (Dallo, Adaár, Teru, Elidar, Bidu,Erebti,Abaala, Gulina)	VSF-G
	4	12		12 (Kori,Afder,Aysaita,Dubti,Afambo ,Mille,Amibara,Gewane,Gelealo, Awas Fentale, Argoba,Dulecha)	BCO
<b>Somali</b>	3	21	11 (Gashamo, Daror, Aware, Marsin, Harshin, Tulguled, Danbal, El-ogaden, Debewoyn, Dig, Gunagado)	10 (Elwayu, Kebredahar, Kudunbur, Kubi, Salahad, Wangay, Kebirbaya, North Jijiga, Awbare)	BCO
	6	17	9 (Moyale, Hargele, Chireti, Barey, Kohle; Boh, Gelade, Gelehamur, Elele)	8 (Kadaduma, Karsadula, Filtu, Guradhamole, Gurobakaksa, Godgod, Hudet, Ferfer)	VSF-S
<b>SNNPR</b>	3	10		10 (Salamago, Semen Ari, Debub Ari, Ale, Dasenech, Nyangatom, Basketo, Male, Konso, Ubadebretshay)	BCO
<b>Bale</b>	3	5		5 (Madawolabu, Dawa sarar, Legahidha, Arero, Guchi)	BCO

<b>W &amp; E Hararge</b>	4	10		10 (Kombolcha, Haromaya, Meta, gorogutu, Anchar, Qumbibordode, , Golo-oda, Babile, Golo Oda, Fentale)	BCO
<b>N &amp; S Wollo</b>	3	4	4 (Jile Tumuga, Minjar-shenkora, Menzmama, Mojana)	-	BCO
<b>Tigray</b>	7	7	3 (Gulo Mekeda, Erob, Raya alamata)	4 (Kiliteawulao, Ambalaje, Endamehoni, Astbiwonbera)	BCO

As explained above, the 2018 Tables show 30 events (5 plus 25) during 2018. The 2018 Table 9 shows the NAHDIC data for 5 more detailed investigations, 3 of which, in Tigray and Amhara, will be from the newly added highland-lowland transition woredas.

Table 2019 above, from the January-June 2019 Project Bi-Annual Report, shows that in 2019 up to end June, there were 28 confirmed PPR events.

**Table: Confirmed PPR Events by Region from OI and/or PDS during Project to June 2019**

Region	2016 & 2017	2018	Jan-Jun 2019	Total
Afar	11	1	1	13
Somali	8	8	20	36
Oromia Borena	1	-	-	1
Oromia Bale	-	4	-	4
Oromia Hararge	-	7	-	7
SNNP South Omo	4	-	-	4
SNNP GG, Segan, BM	-	4	-	4
Amhara Wollo	-	2	4	6
Tigray	-	4	3	7
<b>Total</b>	24	30	28	82

**Table: Data from Jinka laboratory on confirmed PPR events in South Omo during Project**

Name of Woreda	Number of Outbreaks	Laboratory confirmation
Maleie	2	Sodo lab
Bena Tsemay	1	Jinka lab
Hamer	2	Jinka lab
Nyangatom	1	Sodo lab
Dassenech	2	Sodo lab
Hamer	4	Sodo lab

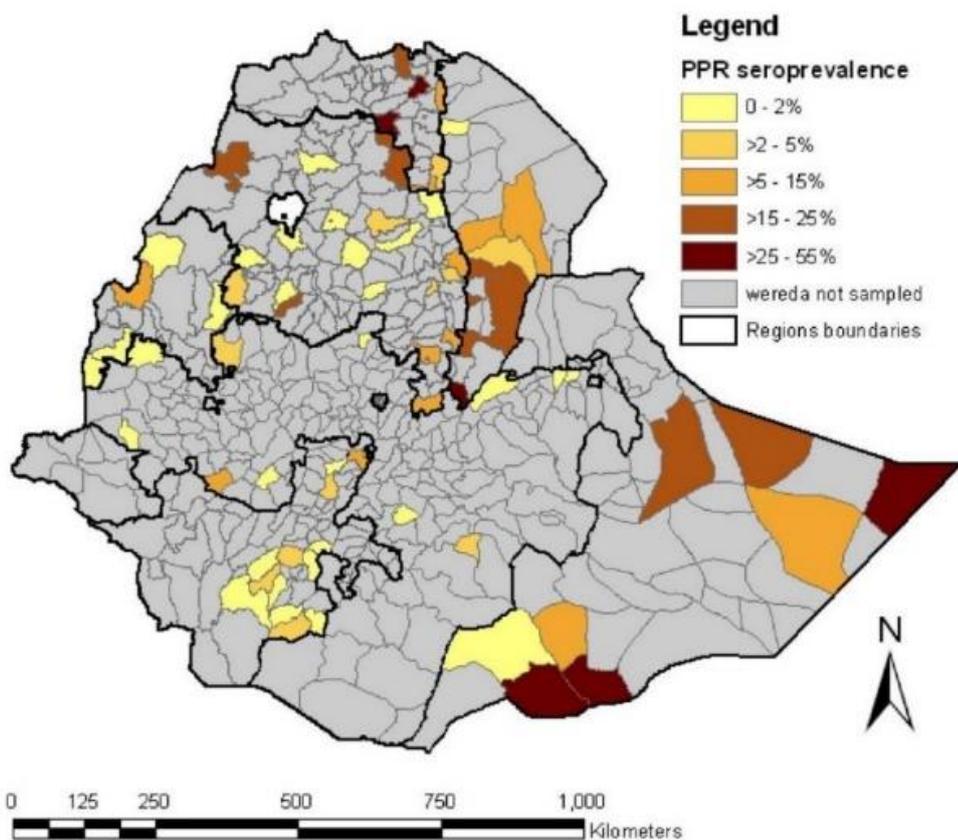
Bi-Annual Report data shows four outbreaks in South Omo during the Project; Jinka laboratory data shows twelve. To elucidate this further requires further accurate date and location data.

**Case study 2: Maps**

This case study makes sense of the maps available about PPR from before the project to 2019.

**Figure 1: Map of PPR distribution based on a sero-surveillance exercise from 1999**

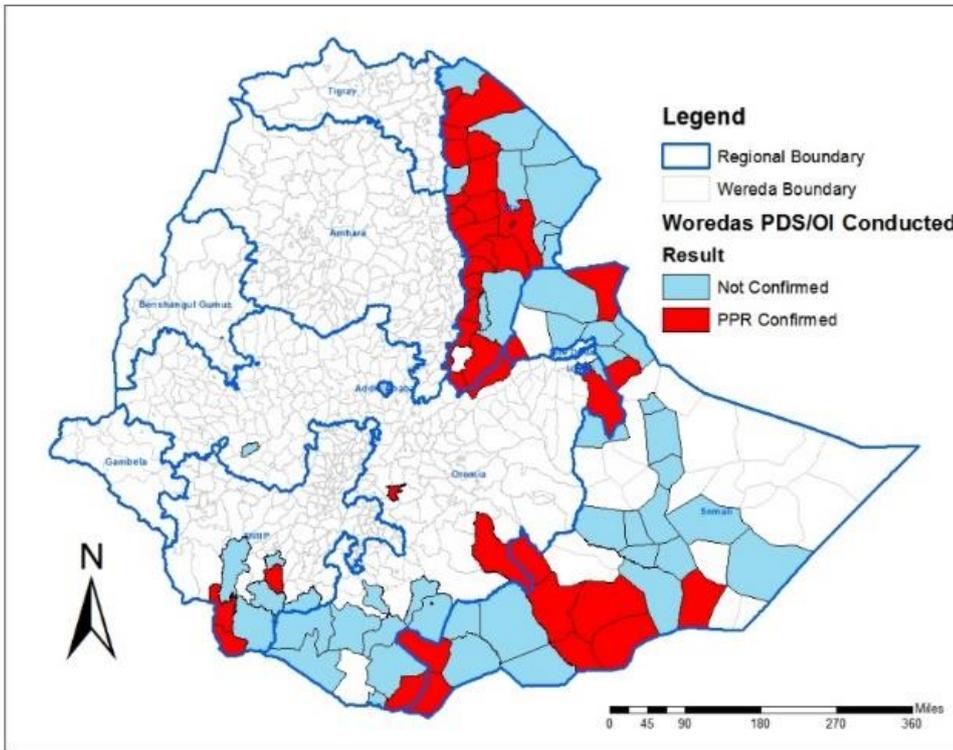
**A baseline of sorts**



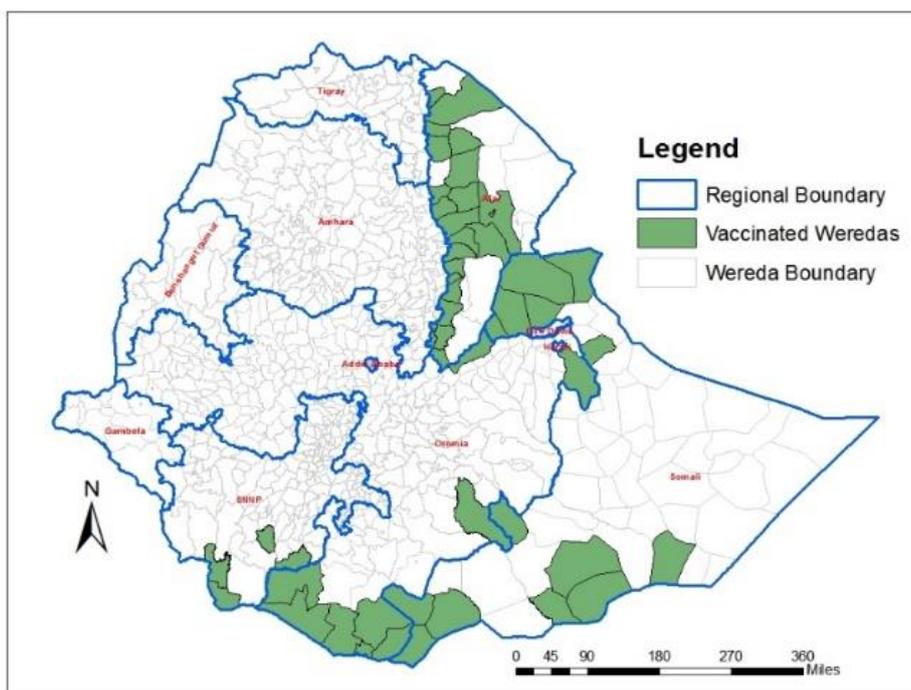
A previous project collected PPR baseline sero-surveillance data but this was never analysed and will now be out of date. However, the map below comes from 1999 sero-surveillance data analysed in 2012 and

provides a baseline of sorts as PPR vaccination between 1999 and 2015 is thought not to have been structured towards nationwide control.

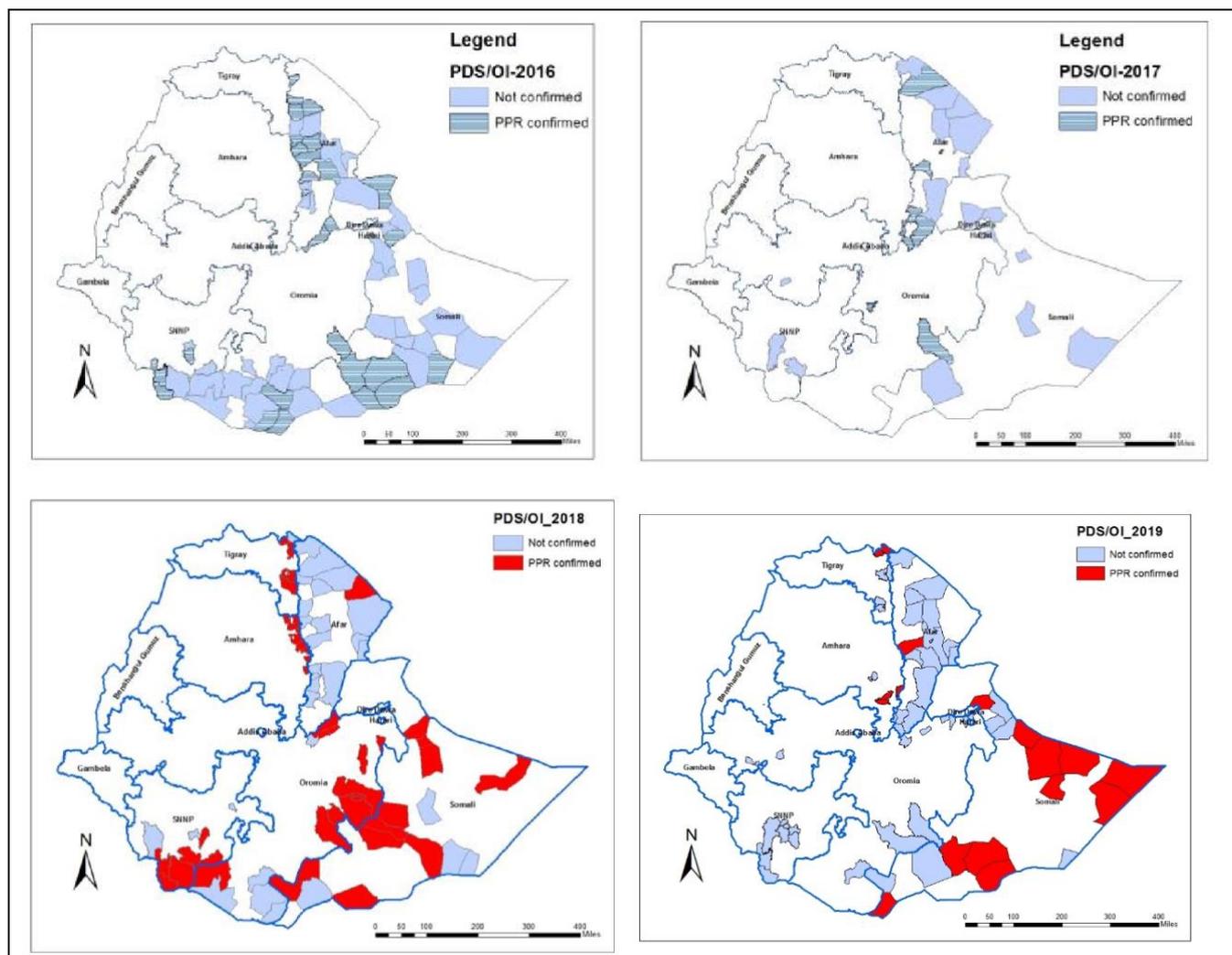
**Figure 2: Map showing 2015-2017 data for Project of woredas where PDS and/or Outbreak Investigations have been conducted, and which had PPR confirmed, and which did not.**



**Figure 3: Map showing Woredas covered by vaccination during Project, 2015-end 2017.**



**Figure 4: Woredas where PDS and/or Outbreak investigations were undertaken 2016-2019**



These maps depict woredas where PDS and/or OI were done and where PPR was confirmed. Therefore, they are pictorial illustration of the PDS / OI reports in the Case Study above.

Some woredas missing in the 2019 map:

Somali: 14 woredas from which in 8 of them PPR was confirmed, most of these woredas are newly established woredas without a code in the shape file

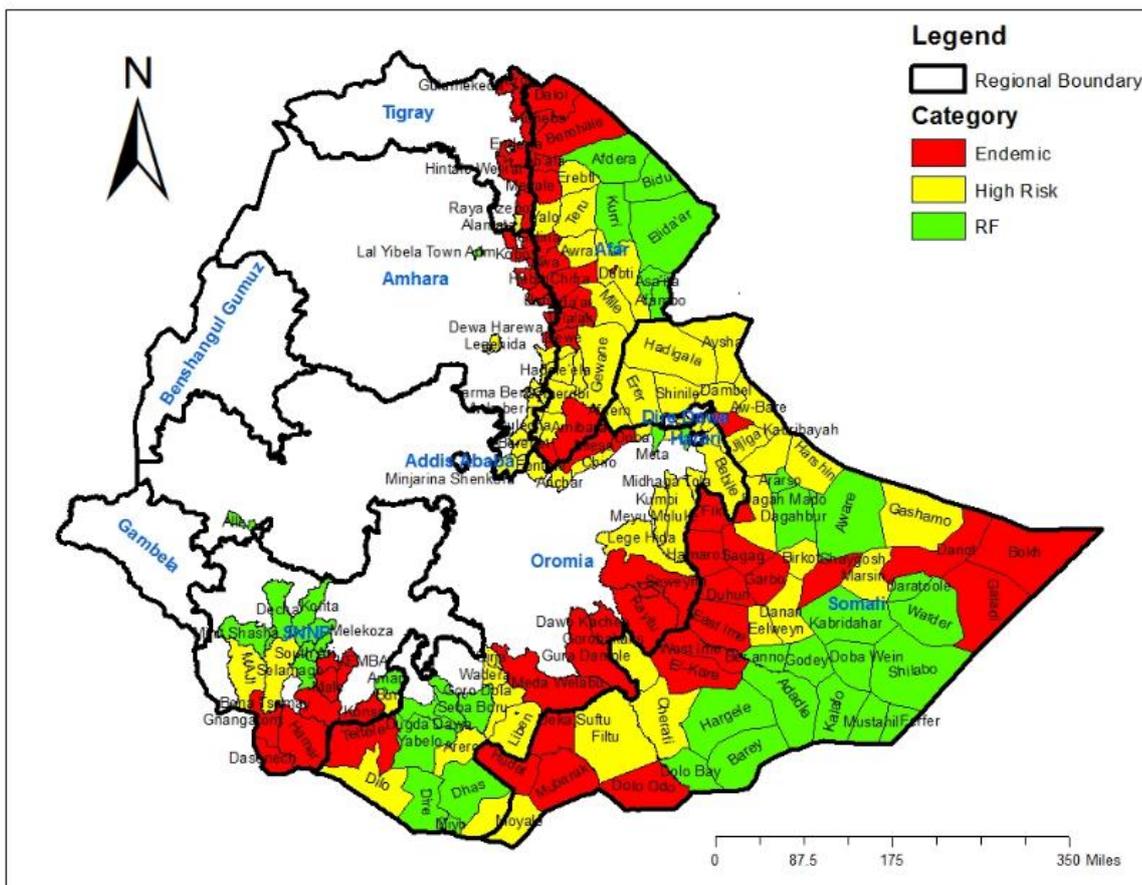
Tigray: 1 woreda where PPR outbreak was confirmed, same explanation as above'

The maps show much PDS/OI activities in 2016 which slows down in 2017 due to security problems in some of the project areas (Oromia and Somali Regions) and then it was expanded in several areas in 2018. The number of confirmed cases also shows the same trend.

PDS activities are based on risk categorization, which is revised every six months during regional and national stakeholders coordination meetings. The next revision will be in September 2019.

**January 2019 PPR Risk map produced by PPR Project PMU:**

Categorization of risk levels based on standard methods and procedures for control of PPR in the greater horn of Africa (2014):



**Endemic area:** geographic area where disease known to be present at low level of incidence

**High risk area:** area with high probability of outbreaks occurring with significant high number of susceptible population.

**RF\*/Area of no known disease status:** area without vaccination where no clinical disease seen or reported within past three years.

\*'RF' stand for relatively free, which refers to areas which are assumed to be free temporarily.

NAHDIC has been doing sero-surveillance of young stock in selected RF areas to detect the circulation of the virus in the new generation of small ruminants.

When PDS is done in an area without any prior report of confirmed PPR cases/outbreak:

if it finds no disease that area is considered as free for the time being;

if PPR is confirmed in the area it is considered endemic and will be surveyed periodically to update the PPR status.

Areas which are located close to an endemic areas and are known to be at high risk due to factors like sharing of grazing and watering areas and small ruminant trade, they are considered high risk areas.

There are some wordas in the project areas specially in Somali Region, which have not been searched by PDS yet. PDS will be intensified in the remaining period of the project and beyond to ascertain that vaccinated populations are indeed free of PPR (since it is believed that most, if not all, of the endemic and high risk areas are covered by vaccination at least once).

**Case Study 3: PDS and risk-based vaccination versus blanket vaccination**

The PPR control and eradication strategy is risk-based accelerated vaccination as opposed to the traditional blanket vaccination approach. Progressive control based on repeated inoculation of all susceptible small ruminants is considered too expensive (socially and economically), and too wasteful of opportunities for greater epidemiological understanding of the disease, to be implemented. Therefore an epidemiologically-based targeting of endemic populations and high-risk zones informed by efficient surveillance is preferred.

The logical starting point in this control strategy is the assessment of the actual status and prevalence of PPR in the country as a basis for scientifically informed planning and implementation of sustainable control measures against the disease. This would also establish, in real terms, the "hot spots" that need to be targeted for intensive vaccination, bio security, movement control and other measures. These include a thorough knowledge of all risk and associated factors such as: the number and distribution of susceptible species; movement patterns for market and grazing; known infected areas; the status of areas along international borders; cultural practices contributing to disease transmission, etc.

However, in Afar Regional State, for instance, small ruminants in 26 woredas out of 32 were vaccinated up to four times in the project period (2016-2019). This is about 81 percent of the administrative woredas being covered by the vaccination. Therefore, it is unclear if the risk-based strategy has been followed or not. In relation to this observation, discussion with the branch coordinator of Afar region confirmed that the region implemented more of a blanket type vaccination though the PDS exercises have been conducted as planned. The major reason was the high movement of small ruminants for grazing, marketing and watering, which effectively extended the epidemiological unit from one location or woreda to the whole of Afar, and made it impractical for the team to focus merely on a closely-identified risk area.

Since the vaccination was effectively given in the vast majority of the woredas, now the disease has been significantly suppressed. The BCO in Afar has recently conducted PDS in almost all the woredas of the region, but only in Bada kebele of Dallol woreda was PPR detected. As a result, the approach, which is nearly blanket vaccination in terms of geographic coverage, is effective enough to reduce the PPR cases to virtually zero.

In another scenario in SNNPR and Oromia regions, the risk-based approach is more or less strictly followed up. But, evidence from field observations, vaccination records and outbreak reports indicate that PPR is effectively spreading among different woredas in both regional states. For instance, some 12 outbreaks of PPR have been confirmed by Jinka and Sodo laboratories using the Penside test kit. The most recent report was in Bena Tseay woreda in Dec 2018. Below are the various outbreaks confirmed in South Omo over the project period indicating that it was not possible to contain the disease at Maleie woreda where it first occurred:

<b>Name of Woreda</b>	<b>Number of</b>	<b>Laboratory</b>
Maleie	2	Sodo lab
Bena Tsemay	1	Jinka lab
Hamer	2	Jinka lab
Nyangatom	1	Sodo lab
Dassenech	2	Sodo lab
Hamer	4	Sodo lab

Even in the project period it was evident that many PPR outbreaks have been repeatedly confirmed from the same woreda, and it is really compelling to question why? Possible factors can be that the vaccination delivery was not effective in terms of coverage, probable breakage of cold chain, or the strategy of risk-based and accelerated response was not properly implemented for various reasons.

Therefore, it is prudent to conclude that, despite the efforts to enhance vaccination coverage following the risk-based strategy, there is evidence indicating serious limitations in fully implementing the strategy and the PDS tool associated with it. The difficulty in properly delineating the epidemiological units for vaccination could also be one of the challenges upsetting the strategy.

Participatory disease surveillance as an integral component of the surveillance plan will be very useful for disease intelligence gathering and detection of clinical cases in extensive and pastoral husbandry systems to enable targeting of control interventions. During the PPR project implementation period a number of PDS trainings were conducted and mobile PDS teams were established. Several PDS events have been also held. However, the result is equivocal in terms of detecting PPR cases. In many instances, the PDS exercises were mainly outbreak-driven. Hence, the PDS tool was not properly used to guide the vaccination as per the strategy.