

Final evaluation of “Pursuing pastoralist resilience through improved animal health service delivery in pastoralist areas of Ethiopia”

**Project Evaluation Series
04/2020**

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pastoralist resilience through improved
animal health service delivery in
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Project code: GCP/ETH/083/EC**

Required citation:

FAO. 2020. *Final evaluation of "Pursuing pastoralist resilience through improved animal health service delivery in pastoralist areas of Ethiopia"*. Project Evaluation Series, 04/2020. Rome.

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ISBN: 978-92-5-132378-6



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Acknowledgements

The FAO Office of Evaluation (OED) would like to thank all those who contributed to this evaluation.

The evaluation team was composed of Dr Stephen Blakeway (Team Leader), Dr Berhanu Admassu and Dr Fisseha Abenet Tadesse, managed by Mr Eoghan Molloy and Ms Maame Duah from the FAO Office of Evaluation in Rome.

The evaluation was carried out with the invaluable assistance of the FAO staff in Addis Ababa, Ethiopia, the Project Management Unit, and associated staff in the Ministry of Agriculture's Disease Prevention and Control and Epidemiology Directorates. Their insight, knowledge, advice and comments made this evaluation possible. Dr Hassen Chaka patiently guided the first part of the field work, facilitating introductions, and lending his epidemiological experience to the elucidation of disease terms in a Somali-Moyale community, an impromptu masterclass in this vital aspect of participatory disease surveillance (PDS). Dr Kelay Belihu kindly and diligently answered a barrage of emailed questions that arose during the writing of this report. Dr Gijs van't Klooster provided further background detail about the Project.

The evaluation benefited from the inputs of many other stakeholders, including government staff in the Ministry of Agriculture, Regional Bureaus, Regional Veterinary Laboratories, woreda animal health offices, and schools; staff of VSF-Germany, VSF-Switzerland, the Royal Veterinary College; staff of other UN agencies, OIE, other research centres, freelance consultants, and other private business people. All their contributions were essential to the team's understanding and are deeply appreciated.

The greatest thanks go to the women and men in the communities visited, most of whom are busy pastoral animal keepers who generously gave up their time with very little notice to join in the participatory rural assessment (PRA) exercise and answer all questions. They are the resilient ones. Without their invaluable contribution this evaluation would have had little meaning.

Acronyms and abbreviations

ADNIS	Animal Disease Notification and Investigation System
AU-IBAR	African Union - Inter-African Bureau for Animal Resources
BCO	Branch Coordination Office
CAHW	Community animal health worker
CCPP	Contagious Caprine Pleuropneumonia
DOVAR	Disease Outbreak and Vaccination Reporting system
EC-HEARD	Health of Ethiopian Animals for Rural Development
EC-SHARE	Supporting Horn of Africa Resilience
FMD	Foot-and-Mouth Disease
GSCEP	Global Strategy for the Control and Eradication of Peste des Petits Ruminants
GTP	Growth and Transformation Plan
ICPALD	International Centre for Pastoral Areas and Livestock Development
IGAD	Intergovernmental Authority on Development
NAHDIC	National Animal Health Diagnostic and Investigation Centre
NDRMC	National Disaster and Rehabilitation Management Commission
NGO	Non-governmental organization
NVI	National Veterinary Institute
NVS	National Veterinary Service
OIE	World Organisation for Animal Health
PANVAC	Pan-African Veterinary Vaccine Centre
PARC	Pan-African Rinderpest Campaign
PDS	Participatory Disease Serching
PPR	Peste des Petits Ruminants
RED&FS	Rural Economic Development and Food Security
RP	Rinderpest
RPLRP	Regional Pastoral Livelihood Resilience Project
RVC	Royal Veterinary College, London
RVL	Regional Veterinary Laboratory
SDG	Sustainable Development Goal
SGP	Sheep and Goat Pox
TAD	Transboundary Animal Diseases
VSF-G	Vétérinaire sans Frontière, Germany
VSF-S	Vétérinaire sans Frontière, Suisse

Executive summary

Introduction

1. The Supporting Horn of Africa Resilience (EC-SHARE) 'Pursuing pastoralist resilience through improved animal health service delivery in pastoralist areas of Ethiopia' project, GCP/ETH/083/EC (EU funded project Ref: FED/2014/346-779-EU-FAO) (hereafter referred to as 'the Project') has been a useful and successful project.
2. It has given focus to Ethiopia's commitment to eradicate Peste des Petits Ruminants (PPR - an internationally notifiable goat and sheep transboundary animal disease (TAD)) by 2027 in conjunction with strengthening animal health and welfare services particularly with regard to controlling other TADs.
3. Among other things the Project has tested Ethiopia's animal health and welfare services providing lessons that will be valuable as Ethiopia's five-year Growth and Transformation Plan 2 (GTP2) approaches 2020, its final year, and planning starts for GTP3 with its opportunities for new thinking.
4. The Project has shown that:
 - i. it is possible to manage and control PPR disease in goats and sheep in areas of Ethiopia and so reduce its economic and social impact;
 - ii. Ethiopia has the technical capability and human competence and commitment to do this;
 - iii. stakeholders at all levels feel strongly that the momentum for PPR control and improved animal health and welfare services should not be lost.
5. However, the Project has also shown that controlling PPR across the whole country, and going further to eradicate the disease in Ethiopia in 2027, and across Africa by 2030, faces enormous challenges. Qualifying and quantifying how control and eradication of PPR will affect 'pastoral resilience'; considering how alternative ways of delivering results, e.g. bringing women into every aspect of the programme; strengthening epidemiology; and using a 'One Welfare' perspective; will be particularly important if the programme is to play its role in Ethiopia's wider transformation.

Main findings

Relevance

6. The primary purpose of the Project is to move Ethiopia along its PPR eradication pathway and strengthen the National Veterinary Services (NVS) particularly regarding control of TADs, while its Overall Objective is to increase food security and strengthen pastoral resilience. The Project funded under a wider EC SHARE programme which is part of an Intergovernmental Authority on Development (IGAD) pastoral resilience initiative. Therefore, Project relevance has to be evaluated in these wider contexts.

7. The PPR project result areas address key priorities of the country:
 - i. Small ruminant diseases are a significant cause of reduced production and productivity to the country's huge small ruminant population.
 - ii. The diseases prioritized for intervention, namely PPR, Sheep and Goat Pox (SGP) and Contagious Caprine Pleuropneumonia (CCPP), all contribute to high mortality, especially in lambs and kids; and the Project contributes to developing well-equipped diagnostic laboratories and capacity of vaccine production to prevent or control them using well-coordinated, strategic interventions.
 - iii. Small ruminants are a key livestock asset of the rural poor, pastoral and agropastoral population of the country with many informal social and economic functions undervalued in standard international economic assessments.
 - iv. Livestock contribute significantly to the country's foreign currency earnings, with pastoral lowlands contributing nearly 90 percent of the exportable stock.
 - v. The Project was aligned with the National, Regional and Global Efforts of PPR Control and Eradication (with Ethiopia's first PPR progressive control and eradication strategy in 2012 older than regional and global PPR control and eradication strategies formulated by IGAD, African Union - Inter-African Bureau for Animal Resources (AU-IBAR) and Food and Agriculture Organization of the United Nations - World Organisation for Animal Health (FAO-OIE).
8. A comparison between PPR and Rinderpest (the equivalent disease of cattle, the first animal disease eradicated globally, and the model for PPR eradication) highlights that PPR is a disease of goats and sheep which are looked after primarily by women, and women need to be at the heart of every part of PPR control and eradication. This is not just for equality - UN projects should be working actively for that anyway - but straightforward pragmatism. Women see signs of illness first, they look after the animals in sickness and in health, collect their milk to feed their children, and appear able to market their animals across lines of conflict. The programme is likely to be more effective, efficient and sustainable if they are at its heart.
9. The Project should have worked to qualify and quantify its social and economic impact, possibly through partnering with pastoral development projects that track household economies, or by working with local university and research institutions. PPR eradication is currently justified on high level global economic projections. Local evidence would better justify work to control and eradicate PPR and other animal diseases in Ethiopia, and to strengthen the National Veterinary Service more broadly. Local evidence would better inform Ethiopia in relation to the big overarching challenges: the Sustainable Development Goals (SDGs) and 'One Welfare' issues such as climate change, global biodiversity loss, population growth, meat and food production, and our changing relationship to the biosphere. Pastoral animal keepers raised these issues during evaluation PRA interviews as pressing challenges, as real, not theoretical concerns.
10. Evidence would justify an enabling environment and strategic investment for an NVS combining cutting-edge disease surveillance, diagnostics and prevention, with effective community-based services supported by a well-regulated public-private sector. This is timely with the GTP2 to GTP3 transition presenting an opportunity for more genuinely transformative visioning and planning.

11. This evaluation supports SHARE programme mid-term review recommendations for better integration of the individual SHARE projects, e.g. by sharing some overarching reporting indicators, or with more integrated communications. Monitoring and evaluation (M&E), indicators and practices in common with other UN agency and donor projects would be even better. Or, better yet, programmatic integration so, for example, animal keepers benefit from joined-up, clearly communicated interventions; their children learn about the same things in school so the whole community can discuss ideas together; pastoralists rewarded for safeguarding and monitoring lowland biodiversity as much as for producing meat (referencing SDG 15 Life on Land); pastoral meat with added market value because of its provenance (referencing recommendations from the mid-term evaluation on intensifying livestock meat offtake); and physics/science departments reaching out to excite pastoral children about the possibilities of solar power and the potential value of applied learning, particularly in places with project solar cold chain equipment (referencing SDG 4 Quality Education).

Effectiveness

12. The Project was well designed with a strong internal logic; its components complement each other. Once it finally started, it was managed in a smart and diligent way; it is excellent, straightforward and honest in its reporting, also regarding challenges it has faced. The Project has worked hard to address shortcomings and weaknesses; and, with the help of several no-cost extensions, it will have achieved almost all the activities it set out to achieve.

Result 1. Improved real-time understanding of the transboundary animal diseases (PPR, SGP, FMD and CCPP) status in the pastoralist areas of the country.

13. The Project has supported the redesign of MS Access based monthly Disease Outbreak and Vaccination Reporting system (DOVAR) to a web-based monthly Disease Outbreak and Vaccination Reporting system (DOVAR-2). Woreda reports fed to Regional Veterinary Laboratories (RVLs) are entered into a web-form, with emailed Excel spreadsheets providing a backup when necessary. Despite significant challenges, training and support have helped raise national average monthly reporting rates from 35 percent in 2015 to 73 percent in June 2019. The Project has supported Afar, Jijiga, Yabello, Sodo and Jinka and more recently transition zone RVLs to cascade DOVAR training. Nevertheless, reports from some woredas, particularly in Somali, can be infrequent and slow to come in.
14. The Project has taken forward a mobile phone-based Animal Disease Notification and Investigation System (ADNIS) that will one day significantly speed up and streamline disease notification, epidemiological analysis, and response. ADNIS embeds time and geographical information with disease report data which will greatly strengthen epidemiological analysis and disease tracking. ADNIS is still in its infancy, but after good progress in 2017 it ran into challenges. End-users have recently been re-trained and usage is rising again.
15. High-quality Participatory Disease Searching (PDS) will be essential for the final eradication of PPR. The Project worked with the Royal Veterinary College (RVC), United Kingdom of Great Britain and Northern Ireland, to train PDS trainers, who continue to cascade PDS training to woreda level. Currently, PDS and Outbreak Investigations are reported together. PDS has already widened epidemiological knowledge about PPR but quality needs to

improve. There are some who excel at PDS; these people need to be identified, further trained and retained.

16. The National Animal Health Diagnostic and Investigation Centre (NAHDIC) supports the Project through sero-monitoring, sero-surveillance, confirmatory diagnostics, and training of RVLs. The Project has assisted NAHDIC to retain its International Organization for Standardization (ISO) certifications, and funded its work on PPR (although these functions are part of NAHDIC's national mandate). More work could be done on virus typing to better understand disease circulation, but this will require a better system for collection and submission of field samples.

Result 2. Improved quality (through production of PPR thermostable vaccine) and quantity of PPR vaccine production at the National Veterinary Institute.

17. After supporting the National Veterinary Institute (NVI) to produce thermostable PPR vaccine, the Project, outside its original plan but with European Union donor understanding and support, and after great effort and expense, has procured highly specialised equipment (a lyophiliser and a vaccine dispensing, stoppering, capping and labelling (dscl) machine) that will allow NVI to produce the vaccine in the amounts needed to sustain the PPR eradication campaign across East Africa. The vaccine dscl machine in particular is highly specialized and procurement of a model with the necessary specifications has been a particularly tough challenge. The Project finally signed a supply contract in February 2020 for delivery in September 2020 and installation and staff training to be completed by 25th November 2020, the final end of the whole EU-SHARE Programme. This is a commendable achievement.¹

Result 3. Improved capacity to implement progressive disease control programmes, particularly PPR and SGP in small ruminants.

18. The Project has helped develop NVS competence and effectiveness in response to TADs: i) by raising PPR awareness at Federal and Regional level; ii) by training and supporting staff; iii) by facilitating vaccination and related activities; and iv) by managing a change from a sporadic 'blanket' approach to vaccination to a more responsive, information-based, 'targeted' approach. The disease appears to be well-managed in Afar, but still faces major challenges in other areas, e.g. Somali.
19. Regional institutional capacity has been strengthened by regional laboratories and field veterinary services taking on the responsibility for 'cascading', organizing and delivering, DOVAR, ADNIS, and PDS training to woreda level; and for managing the change in approach to vaccination.
20. The Project has produced good cross-media awareness-raising communication materials, and detailed training support manuals. However, it is unrealistic to expect one in-house communications officer to produce cutting edge materials across all media. Communications and extension could be much more powerful and effective with a dedicated department producing (or commissioning from the private sector) integrated

¹ While the bulk of this Evaluation Report was written in mid-2019 following the Evaluation Mission, and is factually correct up to that time, finalisation of the report has been held to ensure accuracy about the procurement of the vaccine dispensing, stopping, capping, and labelling machine procurement up to the signing of a final contract for delivery, installation and staff training.

awareness-raising and training materials for all aspects of the NVS and related external projects in a wider context.

21. PPR eradication is a long-term programme and significant progress is still needed with DOVAR ADNIS, PDS, vaccination, and awareness-raising, and with bringing women into the programme.

Result 4. Improved national and subregional animal disease control coordination and knowledge exchange.

22. The Project established a National PPR Steering Committee that included other donor projects working in the animal health sector, and has organized regular coordination meetings and workshops at Regional, National and International levels, facilitating senior staff (e.g. State Minister, Chief Veterinary Officer, Directors of Epidemiology, NVI and NAHDIC) to fulfil their international and cross-border cooperation and collaboration responsibilities at OIE and in other forums.
23. The Project has hosted and/or organized two subregional PPR Coordination meetings in Addis Ababa and in Naivasha, Kenya, in collaboration with the Intergovernmental Authority on Development Centre for Pastoral Areas and Livestock Development (IGAD/ICPALD) in October 2018 and June 2019.
24. The Project Management Unit has built constructive relationships with other animal health and welfare related projects to lobby for long-term alignment of strategy across PPR/TAD work.
25. Nevertheless, despite all this work on coordination, and the passionate commitment of those involved in the PPR Eradication Programme at all levels, the Project itself identifies weakness in all areas of coordination as ongoing challenges.
26. It is unclear if current national and international levels of political and financial commitment are enough, and who will lead all this coordination work after the PPR Project ends. Ideally, this would be owned nationally by the Minister of MoA, the State Minister of Livestock Resources Development, the NVS and the veterinary services in the Regions, with additional awareness raised through the Rural Economic Development & Food Security Committee (RED&FS) to help align strategy; and internationally by organizations such as AU-IBAR, IGAD and East African Community (EAC).

Efficiency

27. The Project was formulated on the assumption that various essential components would have been delivered by earlier projects. These included highly specialized equipment for making thermostable vaccine; transport for regional laboratories; early stages and components of ADNIS; a pilot public-private partnership project; and an epidemiological baseline.
28. The European Union agreed to procurement of vaccine production equipment, vehicles, and development of ADNIS components essential for Project progress. Procurement of vaccine equipment proved highly technical, extremely expensive and enormously time-consuming. However, the equipment will now be the best available for thermostable vaccine production on a scale that allows East Africa to move to PPR eradication.

29. The Project was significantly delayed by various other unexpected challenges. Problems in the FAO Office in Ethiopia led to a stalemate regarding key appointments which required donor intervention and delayed the start of the project by over a year, but the situation has been comprehensively sorted out and the Project has worked well since.
30. All of this has contributed to the project running well past its intended end-date (November 2017), and will have contributed to FAO not taking the lead role in the European Union-funded Health of Ethiopian Animals for Rural Development project. Field work will now continue until end-December 2019, and the delivery, installation and training for the NVI's new vaccine dispensing, stoppering, capping and labelling machine will continue to November 2020.
31. The European Union as donor deserves praise for its patience, flexibility and pragmatism in accommodating these expensive and inconvenient adaptations with regard to procurement, budget, and timeline. The Project Management Unit has done well to take on and work through these additional complex challenges.
32. FAO bureaucracy, particularly the Letter of Agreement (LOA) process, and particularly when conflated with additional European Union requirements, was criticized for causing implementation gaps and delays. For the VSFs, for example, this led to periods when staff could not be paid.
33. The need to budget for daily subsistence allowance (DSA) and 'guestimate' vaccination figures complicates the LOA process. In the future, in the move to eradication, it would be better to have a more responsive draw-down fund available to facilitate vaccination wherever and whenever it is needed.
34. Despite initial government scepticism, VSF-Suisse in Somali and VSF-Germany in Afar, as non-governmental organization (NGO) implementing partners, appear to have played a useful role in the PPR Project. Some of the apparent advantages of VSFs included: i) easier bureaucracy enabling flexible and quick decision-making in looking for alternative financing mechanisms to cater for costly delays associated with LOA of FAO; ii) their operations and community level presence over many years in the pastoral lowlands of Ethiopia with mechanisms for institutional memory and understanding of the ground situation and ongoing connection with the beneficiary community and the community animal health workers (CAHWs); iii) full-time staff assigned specifically to PPR work; iv) relatively stable working environment and management; and v) relatively smaller operational areas and more focused work. However, cost per head of goats and sheep vaccinated, taking into account costs such as higher staff salaries, office rent and running costs, is likely to be higher than the government-led interventions, unless they were also able to deliver vaccination more efficiently. While the evaluation was not able to analyze this level of detail, a more detailed study would be warranted particularly if NGOs play a significant part in Public-Private Partnerships.
35. The role of NGOs in the NVS deserves further study, particularly in relation to developing public-private partnerships. More detailed epidemiological records would allow more straightforward comparison of effectiveness and efficiency, for example in PDS and speed and quality of vaccination response to confirmed PPR events, and cost-benefit analysis.

36. Despite this Government Cooperation Project working towards targets set out in the Government of Ethiopia Growth and Transformation Plan 2, the Project feels like a donor project rather than Government-owned. Lack of buy-in from, and integration between, the Federal Ministry and Regional Bureaus is an ongoing challenge, particularly in the face of high staff turnover.

Sustainability

37. The most obviously sustainable part of the Project is in Result Area 2 (Improved quality (through production of PPR thermostable vaccine) and quantity of PPR vaccine production at the National Veterinary Institute). NVI's new lyophiliser and vaccine dispensing, stoppering, capping and labelling machine will continue to benefit production of thermostable PPR vaccine, and other vaccines whose production is compatible with the new machines.
38. The other Result Areas are more questionable. Result Areas 1 and 3 have involved capacity building; internet-related equipment, field equipment and vehicles; and field work.
39. Benefits from individual and organizational capacity building has been highly regarded and the benefits will persist. However, continuing professional development/capacity building/training (CPD) plays a vital part in maintaining a healthy profession, and it is not clear who will be providing it in future. DOVAR, ADNIS, PDS, and vaccination planning and response, for example, have not yet reached the required level and need further support and staff training.
40. More worrying, the Project has provided a DSA budget for all PPR-related field work (Ministry staff, NAHDIC, Regional Laboratory and Bureau staff, woreda staff, and even CAHWs). Without DSA, it is not clear how much time staff will spend in the field. After the PPR Project, other projects are said to be picking up some of these responsibilities in some of the Project areas (e.g. the four-year 2019-2022 European Union-funded 'Health of Ethiopian Animals for Rural Development' (HEARD) project in Amhara, Oromia and Somali regional states, and the World Bank project, which has a PPR component for highland areas) but PPR is only one part of these projects so they may not be able to provide the same dedicated focus.
41. The Project has purchased 30 vehicles (24 for the original lowland regions, 1 at federal level, and 5 more recently for the additional transition zone). They were bought on preferential UN terms, but transferring them for continued use after the Project may involve the recipient paying duty to the Ministry of Finance. It is not yet clear how this will be managed. Their reallocation to other work would be a blow to the sustainability of the PPR work.
42. Result Area 4 has involved facilitating coordination meetings within Ethiopia, and outside for international coordination (primarily through LOAs with IGAD). The PPR Project has paid for most of these coordination events. The Project Management Unit have also spent time and energy on lobbying: other donor-funded animal health projects to align themselves with PPR work; Federal Government to commit to PPR eradication and general strengthening of the NVS; and Regional Bureau to continue supporting the work when senior staff have changed.
43. All of this has been praised and valued, but it is unclear who will now do or pay for this level of coordination and lobbying, and how much political will there is for it to continue.

While PPR can continue to be discussed within the East African Animal Health Network, it seems little or no donor money has been forthcoming for African PPR coordination or leadership by AU-IBAR, IGAD or EAC; some neighboring countries have no donor funding for PPR related activities; and there seems to be no funding for independent verification of national progress along the PPR eradication pathway.

Conclusions

Conclusion 1. Relevance. Overall, the Project was highly relevant given the context and challenges currently confronting lowland Ethiopia. The Project was coherent, as the four result areas are logically interconnected and essential components of a functioning animal health and welfare system. It has developed and taken forward a national PPR control and eradication strategy that has strengthened and revitalised the NVS structure. The Project is about both PPR eradication and pastoral resilience. The evaluation's most important finding was that, even in the short time available, pastoral animal keepers consistently raised issues related to resilience. These covered all the SDGs, specifically climate change, water, biodiversity changes, gender, the effects of population increase, opportunities for their children, as well as the overall quality of veterinary services and how TAD control fitted alongside more day-to-day challenges. This suggests that UN agencies are providing inadequate support to each other to ensure all UN projects fully address the SDGs. These points provide the context for all other findings and for the recommendations below. It also highlighted that to understand better its contribution to resilience, the Project should have worked to qualify and quantify its social and economic impact.

Conclusion 2. Efficiency. The Project was generally efficient. Significant delays at the start, because of disagreements about key appointments and problems internal to the FAO Office in Ethiopia, and because key building blocks that should have been in place from previous projects weren't delivered, were overcome with the donor deserving particular praise for patience and pragmatic flexibility. Inefficiencies related to the lengthy and inflexible LOA process were widely criticized, but the Project minimized disruption where it could by pragmatic work arounds.

Conclusion 3. Effectiveness. Nevertheless, the Project appears to have been highly effective and has made significant progress in five years against all its intended outcomes. It was well designed with a strong internal logic; and its components complement each other. It has been diligently and intelligently managed; it is excellent, straightforward and honest in its reporting including about challenges it has faced; and has worked hard to address shortcomings and weaknesses. In every Result Area it has moved forward the PPR control and eradication programme for Ethiopia and, with the help of three no-cost extensions, will have achieved almost all the activities it set out to achieve, and gone further in some areas, e.g. procuring vaccine-making equipment.

44. The Project has shown that: it is possible to manage and control the PPR disease in goats and sheep in lowland areas of Ethiopia; Ethiopia has the technical capability and human competence and commitment to do this; stakeholders at all levels feel strongly that a momentum for improved animal health and welfare services should not be lost.
45. Nevertheless, the Project has identified, through its work and the many coordination meetings it has facilitated, that the greater ambition to eradicate PPR across the whole country by 2027, and across Africa by 2030, faces enormous challenges.

46. To progress to eradication, the Government will need to address the separation between Ethiopia's 'Competent Authority',² a federal Government appointee, and Ethiopia's Regional Veterinary Services, each of which is autonomous and over whom the Competent Authority has no direct authority to enforce the conditions and protocols necessary to pursue a disease eradication campaign.

Conclusion 4. Sustainability. Despite being embedded in the Ministry of Agriculture, many informants commented that the Project still feels more like a donor project than government owned. While Government of Ethiopia contribution to this Government Cooperation Project includes vaccine and NVS staff employment costs, contribution to recurrent costs would demonstrate greater ownership of the process, and in the period after the Project with little donor funding on the horizon, Government of Ethiopia is encouraged to make PPR eradication a national flagship project within a GTP3 NVS.

47. There are a number of donor projects with components related to PPR work that will continue after the PPR Project ends. The government believes that these together will be able to continue the work of the PPR Project. However, the Rinderpest campaign required direct leadership from Minister and State Minister level together with an unbroken chain of authority to field level. Without this there is a risk that the progress made under the PPR Project will stall.
48. The Global Strategy for Control and Eradication of PPR document acknowledges the risk that donor money will be more difficult to raise for PPR than it was for Rinderpest because of changed global priorities. Therefore, future applications for donor funding would be stronger if the PPR work was more clearly integrated with the Sustainable Development Goals. This is particularly important for FAO projects now that it is the secretariat for 'The Global Agenda for Sustainable Livestock' a multi-stakeholder partnership that has taken the initiative to link the roles of livestock to the new Sustainable Development Goals (SDGs) set by the United Nations in 2015.
49. The final eradication of Rinderpest required significant social and technical innovations. This level of innovation has not yet emerged strongly within the PPR programme; for example, PPR is a disease of goats and sheep which are looked after primarily by women, yet women are poorly represented in the programme. Innovative ways to bring women into the Project's heart are likely to bring benefits in effectiveness, efficiency and sustainability.
50. Concentrating on the eradication of one disease when field services are generally poor risks losing the trust of pastoral animal keepers. The generally low quality of NVS field services outside places with an effective donor project suggests there is inadequate or inefficiently targeted investment or engagement in the NVS by the public or private sectors, and that there needs to be further testing of public-private partnership models. PPR eradication moving forward alongside more general NVS improvement may lead to better long-term results.

² The Competent Authority in an OIE Member Country or Territory is the government-designated person with the Authority, responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification and other standards and recommendations in the Terrestrial Code and the OIE Aquatic Animal Health Code in the whole country or territory.

51. Pastoralists explain they still buy 'oxy', albendazole tablets and acaricides even though they do not really know how to use them, they do not have faith in them, they know they can be harmful in meat, but it is all they can do; this seems not to have changed since the 1990s apart from their observations about how global issues such as climate change are affecting their lives; and that this is a situation common to many places around the world. The global veterinary profession needs to look carefully at how it serves remote or otherwise marginalised animal keepers, and at the effectiveness of endless three to five year tightly circumscribed development projects as a model to deliver an NVS fit for purpose.

Recommendations

Recommendation 1. Future FAO projects and programmes should be aligned more actively with all SDGs to maximize project value for all stakeholders, by e.g.:

- a) Adding a specific SDG alignment Result section within all project log frames, with Objectively Verifiable Indicators in common with other projects working in the same geographical areas, and with specific activities;
- b) Establishing coordination mechanisms with other projects working in the same geographical areas to agree common SDG indicators, increase efficiency and improve the beneficiary experience;
- c) Commissioning reviews of the project from experts in complementary disciplines, ideally through reciprocal pro bono agreements with other UN agencies or NGOs.

Recommendation 2. FAO should support the Government of Ethiopia to continue TAD control and PPR eradication as a government-funded flagship project within a National Veterinary Service (NVS) that meets the day-to-day needs of animal keepers and their animals, by working with government and other stakeholders in the following actions:

- a) continue to encourage ratification of Ethiopia's PPR eradication strategy with an associated budget;
- b) consolidate and institutionalize lessons from the PPR project, including greater involvement of women, development of public-private partnership, and development of CAHW roles in pastoral areas;
- c) establish a national secretariat for PPR and animal disease control, and functioning Regional vaccine distribution centres stocked with supplies of the necessary vaccines, and serving the needs of the local field veterinary services;
- d) harness the resources and fragmented initiatives of donors, researchers, NGOs etc. to enhance the NVS rather than pull it apart;
- e) find lasting solutions to the Federal-Regional challenges of the NVS; revisiting institutional arrangement at federal and regional levels to ensure direct chains of command for implementation of national programmes, with vertical (federal-to-region) and horizontal (region-to-region) linkages, functional integration, technical harmonization and optimal coordination to achieve an effective NVS with common national objectives;

- f) review the veterinary rationalization road map and engage the private sector in effective public-private partnership models;
- g) ensure vehicles bought under the PPR Project continue to be used for PPR / NVS strengthening work after the end of the PPR Project;
- h) equip every NVS vehicle with a basic animal first aid kit;
- i) create and foster complementarities and synergies (both programmatically and geographically) with other development projects focusing on pastoral resilience to maximize results for the realization of the Sustainable Development Goals.

Recommendation 3. FAO should assist the government in developing epidemiology, disease surveillance and response capacity as the cornerstone of an NVS capable of controlling TADs, by:

- a. streamlining epidemiological data management with a single database containing all relevant disease event data (time, location, event, response, follow-up) owned, shared, and used by Ministry, NAHDIC and regional laboratories and bureau, to track likely routes of infection, where outbreaks are originating from, and how TADs are circulating within the wider sub-region (thereby enhancing the efficacy of response and control);
- b. continuing development of DOVAR and ADNIS by, for example:
 - i. providing or contracting in dedicated IT professionals to solve the ongoing technical problems and to ensure consistency and continuity; and
 - ii. finding a simple modality for incentivizing ADNIS reporting;
- c. continuing development of PDS capacity and vaccination response capability;
- d. ensuring there is follow-up diagnosis of diseases when PPR is ruled out (i.e. when there is a negative pen-side test result), to control for potential outbreaks of other diseases, and to instill confidence among livestock owners;
- e. improving the use of GIS and infographics for more effective communication;
- f. increasingly good working relationships between NAHDIC and RVLs developed through the PPR Project to improve timely diagnosis of all diseases, not just for TADs, to help build animal keeper trust in the NVS.

Recommendation 4. FAO should assist the development of the communication aspect of the NVS, e.g.:

- a. pool communications resources across projects to enable a wider pool of communications professionals producing integrated content for e.g. advocacy and public awareness, as well as more specialized content for e.g. training;

- b. prioritize two-way communication, ensuring feedback on all work reports, including to animal keepers about local disease investigations, sero-surveillance, sero-monitoring, and virus typing;
- c. develop communication strategies based on continuous monitoring of the effectiveness of communication and outreach activities, with differentiated and specialized communications products for different target groups (e.g. appropriately timed radio shows based on an analysis of listenership habits; handout flyers and posters with mostly photos and images, rather than text, etc.).

Recommendation 5. FAO should continue using its comparative advantage in leading international coordination for TADs Control and PPR eradication, as well as assisting with internal coordination wherever possible, e.g.:

- a. developing more effective, flexible cross-border veterinary coordination so pastoralism as a highly effective natural resource use strategy can continue, but with better disease control;
- b. helping strengthen coordination at woreda, regional, national and international level, for more efficient implementation of disease control;
- c. continuing to push for technical and financial support/resource mobilization for IGAD and AU IBAR for alignment of member state disease control and eradication initiatives;
- d. ensuring internal financial procedures are streamlined for more efficient project implementation by reducing delays in disbursement of funds and in some cases to reduce inappropriate use of project resources.

Recommendation 6. Gender - FAO should work with donors, government and NGOs to bring women more actively into all aspects of the NVS, particularly for animal health and PPR-related projects, e.g.:

- a. exploring studentships, internships, mentoring programmes for women to engage in project activities;
- b. building innovative gender-based pilot studies into all NGO implementing partner agreements.

Recommendation 7. As part of continuing the TAD control and PPR eradication as a national funded flagship project, FAO and the Ministry of Agriculture should help address high staff turnover at federal, regional and woreda levels, e.g.:

- a. promote an organizational culture that recognizes, values, celebrates, and rewards competence, as much by allowing it to achieve its potential (within a normal working week) as through financial incentives;
- b. continue to build staff capacity through coaching, mentoring, refresher training;
- c. use education professionals to help develop higher-level capacity building strategies;

- d. continue to review with Regional Bureau the Business Score Card evaluation for all veterinary staff in line with the needs of NVS, and specifically regarding disease reporting;
- e. reorient the veterinary curriculum to produce more practical, service-oriented graduates, and provide refresher training for current vets, for more effective veterinary services.

Recommendation 8. As part of continuing PPR eradication as a national flagship project, FAO and the Ministry of Agriculture should lobby for adequate funding to the NVS:

- a. to provide a clear budget line for PPR control and eradication programme which is currently using other projects and government budget lines for e.g. TADs vaccine costs, in line with commitments under the national PPR eradication strategy, and in line with commitments to the Malabo Declaration of the African Heads of States to allocate over 10 percent of their GDP to agricultural development;
- b. based on rigorous and credible evidence-based studies that quantify and qualify social and economic benefits.

Recommendation 9. In future country programming, FAO should support pastoralism as a special case given the inextricable role it plays in the effective use and management of rangeland biodiversity, water resources and productivity of animal resources:

- a. help trial and develop more veterinary services that include the private sector but are driven by the need to control disease and deliver safe, effective, appropriate and timely veterinary treatments to all animal species and all animal keepers however remote or resource-poor;
- b. help make a case for Ethiopia having a comparative advantage in producing and supplying pastoral meat as an ecological and economical alternative to the prevailing model of intensive, high-input, low-welfare animal production systems;
- c. as part of future programming, commission evidence-based studies to quantify and qualify social and economic benefit for more effective advocacy and planning of future NVS work including disease control programmes.

1. Introduction

1.1 Purpose of the evaluation

1. This evaluation report presents the findings, conclusion and recommendations of the final evaluation of the Project GCP/ETH/083/EC – ‘Pursuing Pastoral Resilience (PPR) through improved animal health service delivery in pastoral areas of Ethiopia’, funded under the European Union Supporting Horn of Africa Resilience (EC SHARE) programme.
2. The purpose of the evaluation is to provide an external and independent review of the Project’s Relevance, Efficiency, Effectiveness and Sustainability, and on other specific cross-cutting issues such as Gender, and to document lessons learned from the Project process.

1.2 Intended users

3. The evaluation is intended for all direct Project stakeholders, including the Government of Ethiopia at all levels (Federal, Regional, Woreda, Kebele); the donor (European Union); the implementing agencies (Food and Agriculture Organization of the United Nations - FAO, Vétérinaire sans Frontière, Germany - VSF-G; Vétérinaire sans Frontière, Suisse - VSF-S, Royal Veterinary College - RVC); and beneficiary communities.
4. It is intended also to inform indirect stakeholders, including other institutions with animal health-, welfare- and production-related programmes and projects in the country; and others involved in animal health and welfare service provision or in the management, control and eradication of transboundary animal diseases (TADs) internationally such as the World Organisation for Animal Health (OIE) Regional Office in Nairobi, and representatives from neighbouring countries involved in TAD management and control.
5. Finally, it aims to be of value in the wider discourse on global challenges such as Global Biodiversity Loss, Climate Change and ‘One Welfare’ - balancing the health and well-being of people, other animals, and the wider environment for sustainability and survival.

1.3 Scope and objective of the evaluation

6. The evaluation covers the intended Project objective and overarching outcome, and all four Project result areas/components. As a summative evaluation, the evaluation covers the whole time period of the Project from July 2014, when it was signed as a contribution agreement (FED/2014/316-779) with a total budget of EUR 9 277 294, through its intended end date in November 2017, its first no-cost extension to 24 November 2018, to the end of its second no-cost extension on 24 September 2019. It also looks ahead to an agreed no-cost extension to 25 November 2020 to cover the supply, installation and training for equipment to make and package thermostable vaccine, with field activities extended to end December 2019.
7. The evaluation aimed to visit as wide a range of communities as possible across the geographical spread of the Project, which operated in the entirely lowland pastoral Afar and Somali Regional States, the lowland pastoral areas of Oromia and Southern Nations, Nationalities and Peoples (SNNP) Regional States, and since 2018 when it extended to include highland-lowland interface areas, in parts of Amhara and Tigray Regional States.

The evaluation aimed to interview from across the spectrum of Project direct and indirect stakeholders.

1.4 Evaluation objectives and questions

8. The evaluation assessed the Project against criteria of relevance, effectiveness (including signs of impact), efficiency and sustainability. It also looked at the wider context and reviewed the extent to which cross-cutting issues such as gender equality and environmental sustainability were taken into account at formulation and implementation stage.
9. The evaluation has the following specific objectives:
 - i. assess the degree to which the planned project results have been realised;
 - ii. assess the actual and potential impact of the project;
 - iii. identify good practices and lessons learned from the project that could feed into and enhance the implementation of related interventions.
10. The evaluation was guided by the questions presented in Box 1. The full list of evaluation questions and sub-questions, as well as the methods used for answering each question, can be found in the evaluation matrix (Annex 3). The schedule of field visits and the list of people met are included in Appendix 1.

Box 1: Evaluation questions

Relevance

- To what extent were the project design and approach (including partnerships) relevant to the needs, in terms of reducing morbidity and mortality due to PPR and SGP among the small ruminant population owned by the pastoralist communities of Ethiopia?
- Given the transboundary nature of these diseases and the global aim of PPR eradication, how relevant was the targeting of beneficiaries for the control of PPR in Ethiopia?

Effectiveness and signs of impact

What outcomes, both intended and unintended, are being achieved? In particular:

- To what extent has the programme achieved or is expected to achieve its stated objective under the project results framework?
- To what extent has the project developed national capacities to plan and undertake vaccination campaigns and other disease control measures, as well as surveillance and diagnostic capacity to ensure early identification of suspected cases?
- To what extent has the project contributed to strengthening the capacities of pastoralists for self-alertness and reporting of potentially hazardous animal health events?

- What factors have contributed to the achievement or non-achievement of the intended outcomes?

How have gender relations and equality been affected by the project?³

Efficiency

How effective was the project management and implementation? (Including an assessment of the implementation gaps and delays (if any, their causes and consequences), and quality and use of monitoring and evaluation data in informing project implementation.)

Sustainability

- To what extent are project results sustainable?
- What are the prospects for sustaining and scaling up project results after the completion of the project?
- What systems need to be in place to ensure that the Government's national programme on PPR, and other activities (e.g. the HERD programme) can continue to build on the project's results?

1.5 Methodology

11. The evaluation was managed by the FAO Office of Evaluation (OED) and carried out by three leading experts: the evaluation team leader (international consultant) and two Ethiopian experts in animal health and transboundary animal disease control, each with experience in conducting evaluations.
12. In the time available the evaluation team prioritised meeting communities to hear their experience of the PPR Project and its impact, while also meeting government and non-governmental organization (NGO) staff at woreda, zone, state and federal level, to explore the wider resilience context as well as the implementational detail of the Project.
13. The evaluation had three stages (see Annex 2. Evaluation team timetable & itinerary):
 - i. **Preliminary stage:** individual evaluators at their home locations reviewed project and supporting documents.
 - ii. **Teamwork in Ethiopia:** the evaluation team met in Addis Ababa together with the evaluation manager; agreed and refined methodology; examined and diagrammed the theory of change (TOC) inherent in the Project LogFrame and as redefined in the Project mid-term evaluation (see Section 2 and Annex 9); undertook field work together with different pairs to fit availability, and involving interviews and

³ Particularly with regard to FAO's Gender Equality Objectives: i) Equal decision-making; ii) Equal access to productive resources; iii) Equal access to goods, services and markets; iv) Reduction of women's work burden. FAO Policy on Gender Equality, 2013. <http://www.fao.org/docrep/017/i3205e/i3205e.pdf>

conversations with project staff and other stakeholders in Addis Ababa, in regional, zonal and woreda centres, and with pastoral livestock-keepers.

- iii. **Final stage:** in home locations liaising by email, Skype etc, further document review, remote interviews, research, revisiting the TOC (see Section 2 and Annex 9), and report-writing; with an initial draft to FAO Office of Evaluation (OED) and subsequent amendments; and a second draft to the Project Management Unit in Ethiopia and subsequent final amendments.
14. When the evaluation team met, they brainstormed and collated evaluation question lists and agreed methodologies (see Annexes: 3. Evaluation matrix from inception report; 4. Stakeholder analysis from inception report; 5. Guide question lists for semi-structured interviews).
 15. The evaluation team chose to use semi-structured interviews to check facts and corroborate and triangulate project details, using open questions to broaden their understanding of Project context, and to encourage reflection on lessons learned. This occurred for the following reasons:
 - i. project documentation is generally excellent, thorough and well-analysed;
 - ii. project staff in FAO and the Ministry were open and helpful, and reflective about challenges, successes, levels of knowledge and understanding, and operational constraints;
 - iii. it was understood that the Project had been audited routinely for financial probity;
 - iv. no areas of hidden concern emerged that would have required more forensic lines of questioning.
 16. For similar reasons, in the relatively short time they were together in Ethiopia, the evaluation team prioritised interviewing goat and sheep keepers in the pastoral lowlands, and staff at Branch Coordination Offices (BCOs), Regional Laboratories, Woreda animal health offices, and at the offices of the VSF-G and VSF-S collaborating partners, over time in Addis Ababa going through Project records in even greater detail.

Box 2: List of interviews conducted, by type

Interviews by type:
Addis Ababa: FAO, MoA, EU, NVI, NAHDIC, VSF-G, VSF-S
Regional Bureau of Agriculture: SNNPRS; Afar
Branch Coordination Offices/Regional Laboratories: Sodo for South Omo, SNNPRS; Yabelo for Borena, Oromia; Jigjga for Somali
Other Regional Laboratories: Jinka, SNNPRS; Semera, Afar

<p>Other Institutions:</p> <p>Semera University Veterinary Laboratory</p>
<p>Woreda Veterinary/Livestock and Rural Development offices:</p> <p>Dimeka, Hamar; Key Afer, Bena Tsemay; Mega, Dire; Moyale, Moyale, Oromia; Dewe, Chifra, Ewa, Eliddar; Shinile and Erer Woredas, Somali; Ewa Woreda, Afar Region</p>
<p>Communities:</p> <p>Doko village, Shenko kebele, Hamar woreda, South Omo zone</p> <p>Gyrya village, Woro kebele, Hamar woreda, South Omo zone</p> <p>Oumble, South Omo zone</p> <p>Luka township, Luka kebele, Bena Tsemay woreda, South Omo zone</p> <p>Dumma/Woito, South Omo zone</p> <p>Teshoma Village, Lay Kebele, Moyale Woreda, Leben Zone, Somali (vaccination site)</p> <p>Laksaden Village, Darusalem Kebele, Moyale Woreda, Leben Zone, Somali</p> <p>Gad Kebele, Shinile woreda, Somali</p> <p>Regden, Duba kebele, Ewa woreda, Afar (vaccination site)</p>

17. Conversations with officials were guided by semi-structured question lists tailored to different roles (see Annex 5). Conversations with pastoral livestock-keepers were structured using participatory rural appraisal (PRA) exercises that included card ranking, matrixes and proportional piling.
18. The evaluation balanced three particular interests:
 - i. to open conversations widely enough to explore relevance, interconnectedness and sustainability;
 - ii. to explore aspects of project implementation in detail; and
 - iii. to collect data from PRA exercises consistently enough across livestock-keeper groups to allow some non-parametric statistical analyses (such as Kendall's Coefficient of Concordance).
19. After the early livestock keeper interviews, the evaluation team reviewed these interests and agreed to drop the last, unless opportunities for a more consistent series of interviews arose at a later stage during the Afar or Somali field visits.
20. As a summative evaluation, the report includes the full time-period of the Project. However, where the Project's mid-term evaluation (MTE) had already explored some of the Project's early challenges in detail and as it is clear that these challenges have already been widely recognised and addressed, the evaluation team chose not to repeat these explorations. The Report therefore mentions these early challenges but does not dwell on them.
21. For ease of cross-referencing with project documentation, the report uses the structure of the Project's excellent bi-annual progress reports, which are well-written, comprehensive and honest. This report aims not to duplicate these bi-annual reports but to complement them, add value and identify lessons learned through commentary, field evidence and additional analysis.

22. With particular regard to relevance and sustainability: because this is a UN agency run project with EU pastoral resilience funding; FAO is the secretariat for 'The Global Agenda for Sustainable Livestock' a multi-stakeholder partnership that has taken the initiative to link the roles of livestock to the new Sustainable Development Goals (SDGs) set by the United Nations in 2015; and the evaluation is part of the process of learning and looking forward; the evaluation examined how the Project sits in relation to issues that have become more prominent since the Project's inception, including global biodiversity loss, climate change, Sustainable Development Goals (SDGs), and the concept of 'One Welfare' now recognised by OIE. It also includes comments on possible ways that these can be included in future practice. These points are relevant to such projects in the future, or SDGs will never be properly addressed. The SDGs can be looked at as the soil in which the seeds of all development projects grow, and that all development projects therefore need to play their part in keeping this soil healthy.

1.6 Limitations

23. Due to availability constraints and unavoidable delays in recruiting the evaluation team, data collection could only commence during the second half of May 2019, during the middle of Ramadan and at the hottest time of the year in the lowlands. Given that the Project has been implemented in areas where the population are predominantly Muslim, sampling of sites to be visited had to be carefully considered so as to avoid imposing undue strain on beneficiary communities during fasting season. As such it was decided to visit South Omo and Borena where the population is less predominantly Muslim from 1-5 June. The field visits in Somali and Afar regions were instead be visited after Eid (i.e. 6-12 June, and 22 June-2 July).
24. When team members were 'grounded' due to security concerns, field work days were lost. Collectively, the evaluation team lost nine days of field work.
25. Despite an open call for expressions of interest, only two Ethiopian female candidates applied to the vacancy announcement, and their profiles were not found to be suitable for the assignment. Therefore unfortunately, the evaluation team constituted did not include any female team members. This meant the evaluation team was an all-male team which may have compromised data collection in the field, particularly with regard to speaking with women community members.

1.7 Structure of the report

26. Following this introduction, Chapter 2 presents the background and context of the Project; Chapter 3 presents the findings, followed by cross-cutting issues in Chapter 4. Lessons learned are presented in Chapter 5. Lastly, Chapter 6 presents conclusions and recommendations.

2. Background and context of the PPR Project

2.1 Context of the PPR Project

27. This section lays out the main components of the PPR Project which, to avoid repetition, are then referred to in the report text. Since the Project was a Government Cooperation Partnership delivered through the National Veterinary Service (NVS), it also includes the NVS structure.

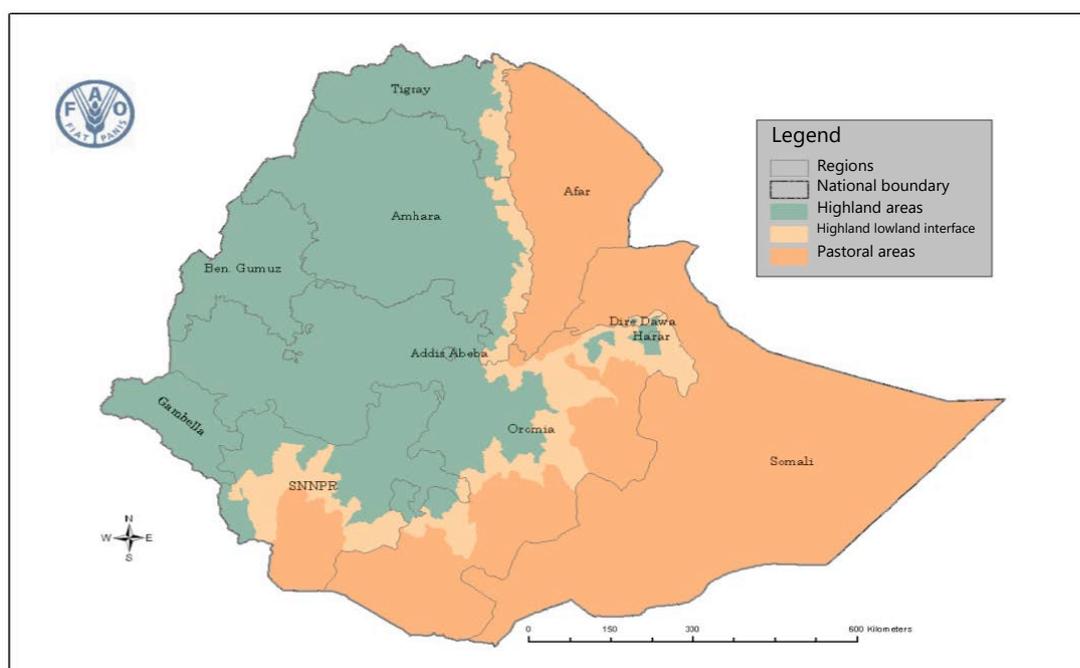
Table 1: Basic project information

Project title	Pursuing pastoralist resilience in pastoral areas of Ethiopia
Project code	GCP/ETH/083/EU
EU funded project ref	FED/2014/346-779-EU-FAO
Donor	European Union
Budget	EUR 9 277 294
Implementing partners	Ministry of Agriculture, VSF-Suisse, VSF-Germany, Royal Veterinary College (UK).
Duration	40 months, extended by 22 months (and possibly longer)
Project signed	25 July 2014
Project started	
Planned end date	November 2017
First extension to	November 2018
Second extension to	25 September 2019
Third extension	September 2020 (field work to end-2019)

28. In response to the 2010/11 drought, the East African community's (EAC) Intergovernmental Authority on Development (IGAD) started an 'Ending the impact of drought in the Horn of Africa' initiative. The European Union-funded, multi-country, EUR 270 million 'Supporting Horn of Africa Resilience' (SHARE) programme was designed to build the resilience of the lowland pastoral populations as part of this IGAD initiative. The project - GCP/ETH/083/EU – 'Pursuing pastoralist resilience through improved animal health service delivery in pastoralist areas of Ethiopia', is one of seven Ethiopian projects within the EC-SHARE Programme. The other six Ethiopian projects within the EC-SHARE Programme are: support to the 'Productive safety net' Project; 'Integrated nutrition services'; 'Integrated recovery support'; 'Sustainable environmental protection and watershed management in the Bale eco-system'; 'Strengthening institutionalized coordination structures and harmonisation mechanisms'; and 'Ethiopia strategy support programme research'.

29. The PPR project was designed to build the capacity of the federal, regional and woreda level public veterinary services with a primary focus to implement a progressive control programme for Peste des Petits Ruminants (PPR), a disease of goats and sheep on the OIE list of transboundary animal diseases. Initially the Project was implemented in the lowland pastoralist areas of Ethiopia of Afar and Somali Regional States, and the southern lowlands of Oromia and Southern Nations, Nationalities and Peoples Regional States, but in 2018 expanded to the adjacent Highland-Lowland interface areas including Kombolcha in Amhara, Hirna in Oromia and Mekelle in Tigray (see Figure 1).

Figure 1: Map of project area showing original project area (darker orange) and the extended area (from 2018) into the highland-lowland interface



Source: Project document (GCP/ETH/083/EC)

30. The PPR Project attempted to reduce sheep and goat mortality and other production losses caused by animal diseases, so contributing to increased livestock productivity, improved drought preparedness, improved access to international markets, and consequently better resilience of the pastoral communities in Ethiopia. The project focused on strengthening animal disease notification, disease surveillance and reporting systems for all transboundary animal diseases; on building the capacity to conduct participatory disease surveillance, sample collection and forwarding, as well as diagnostic capacity at federal and regional states levels; on building the capacity of the national and state-level veterinary services to control the disease through vaccination, including through the development of a thermostable vaccine which would go a long way towards facilitating vaccination campaigns in the warm and under-equipped Ethiopian lowlands; and on improving coordination from woreda to international level.
31. Besides the Ministry of Agriculture, Project partners identified during formulation included Vétérinaire sans Frontière Suisse and Vétérinaire sans Frontière Germany for implementation and monitoring of fieldwork, and the Royal Veterinary College (of the United Kingdom of Great Britain and Northern Ireland) for capacity building in participatory epidemiology and specifically participatory disease searching.

32. The overall objective of the Project was to improve food security and resilience to drought (and other natural disasters) in the pastoral lowland communities of Ethiopia. The specific intended outcome was an improved understanding of animal disease status in pastoral areas, and a reduced morbidity and mortality related to PPR and sheep and goat pox (SPG)⁴ among the small ruminant population owned by the pastoralist communities of Ethiopia. The Project will progressively control PPR ultimately leading to eradication, contribute to the control of Sheep and Goat Pox (SGP), and through improved disease surveillance contribute to the control of other transboundary animal diseases.
33. The four results areas of the projects are:

Result 1. Improved real-time understanding of the transboundary animal diseases (PPR, SGP, FMD and CCP) status in the pastoralist areas of the country.

Result 2. Improved quality (through production of PPR thermostable vaccine) and quantity of PPR vaccine production at the National Veterinary Institute.

Result 3. Improved capacity to implement progressive disease control programmes, particularly PPR and SGP in small ruminants.

Result 4. Improved national and subregional animal disease control coordination and knowledge exchange.

Implementation arrangement

34. The Project works through implementing partners, managed and funded by FAO mainly through Letters of Agreement (LOAs) as detailed to June 2019:
- i. Ministry of Livestock and Fisheries (6 LOAs), renamed to Ministry of Agriculture and Livestock for the first half year of 2018 and Ministry of Agriculture in the second half of 2018.
 - ii. Vétérinaires sans Frontières Germany (VSF-G) - 4 LoAs.
 - iii. Vétérinaires sans Frontières Suisse (VSF-S) - 3 LoAs.
 - iv. Royal Veterinary College (United Kingdom of Great Britain and Northern Ireland) - 1 LOA.
 - v. National Animal Health Diagnostic and Investigation Centre (NAHDIC) - 3 LOAs.
 - vi. IGAD Centre for Pastoralist and Livestock Development (ICPALD) - 2 LOAs.
 - vii. Ethiopian Veterinary Association (EVA) - 2 small grant agreements (SGA).
35. To June 2019, a total of 19 LOAs have been concluded with the development partners listed above. 13 of the 19 LOAs have been completed and closed, while 6 are ongoing with various completion dates up to September 2019. Because of delays to the supply and installation of equipment to make thermostable vaccine and the associated training of staff, the Project will continue until November 2020, field operations ending in December 2019.

⁴ Sheep and Goat Pox are malignant pox diseases caused by members of the *Capripoxvirus* genus of pox viruses. While focused on PPR eradication, the Project also aimed to control SGP which affects the same general population of small ruminants.

Management structure and staffing of the PPR Project

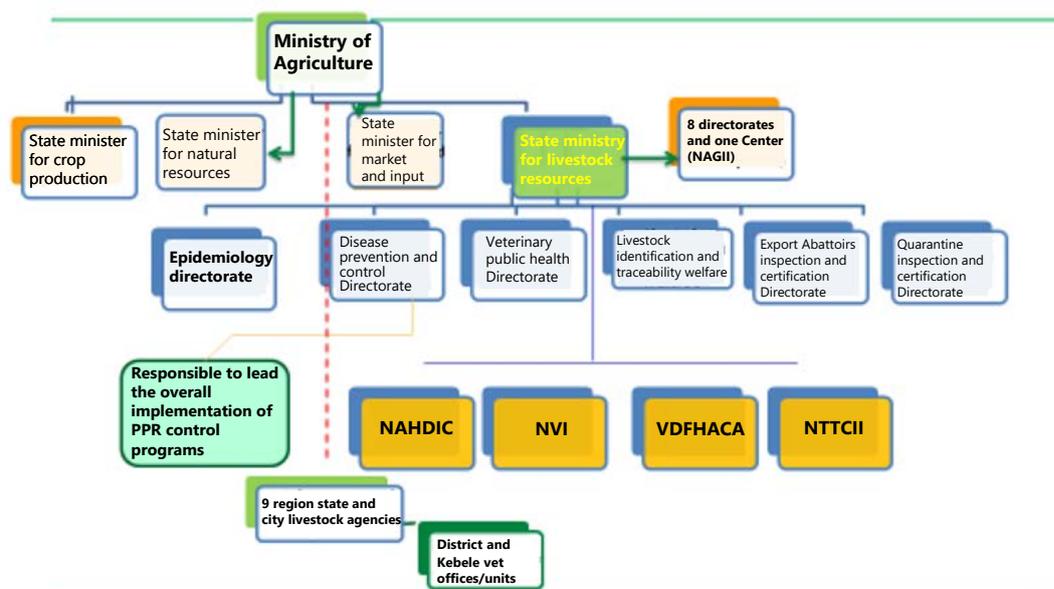
36. The Project Management Unit is operating under the State Ministry of State Minister for the Livestock Sector and is directly reporting to the Disease Prevention and Control Directorate, while working closely with the Epidemiology Directorate on disease surveillance and reporting matters. The Project Management Unit officially consists of six personnel. It worked closely with three staff members of the Epidemiology Directorate to oversee the implementation of the Animal Disease Notification and Investigation System (ADNIS) and the monthly Disease Outbreak and Vaccination Reporting system (DOVAR) and other surveillance activities.
37. At the regional level, PPR Branch Coordinators were appointed in the different Branch Coordination Offices/Regional Laboratories in Afar, Somali, Oromia, SNNP and Tigray, as well as in Kombolcha Regional Veterinary Laboratory (RVL) and Hirna RVL. The BCOs oversee the implementation of all field activities related to PPR eradication, i.e. participatory disease searching, disease investigation, community awareness-raising and vaccination. They work closely together with the veterinary services in the Regional/Zonal Livestock Bureaus in their respective regional state.
38. FAO contributed staff time and resources. This included a part-time international operations officer; a national procurement assistant, a national operations assistant, a national programme coordinator (responsible for budget and follow-up of procurement), a Geographic Information System (GIS) officer (responsible for preparation of woreda maps and preparation of GIS training), a communications officer (press release), and Administrative, financial and administrative assistance, subregional office for Eastern Africa SFE livestock officer for Eastern Africa under Technical Support Services (TSS), as well as the FAO field office staff participating in monitoring of vaccination activities.

Ethiopia National Veterinary Structure (NVS)

39. As a Government Cooperation Project, the Project works through the National Veterinary Structure. The components of the current NVS structure most relevant to the Project (with relevant Result Areas in brackets) include:
 - i. the Federal Government's Ministry of Agriculture in Addis Ababa, working in partnership with autonomous Regional Government Bureaus of Agriculture (or equivalent), with networks of veterinary offices/clinics to woreda level, staffed by vets, Bachelor of Veterinary Science graduates, animal health assistants (AHAs), and animal health technicians (AHTs), and supported by community animal health workers (CAHWs) (Results 1, 3, 4);
 - ii. the National Animal Health and Disease Investigation Centre which is mandated to work alongside Regional Veterinary Laboratories to research and investigate animal disease in Ethiopia (Results 1, 3);
 - iii. the semi-autonomous National Veterinary Institute at Bishoftu which makes or purchases, and distributes, all vaccines (Result 2);
 - iv. others who contribute to veterinary services, e.g. private practitioners and pharmacies, NGOs, Universities and other Research Institutes.

40. In addition to the government NVS, the Project brought in three other implementing partners:
- two international NGOs, VSF-G and VSF-S were included in the Project on the request of the donor to add implementational capacity in Afar and Somali, the more remote areas, and, after initial government resistance, this was finally agreed;
 - the Royal Veterinary College, University of London, United Kingdom of Great Britain and Northern Ireland, which was brought into the project for Epidemiology and Participatory Disease Search support.
41. **The Federal Ministry of Agriculture.** The Ministry structure has changed during the life of the PPR Project. The Project was conceived under the Ministry of Agriculture which split in 2016 into a Ministry of Agriculture and Natural Resources and a Ministry of Livestock and Fisheries, the Project starting activities under the latter. In early 2018, the two Ministries remerged to become the Ministry of Agriculture and Livestock Resources, which reverted to its original name, the Ministry of Agriculture, in the second half of 2018. The 2019 organogram of the Ministry of Agriculture highlighting Animal Health and Welfare is illustrated below.

Figure 2: 2019 organogram of the Ministry of Agriculture highlighting Animal Health



Source: Project document (GCP/ETH/083/EC)

42. The Ministry of Agriculture is overseen by a Minister responsible for four State Ministries: Crop Production, Natural Resources, Market and Inputs, and Livestock Resources. The State Minister for Livestock Resources is responsible for eight Directorates, two related to Animal Production and Marketing, and six related to Animal Health and Welfare. These are the Directorates of Epidemiology; Disease Prevention and Control; Veterinary Public Health; Livestock Identification and Traceability and Welfare; Quarantine Inspection and Certification (including the Export Abattoir). Additional institutes under the State Ministry of Livestock Resources are: NAHDIC; National Veterinary Institute (NVI); Veterinary Drug and Animal Feed Administration and Control Authority (VDFACA); National Tsetse and Trypanosomosis Control Institute (NTTCI); National Animal Genetics Improvement Institute (NAGII).

National Veterinary Institute (NVI)

43. The National Veterinary Institute has the national mandate to: produce vaccines for animal and zoonotic diseases; formulate and distribute veterinary drugs; produce biologicals and reagents; sell products to national and international markets; engage in other related activities conducive to the attainment of its goals. NVI, which is accountable to the State Minister for Livestock Resources and governed by a Board of Directors, is managed as a Government enterprise and has operated on a cost-recovery basis since July 1999. NVI has received the following certificates and accreditation since 2006: ISO/QMS 9001:2015 certified (since 2006); ISO/IEC 17025:2017 accredited (since 2014); National GMP certified (since 2015).
44. NVI currently produces 13 viral vaccines and 9 bacterial vaccines:
 - i. Viral: Peste des Petits Ruminants (PPR), Sheep and Goat Pox (SGP), Lumpy Skin Disease (LSD), Foot and Mouth Disease (FMD), African Horse Sickness, Camel Pox, Rabies, Newcastle Disease (HB1, Lasota, Thermostable and inactivated), Infectious Bursal Disease (Gumboro), Fowl Pox, Marek's Disease.
 - ii. Bacterial: Anthrax, Contagious Bovine Pleuro-Pneumonia (CBPP) (T144 and T1SR), Contagious Caprine Pleuropneumonia (CCPP), Blackleg, Bovine Pasteurellosis, Ovine Pasteurellosis, Fowl Typhoid, Fowl Cholera.
45. NVI is currently working strategically to improve from conventional vaccine production technologies to state-of-the-art technologies. It has around 300 employees.

Other contextual points relevant to the working of the NVS

46. **Competent Authority.** The Competent Authority is an internationally recognised position within an OIE Member Country or Territory. They are the government-designated person with the authority, responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification and other standards and recommendations in the Terrestrial Code and the OIE Aquatic Animal Health Code in the whole country or territory. The position in Ethiopia is currently with the Director of the Disease Prevention and Control Directorate in the Federal Ministry of Agriculture.
47. **Federal Structure.** In the early 1990s, Ethiopia moved to a Federal structure after which the Regional States became autonomous. This has resulted in two layers of administration with decentralization of service provision. Veterinary work involving national coordination, such as control or eradication of transboundary animal diseases which is a mandate of the Competent Authority, requires Memoranda of Understanding (MOU) signed between the Federal Ministry of Agriculture and the Regional States' Bureaus of Agriculture.
48. **Woreda equality approach to development, and woreda division.** Ethiopia takes a 'woreda equality approach' to development. This aims for even progress and fair distribution of development interventions to woreda level across the whole country. As resources may not stretch to every woreda getting meaningful access to every initiative, neighbouring woredas may get different initiatives, which can complicate 'joined-up' programmes, such as disease eradication for pastoral resilience. This gets more complicated as larger woredas are divided into smaller woredas.

Other government bodies and initiatives

49. The Rural Economic Development & Food Security Committee (RED&FS) is intended to coordinate donor projects and other similar initiatives.
50. The Ministry of Finance has significant power over Federal and Regional State budgets. A new Ministry of Finance Directorate for Public-Private Partnership is expected to promote greater private sector involvement in Veterinary Service delivery to improve efficiency and save costs.
51. Ethiopia is moving through a series of five-year Growth and Transformation Plans (GTP). GTP2 (2015-2020) aspires to build government veterinary clinic/offices in every woreda and even to kebele level. Planning for GTP3 (2020-2025) has started and is in line with Ministry of Finance budget planning. There is expected to be a shift in focus from building government veterinary clinics to supporting functional veterinary services through public-private partnerships, preceded by a full audit of veterinary infrastructure and NVS needs across the country.

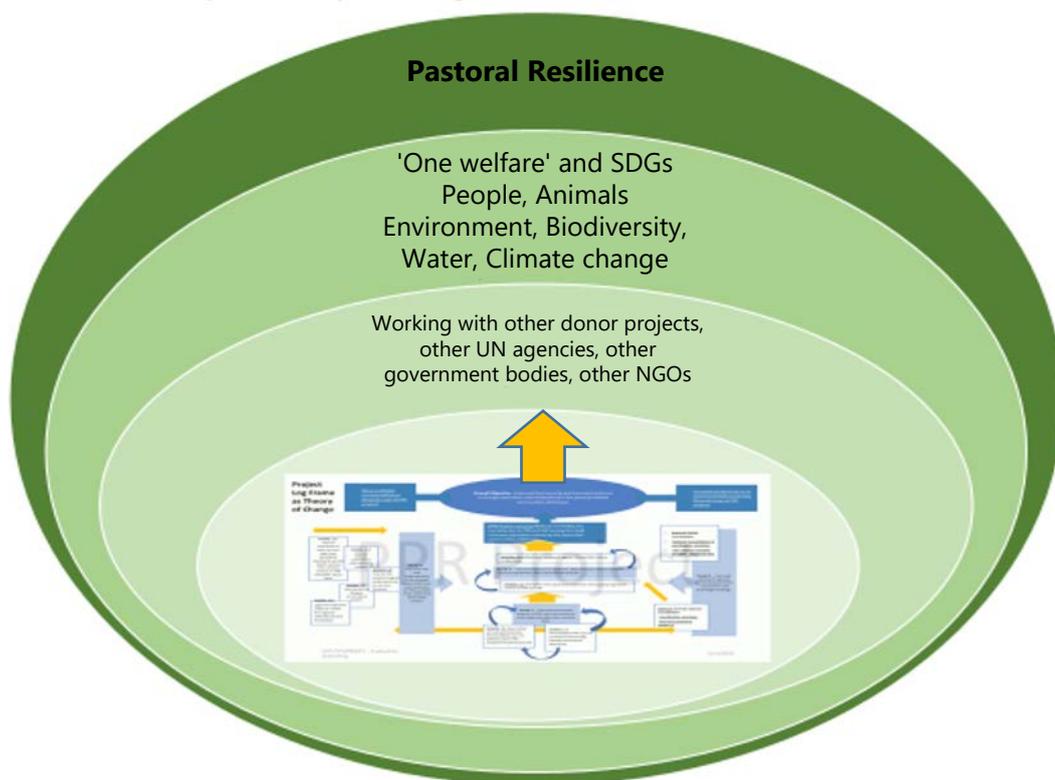
2.2 Theory of change

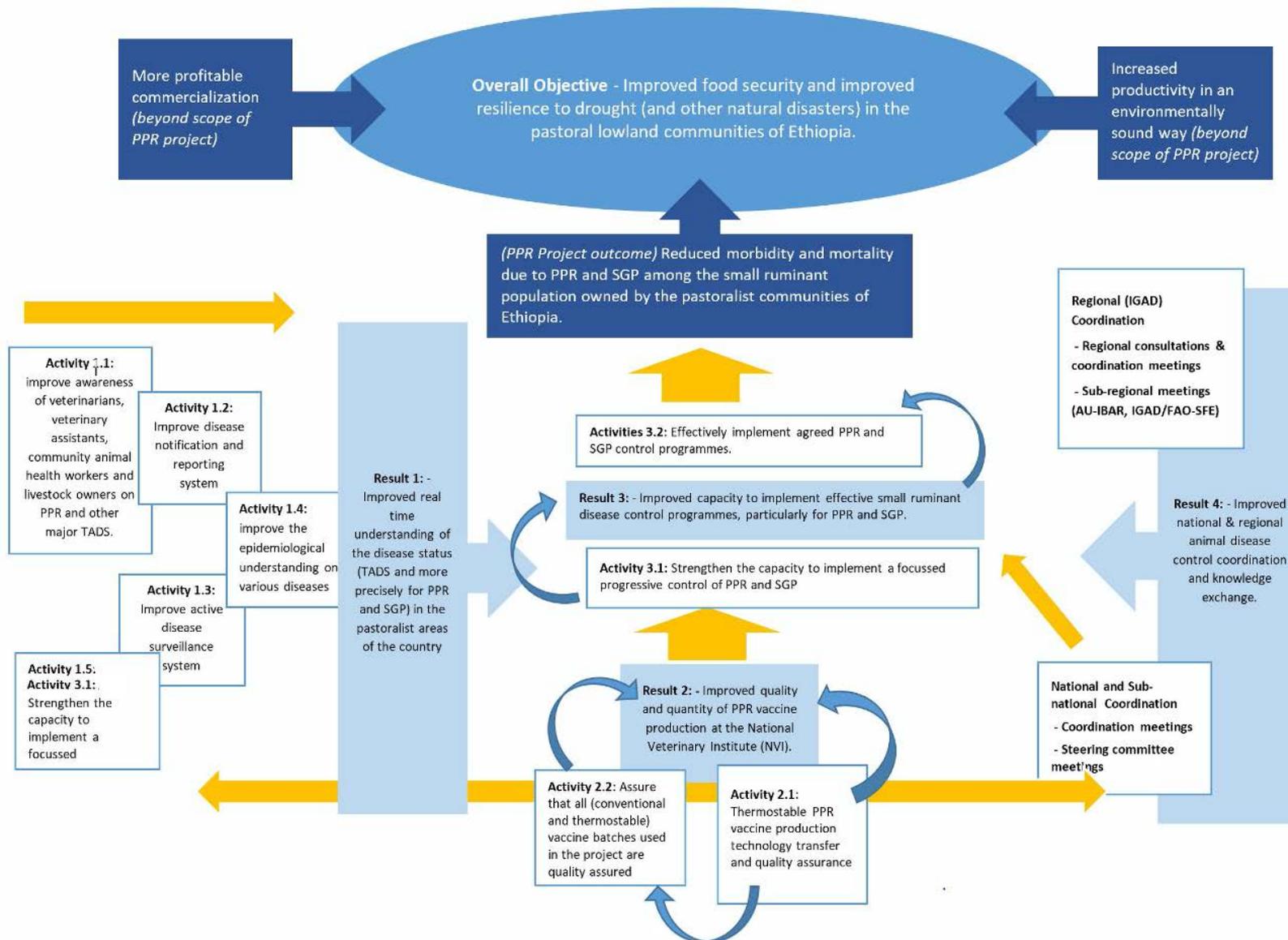
52. The Project has a strong internal logic described through its LogFrame, and as described and represented diagrammatically below:
 - i. PPR is a serious disease of goats and sheep. In an epidemic, it can cause significant mortality in all ages of goats and sheep. Surviving animals have life-long immunity, so, if the goat and sheep population is able to support a circulation of virus primarily through young animals, the disease can become endemic. Pastoral herds provide the ideal environment for endemicity. When endemic, PPR manifests through disease primarily in young stock, with the overall mortality of young stock from the disease estimated at up to 10 percent. Sporadic vaccination campaigns can leave populations at risk of epidemic outbreaks in all ages.
 - ii. Managing, controlling and ultimately eradicating PPR (intended Project Outcome) will therefore remove a risk for those whose goats and sheep contribute significantly to their livelihoods, which will in turn help make them more resilient (intended Project Objective).
 - iii. Managing the disease requires a smoothly functioning, well-trained and supported, well-coordinated veterinary service. Capacity building through staff-training, tools and equipment is therefore a logical project component (Result 3).
 - iv. It also requires a means of control, and there is an excellent thermostable vaccine. PPR is antigenically stable, so the vaccine produces solid immunity that in most animals will last for life. Commercial thermostable PPR vaccine undiluted is certified stable for three days at 40°C. Experimentally, it can remain viable at 37°C for over 30 days, and at 56°C for nearly two weeks.
 - v. The manufacturing process is affordable, so the Project supporting the Ethiopian National Veterinary Institute to develop the technical capability to make the vaccine, and procure the equipment needed to make the vaccine in quantities large enough for its own domestic market, and to supply neighbouring countries, is again a logical step (Result 2). The process leading to eradication in an environment with significant

movement of animals between Ethiopian regions and neighbouring countries requires coordination and collaboration (Result 4), and strong processes for real-time disease intelligence gathering and sharing (Result 1) throughout the life of the project.

53. Therefore, all Project Results are logically interconnected.
54. The Project mid-term evaluation expanded this theory of change by linking to other projects, including some under the same IGAD/African Union - Inter-African Bureau for Animal Resources (AU-IBAR) and EC-SHARE Programme umbrella that aim at increased commercialisation of pastoral livestock production systems. The mid-term evaluation therefore suggested placing the Project in relation to two additional Outcomes: Increased productivity in an environmentally sound way; and More profitable commercialization (see diagram in Annex 9).
55. This evaluation goes one step further and places the Project theory of change in relation to Ethiopia's transformation agenda and a 'One Welfare' viewpoint as recognised by OIE that links the health and well-being of people, animals and the environment. From this perspective, pastoral resilience is just one part of addressing some bigger challenges for Ethiopia about the UN Sustainable Development Goals, Global Biodiversity Loss, Climate Change and the contribution of meat consumption (see Figure 3).

Figure 3: Suggested final theory of change diagram from PPR project final evaluation





Source: Evaluation team

3. Findings

56. Each of the findings areas - relevance, effectiveness, efficiency and sustainability - will start with a section on the National Veterinary Service structure, because NVS structure has been central to the Project, and will continue to be central to the delivery of animal health and welfare services, and to transboundary animal disease control.

3.1 Relevance

Evaluation Question 1: To what extent were the project design and approach (including partnerships) relevant to the needs, in terms of reducing morbidity and mortality due to PPR and SGP among the small ruminant population owned by the pastoralist communities of Ethiopia? Given the transboundary nature of these diseases and the global aim of PPR eradication, how relevant was the targeting of beneficiaries for the control of PPR in Ethiopia?

57. This section of the report looks at three aspects of relevance:
- i. relevance of Project design, approach and targeting;
 - ii. a detailed comparison between Rinderpest and PPR;
 - iii. the contextual relevance of the Project - where a disease control project fits with current thinking on Pastoral Resilience and other global issues.

Relevance of Project design, approach and targeting

Finding 1. The PPR Project's aims to eradicate PPR and help build livelihood resilience are highly relevant to challenges currently confronting lowland Ethiopia. Its four result areas are logically interconnected and essential components of a functioning animal health and welfare system. It has developed and taken forward a national PPR control and eradication strategy that has strengthened and revitalised the NVS structure. Government contributes vaccine and NVS staff employment costs. Government contribution to running costs would show greater ownership.

58. As a Government Cooperation Project, working through the National Veterinary Service was essential as well as relevant. Inevitably, NVS structure dictated many aspects of the Project. However, a commonly reported finding was that PPR eradication appeared practically to be Project-led, rather than government-led. Informants requested government to show a similar level of political will as it showed for Rinderpest. Rinderpest had the direct support of the Minister of Agriculture who took a personal interest in progress towards eradication. The programme was managed centrally by the national Pan-African Rinderpest Campaign (PARC) coordinator with branch coordinators directly accountable to him. The PARC Coordinator was accountable to the Minister. There was also direct support from AU/IBAR which was very significant. PPR eradication will need similar support.
59. In 2012 Ethiopia developed its first PPR progressive control and eradication strategy, in 2013 it refined it and included it in GTP2, all before the 2015 Global Strategy. In 2017 it aligned its strategy with the global strategy, but targeted eradication by 2027, three years ahead of the 2030 Global Strategy for the Control and Eradication of PPR (GSCEP) target.

60. Nevertheless, the government is still to ratify its revised National PPR Eradication Strategy (NPES). A signed NPES would demonstrate political will not just to PPR but to the NVS that makes it possible; and would require government to allocate funding rather than just rely on donor money. This in turn would galvanise federal-regional discussions. The NPES document is, apparently, about to clear its final hurdle - approval of the Amharic translation. Official ratification before the end of the PPR Project would give a positive message of government commitment that the benefits of the Project will not be lost.
61. PPR eradication is just one of many projects related to animal health and welfare working through the NVS, each with its own specific interests. The evaluation saw little evidence of synergy between these diverse projects. Clearer NVS coordination through a government body (e.g. the Rural Economic, Rural Development & Food Security committee) with the necessary authority, could harness these diverse projects so they work together to strengthen the NVS rather than pull it apart. Short-term emergency relief programmes in particular were reported to undermine NVS processes, mainly for establishing more sustainable service delivery models such as public-private partnerships.
62. The PPR Project appears unusual in strengthening the whole NVS structure. As described in the TOC section (*see paragraph 52-55*), the Project's intended outcome of 'reduced morbidity and mortality related to PPR and sheep and goat pox (SPG)⁵ among the small ruminant population owned by the pastoralist communities of Ethiopia', requires progress against all four Results with each component dependent on the others, and collectively strengthening systems and capacity across a major part of the NVS.
63. The Project built or strengthened systems and capacity at three levels: individual, organizational and enabling environment by providing: opportunities; training, travel and per diem costs; and logistical equipment and materials transport including vehicles. Government and NGO staff in every interview praised the capacity building work of the Project and valued the opportunity the Project has provided to be an active professional doing meaningful work.
64. The Project has focussed much of its effort during this early stage of the PPR work, putting in place the big building blocks - DOVAR, ADNIS, participatory disease surveillance (PDS), equipment for NVI, vehicles, coaching regional government staff on international responsibilities, etc. Nevertheless, even during this short evaluation, it became clear that there were differences in levels of success between people and between places (e.g. some staff explained their vaccination strategies more coherently than others; Oromia-Moyale woreda seems to have more women animal health assistants than most places). These differences provide opportunities for peer mentoring, for developing competency frameworks, and other approaches to higher level capacity building. NGOs should be in a better position to trial these ideas and future projects would do well to build clearly identified higher level capacity building work into their contracts. Equally, RVC, the partner identified to help with PDS development, might still be able to help develop a framework for looking at higher level PDS skill development within the third project extension into 2020.

⁵ Sheep and Goat Pox are malignant pox diseases caused by members of the *Capripoxvirus* genus of pox viruses. While focused on PPR eradication, the Project also aimed to control SGP which affects the same general population of small ruminants.

65. By facilitating the hosting or attendance of international meetings, the Project extended its coordination and cooperation activities to the animal health services of the wider Horn of Africa Region because PPR is a transboundary animal disease affecting goats, sheep and animal keepers in ecosystems that span internal and external national boundaries.
66. The Project emphasised the disease PPR above other TADs because:
- i. PPR belongs to the same genus of viruses as Rinderpest (RP), a genus of viruses that is unusually easy to eradicate (compared to other groups of viruses); and
 - ii. following from the eradication of Rinderpest (using the Global Rinderpest Eradication Programme, GREP), a 'Global Strategy for the Control and Eradication of PPR' developed by OIE and FAO has been widely endorsed, including by all countries in the Horn of Africa.

Box 3: Vaccines and disease eradication

Vaccines and disease eradication

Vaccines are an ideal way to control disease, highly relevant in the face of current global challenges such as climate change, biodiversity loss, resistance to curative treatments and food safety. Vaccines prevent disease. Non-toxic, they do not poison water catchments, the wider environment, or leave toxic residues in food. Once developed they can be relatively cheap to manufacture. Animals immune to disease are more carbon/climate-friendly as they do not waste energy fighting disease or dying prematurely.

Effective vaccines are ideal in disease control, but few vaccines are anywhere near as stable and effective as the morbillivirus vaccines (i.e. PPR, Rinderpest, Measles in humans, Newcastle Disease in poultry, Distemper in dogs). Vaccines therefore complement rather than substitute for other preventative measures, some of which are social rather than technical.

In terms of biodiversity loss, eradication of a disease does not in fact reduce global biodiversity by one, because their viruses are being kept in a small number of laboratories around the world, where, despite high levels of biosecurity, they pose a terrible risk. However, getting countries to give up their viruses is not a simple task.

67. For all the above reasons, the design of the Project has been Relevant.

Comparison between Rinderpest and PPR

Finding 2. A comparison between PPR and Rinderpest (the equivalent disease of cattle, the first animal disease eradicated globally, and the model for PPR eradication) highlights two essential points: a range of social and technical innovations enabled final eradication of Rinderpest, and PPR eradication has not yet made similar levels of innovation; PPR is a disease of goats and sheep which are looked after primarily by women, yet the programme hasn't included them adequately. The Project is likely to be more effective, efficient and sustainable if women are at its heart.

68. The Global Strategy for Control and Eradication of PPR draws on the success of the earlier Global Rinderpest Eradication Campaign and its Pan-African Rinderpest Campaign. Nevertheless, while PPR is eradicable, the world has changed since the days of Rinderpest, which brings both opportunities and challenges for the PPR campaign (see Table 2 below).
69. The Executive Summary of the GSCEP document summarises the strengths and opportunities (for full GSCEP SWOT analysis see Annex 8): The strengths-weaknesses-opportunities-threats (SWOT) analysis has identified numerous favourable factors for PPR

control and eradication. Examples include the availability of very efficient and safe live attenuated vaccines giving inoculated animals life-long immunity and specific and highly sensitive diagnostic assays; favourable epidemiological features (absence of long-term carrier state in animals and no known reservoir in wildlife or in domestic animals other than small ruminants); and growing political support for the control and eradication of PPR, following on from the successful completion of the Global Rinderpest Eradication Programme (GREP) and benefiting from the lessons learnt. In favour of the Global Strategy are:

- i. the potential for achieving economies of scale and a subsequent relative reduction of programme costs by combining PPR control with activities against other major diseases of small ruminants,
 - ii. the incentives provided by the prospect of gaining official OIE recognition of PPR free status or endorsement of national PPR control programmes.
70. The GSCEP SWOT, together with the observation from one interviewee that “we need to recognise the whole environment is different from Rinderpest time”, will be revisited in the next section on the contextual relevance of the Project.
71. In ‘Rinderpest: the veterinary perspective on eradication’ (2013), Peter Roeder, Jeffrey Mariner and Richard Kock, the authors, who also played significant roles in the RP eradication programme, give a comprehensive history of Rinderpest and the process by which it was controlled and eventually eradicated. The abstract summarises the final stages thus: “However, during the past decades, innovative strategies were deployed for the last mile to overcome diagnostic and surveillance challenges, unanticipated variations in virus pathogenicity, circulation of disease in wildlife populations and to service remote and nomadic communities in often-unstable states. This review provides an overview of these challenges, describes how they were overcome and identifies key factors for this success.”
72. Table 2 presents the comparisons of Rinderpest and PPR in terms of key factors and considers similarities, differences and implications for PPR eradication.

Table 2: Comparison of Rinderpest and PPR regarding factors that led to the successful eradication of Rinderpest

Rinderpest	Peste des Petits Ruminants
The most feared livestock disease since people and cattle started to coexist; a long history of causing catastrophic disease epidemics; affecting other species as well as cattle; so, in most places it was known and feared, and there were well-established specific local names for the disease that translated directly to RP.	A recent disease that is already gaining notoriety - but not nearly as well-known as RP was, with local naming more variable and often syndromic. PDS practitioners need to be diligent, skilful and alert to this. During the field visits, it became apparent that some field vet staff are confused by local names.
Affects cattle - higher social status and the domain of men.	Affects goats and sheep - lower social status and, in the pastoral lowlands of Ethiopia, primarily the domain of women.
Mass vaccination campaigns for decades before final global eradication plan conceived in 1994.	Has emerged relatively recently so no long history of vaccination, and control measures not widely known by livestock keepers who, when interviewed by the

Rinderpest	Peste des Petits Ruminants
	evaluation team in South Omo and Somali Moyale, seemed confused about what diseases their goats and sheep had received vaccine for in recent years.
GREP used characteristic ear-punchers in many places to mark vaccinated animals permanently - though this was not popular with the cattle owners.	Shoats marked temporarily with chalk - no long-term marking of vaccinated animals.
Plowright tissue culture rinderpest vaccine (TCRV) developed in 1960 – “TCRV was one of the finest vaccines ever developed in human or veterinary medicine”.	PPR vaccines have benefitted from this experience.
The ‘final mile’ of eradication relied on ground-breaking innovations listed below:	So far the PPR eradication plan has attempted to follow lessons from the RP plan without significant innovation.
“A monoclonal-antibody-based competitive ELISA format which became the mainstay of serological studies for monitoring of vaccination programmes and surveys for verification and official recognition of freedom. With sensitivity exceeding 70 per cent and specificity of at least 99.5 per cent, the test was fit to meet the needs of GREP. Apparent false-positives met during extensive sero-surveillance programmes in the final stages of GREP were greatly reduced when it was realized that maternally derived antibodies could persist for 11 months.”	A pen-side test (the Pirbright Institute PESTE-Test) ⁶ has already been developed for PPR which should significantly shorten time between confirmation and response (vaccination, disease tracking, etc.). The Project has already detected differences in sensitivity between some currently available ELISAs. Selecting effective tests has improved epidemiological insight.
Genetic characterisation of RP morbillivirus allowed differentiation between field strains of different geographical origin, as well as three occasions when field strains had reverted to virulence.	PPR virus strain characterisation appears to be hindered by poor sample collection practice and transportation difficulties, which means that valuable disease intelligence is potentially being lost.
Tight time frame (1994-2010) for ‘last mile’ RP eradication plan a result of concern about reversion to virulence of vaccine strains of virus.	Global PPR eradication plan has a similarly tight time frame (2015-2030) to RP, yet does not benefit from the same starting level of awareness regarding the disease and its vaccination campaigns.
To ensure quality of vaccine, Pan-African Veterinary Vaccine Centre (PANVAC) was established, and successfully institutionalized independent quality control for rinderpest and other key livestock vaccines.	PANVAC testing laboratory based at NVI, Ethiopia so ideal for testing PPR vaccines produced at NVI.
“Development of thermostable vaccine retaining the international required minimum immunizing dose for up to eight months at 37°C, and 10 days at 56°C. The new vaccine, named ThermoVax, had a recommended shelf life of 30 days outside the cold-chain and it was required to hold the minimum titre for 14 days at 45°C.”	Thermostable PPR vaccine now being produced at NVI and certified by PANVAC as “stable for three days at 40°C.”

⁶ The Pirbright Institute PESTE-TEST: Rapid field test detects virus using superficial swabs from live animals. It is fast and easy to perform, providing an accurate diagnosis at the pen-side within 20 minutes.

Rinderpest	Peste des Petits Ruminants
<p>Innovative community-based vaccine delivery systems were extraordinarily effective, despite initial professional scepticism/resistance.</p> <p>As a result, community-based animal health workers have been recognised by OIE as a valid part of an NVS.</p> <p>Male community vaccinators vaccinating a species managed by men, at times and in places that best suited the cattle.</p>	<p>PPR eradication benefits from this OIE recognition of CAHWs, but current use of CAHWs to deliver PPR appears not to be as flexible as with RP.</p> <p>Involving female small-ruminant keepers in the planning and implementation of the vaccination might significantly increase coverage and efficiency, and reduce cost.</p>
<p>Those involved in the RP campaign felt valued and involved in something significant. The campaign cultivated epidemiological rigour which led to innovations such as Participatory Disease Searching, and greater awareness of unexpected variability in disease virulence and circulation into wildlife species.</p>	<p>There seems less opportunity for those involved in the PPR campaign to feel valued for their competence and commitment. Although staff everywhere valued the PPR Project for its capacity development, DSA seems a more accessible reward than being valued for professional competence.</p>
<p>Closely monitored epidemiological intelligence allowed review and adaptation of strategy as the eradication progressed.</p> <p>Epidemiological understanding extended to wildlife.</p>	<p>Depth of epidemiological understanding needs further development. One informant: "Need a more thorough epidemiological survey if ever want to eradicate the disease".</p> <p>NVS needs communication with Wildlife Services and NVS to develop a mechanism for monitoring possible entry of PPR virus into the wildlife population.</p>
<p>Community knowledge of RP was vitally important to the success of the surveillance stages of the RP eradication.</p> <p>Men talked to mostly male key informants about a disease of animals looked after mainly by men.</p>	<p>PPR PDS seems mainly to be conducted with male informants.</p> <p>The extent to which women key informants are being targeted about a disease of animals looked after mainly by women is unclear. More female veterinary staff would make engaging with female informants more straightforward.</p>
<p>Computer disease modelling was relatively new in the time of RP, yet "stochastic Susceptible, Exposed, Infectious and Recovered (SEIR) models", together with estimation of the basic reproductive number (R_0, defined as the number of new cases resulting from the introduction of one infected animal into a susceptible population, which determines the minimum herd immunity required to interrupt transmission, and allows estimation of the size of host population needed by the virus to stop it 'burning itself out') proved useful in epidemiological prediction, and as a communication tool for advocacy work to maintain interest in funding the campaign in its final stages.</p>	<p>Computer modelling such as around R_0 values was discussed, but seems not to have progressed far yet. Nevertheless, computer power and GIS programmes have made epidemiological modelling and analysis more powerful and accessible, and exporting to animations is more developed and might also help in communications, policy and advocacy, so this remains a potential area for further innovation.</p>

Rinderpest	Peste des Petits Ruminants
<p>In several places RP eradication took place against a backdrop of conflict and insecurity. Nevertheless, veterinary teams found ways to work together across lines of conflict; and novel approaches to conflict resolution were tried and worked well. For example, after meeting with RP programme team members, Karamajong, Turkana and Toposa women persuaded young men to halt the raiding that was helping the virus to circulate between northern Uganda, northern Kenya and southern Sudan.</p>	<p>PPR is likely also to be circulating across current lines of conflict, for example between Somali-Moyale and Oromia-Moyale, and this is complicating logistics and wasting resources. Again, there could be a role for women, some of whom are apparently trading their goats and sheep across these lines of conflict.</p>
<p>'Seek, Contain, Eliminate' approach to eradication which took diligence, focus and effort to push on to the end, especially as donor and political interest waned once the clinical disease appeared to have become a thing of the past.</p>	<p>Eradication of PPR will need champions. The current PPR Project has some passionate and articulate staff. They should not be lost.</p>
<p>Rinderpest benefitted from the strong support of AU/IBAR which had its own funds, from direct involvement of Ministers and State Ministers, and an unbroken chain of authority to field services.</p>	<p>PPR does not have this level of support. AU/IBAR is no longer as well funded; Ministers and State Ministers have other pressing priorities; and the separation between National and Regional States has introduced a negotiation step between the Competent Authority and field services.</p>
<p>Rinderpest left a legacy, with all the advances mentioned above, but its contributions to strengthening pastoral resilience and veterinary responses to other TADs (assuming it made some) are not widely understood or acknowledged.</p>	<p>PPR eradication, when it happens, will also leave a legacy. With the benefit of foresight, and for the benefit of future animal disease eradication campaigns, the PPR eradication process needs to be charted more widely than just through veterinary science, by involving universities and other anthropological, social and economic research institutes from the start.</p>
<p>Rinderpest was more than a disease. The money it attracted supplied veterinary services in many countries with much needed operational funds for vehicles, equipment, staff training, etc, over many decades. Eradication stopped all that.</p>	<p>PPR does not have the same celebrity status. It is competing with (among other pressing global challenges) a host of other established and emerging diseases, some of which are zoonotic. It can be eradicated but when the paper 'PPR: the veterinary perspective on eradication' is published afterwards, it will almost certainly be detailing as-yet unimagined innovations and lessons learned.</p>
<p>GREP/PARC in the time leading up to eradication was an environment soaked in higher level capacity building opportunities - mentoring, peer-to-peer knowledge and skills exchange, problem solving, supportive delegation of responsibilities - and led to institutional transformation as with a reversal of attitudes to community-based approaches and acceptance of CAHWs by OIE.</p>	<p>With strong, committed leadership, all this could be available to PPR too.</p>

73. A lesson that emerges from the above table is that the PPR eradication programme going forward would do well to bring women 'front of stage', not just as beneficiaries, but as

active participants. As women are almost entirely responsible for looking after goats and sheep, they will be the ones seeing the early signs of disease, they feed the milk to their children, they play the greatest role in marketing their goats and sheep, and they have a greater interest in the survival of the kids and lambs. Alongside more general exploration, the evaluation team explored the role of women in livestock rearing which confirmed this general understanding (see Box 4).

Box 4: Illustrative points from interviews on women's roles

After a group of male informants had ranked cattle and camels as the most important animals, they were asked if they imagined a group of women would rank the species differently. After making clear that imagining being a woman was a very difficult thing to be asked to do, they put goats and sheep second after chickens. When asked why, they explained that men are involved in some decision-making around goats and sheep, and may help in other ways, but every aspect of chickens is under the control of women, including any business they do with them. When women in the same village were asked who looked after goats and sheep, they mentioned that men fence the pens, perform castration and help find lost animals, but otherwise everything, including managing the money made from sales, is the work of women.

NB: Incidentally this suggests that Newcastle Disease - the globally-important morbillivirus disease of chickens equivalent to RP in cattle and PPR in goats and sheep - is unlikely to be eradicated, particularly in extensively-reared poultry, until a Newcastle Disease eradication programme is led primarily by women for women.

74. Male informants acknowledge that women could be CAHWs for small ruminants and for specific tasks but could not deal with cattle or adult camels which are too strong and difficult to handle. This same argument was used traditionally against women becoming large animal vets in many parts of the world - until they did and proved very competent at it. Nevertheless, we were told by female informants that two women are working well as the only CAHWs in Bede kebele in Somali-Moyale woreda, and that they deal with all species. There are apparently other kebeles where women are providing some CAHW services, but it remains extremely rare. It is encouraging that VSF-S has started training more women to focus on small ruminants, and 5 of 18 woreda animal health assistants in Oromia-Moyale are apparently women. Pockets of success make good case studies.
75. RP eradication relied on innovation in a wide range of areas, including in community-engagement. It is highly likely that bringing women more actively into the programme would deepen epidemiological understanding of the disease, and possibly lead to more effective and cost-efficient ways to deliver the vaccine. They might even be able to help address the challenge of allowing animal health and welfare services to operate across current lines of conflict, and that could bring additional benefit in other sectors. As a long-term programme, PPR eradication needs to fit with larger social needs. Any donor-funded or UN-supported project needs actively to encourage female professionals and para-professionals, perhaps through, for example, bursaries, studentships, internships, apprenticeship programmes. In this way they will also be contributing more broadly to the growth and transformation of Ethiopia. Apparently the Government of Ethiopia already takes affirmative action to bring more women into government service, but it is a slow process, and donor projects and NGOs could be trialling new ways to speed this up.
76. Similar points about gender are raised in the 2018 evaluation of FAO's Emergency Prevention System (EMPRES) Programme in Food Chain Crises: "Recommendation 215v: **Gender** and accountability to affected populations required considerations in the management of Transboundary Pests and Diseases and Food Safety Threats response,

particularly emergency responses. Bearing in mind the priority FAO places on these issues, specific EMPRES strategies for these areas should be formulated and referred to in the overarching, regional and component strategies”.

Contextual relevance of the Project to resilience

Finding 3. While the primary purpose of the Project is to move Ethiopia along its PPR eradication pathway and strengthen the NVS particularly regarding control of TADs, its Overall Objective is to increase food security and strengthen pastoral resilience, and it is funded under a wider EC SHARE programme which is part of an IGAD pastoral resilience initiative. Therefore, Project relevance has to be evaluated in these wider contexts. To support this better, the Project should have worked to qualify and quantify its social and economic impact. Animal keepers interviewed during the evaluation consistently raised topics related to, for example, population growth, future opportunities for their children, climate and biodiversity changes, and environmental pollution that set the PPR work within a wider resilience context.

77. The PPR Project’s overall objective is: “Improved food security and improved resilience to drought (and other natural disasters) in the pastoral lowland communities of Ethiopia”.
78. FAO’s definition of resilience: “The ability to prevent disasters and crises as well as to anticipate, absorb, accommodate or recover from them in a timely, efficient and sustainable manner. This includes protecting, restoring and improving livelihoods systems in the face of threats that impact agriculture, nutrition, food security and food safety,”⁷ emphasises resilience as an externally mediated process. The United States Agency for International Development’s (USAID) definition: “the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth”,⁸ emphasises community empowerment.
79. Both aspects are important. Some threats are the result of global effects such as climate change that require global partnerships to resolve, yet affected communities need an enabling and supportive policy environment to be able to adapt, survive and thrive.
80. This section considers the PPR Project’s relevance in relation to: i) Ethiopia’s growth and transformation agenda; ii) current thinking about resilience, particularly with regard to Climate Change, Global Biodiversity Loss, and Meat; iii) the Sustainable Development Goals; iv) other projects involved in pastoral resilience in Ethiopia; v) the OIE-recognised concept of ‘One Welfare’. It also makes a case that looking for synergies across projects and sectors would increase relevance and increase sustainability.
81. Ethiopia has targeted 2027 for the eradication of PPR - eight years from the end date of this project. The Growth and Transformation agenda imagines Ethiopia on its way to being a very different country by 2027. The population of Ethiopia has doubled since 1994, droughts are becoming more frequent, and figures for Emergency Food Aid Beneficiaries in Borena Zone in the EC-SHARE Programme mid-term evaluation show the increasing scale of the challenge. One interviewee said “we need to recognise the whole environment is different from Rinderpest time”, adding “in Rinderpest time, Ethiopia had 35 million

⁷ <http://www.fao.org/emergencies/how-we-work/resilience/en/>.

⁸ From ‘Resilience in USAID’, 2015.

people and 25 million cattle; now it has 110 million people and 150 million cattle, sheep and goats”.

82. Points in Box 5 from community interviews explain this from the perspective of pastoralists.

Box 5: Highlights from community interviews

In one representative community pastoral animal keepers listed the major challenges they face, then ranked them from most important to least important:

1. Lack of water & Lack of feed and grazing
3. Disease
4. Too much rain
5. Drought

Asked about the difference between 'Lack of feed and grazing & Lack of water' and 'Drought', they explained that the first was the result of increasing population.

When PPR had come to the woreda, around one-third of the sheep and goats got sick, and half of those that got sick then died. Those who had good herds survived, but some people with few animals had to leave pastoralism.

In a neighbouring village, when talking about education and his nine children, a man told the evaluation team that he wanted the oldest children to stay in pastoralism, but the young ones could go to school and could do what they wanted afterwards - stay in pastoralism or do something else. In an interview with 12 men in another village, only 4 claimed to be pastoralists, though only 4 of the others had no animals. The non-pastoralist explained they make their living from handwork and farming, though that is not productive now because of drought. All joined in the discussions with equally interesting insight.

83. The Strengths, Weaknesses, Opportunities and Threats Analysis in the Global Strategy for the Control and Eradication of PPR includes, among weaknesses: “Other priorities than animal health and veterinary public health in some countries’ political agenda”.
84. Leaving aside the immediate managerial challenges facing the relevant Ministers and State Ministers of near continuous restructuring during the time period of the Project, besides building veterinary services and eradicating PPR, Ethiopia has many other priorities. These include: addressing a rate of population growth among the highest in the world, increasingly frequent droughts, supplying safe drinking water, increasing numbers of people on emergency food aid, land degradation, invasive plants, providing usable energy, educating an increasingly young growing population, ambitious physical infrastructural development, and rapacious global capitalism.
85. A 2018 review by Tim Leyland for the British Government’s Department for International Development (DfID) of “evidence and research needs on pastoralism, disasters and protracted crises in East Africa” affirmed the social and economic importance of traditional forms of pastoral and agro-pastoral animal keeping for Africa’s Arid and Semi-Arid Lands (ASAL), and of animal disease control particularly through vaccination. It acknowledges the harm done to these production systems by ‘tragedy of the commons’ misinformation starting in the 1960s; that redressing this harm is essential if the ASAL areas are to play their valuable part in climate-smart resilience; and that “evidence has been provided to confirm that pastoralism is still fit for purpose”. Part of this will be pushing back on the trend towards acquisition of pastoralism by fewer, richer people, sometimes living outside pastoralism and employing herders, which undermines the foundations of the social platform on which pastoralism is built. It also emphasises the need for further evidence to

- influence policy, particularly around processes of change, as well as the “urgent need to facilitate and support people moving out of direct involvement in pastoral production”.
86. The 2016 World Bank Study: ‘Prospects for Livestock-Based Livelihoods in Africa’s Drylands’ makes the same point: “The lack of quantitative data on livestock-keeping livelihoods in drylands seriously constrains informed decision making.”
 87. De Haan 2016 observes that “Shocks within Africa over the past decade have led to an annual flow of about USD 1 billion in humanitarian emergency aid into the drylands and affected an average 5 million people per year.” It is likely that the PPR Project, costing EUR 9.2 million over five years and controlling a major transboundary disease of goats and sheep has been cost-effective. The GSCEP document cites high level global calculations of projected economic benefit from eradicating PPR, but these are not disaggregated by country. The 2013 *Strategy for the Progressive Control of Peste Des Petits Ruminants in Ethiopia* contains an excellent summary of the social and economic case for proposing an eradication programme.
 88. In this context the PPR Project would have done well to track the real benefits, commissioning local research, engaging with university departments across a broad range of disciplines, including social science, anthropology, natural sciences, as well as economics and veterinary science. This would have to include the ability to attribute costs between risks because, for example, informants talked of goats saved from PPR later dying in drought. If this research had included a lowlands-wide citizen-science component involving schools in local-knowledge-based biodiversity and environment studies, encouraging children to see the joint relevance of education and pastoralism to their futures, and owned by the whole nation, that would have been even better. In a country with abundant sunshine and a programme using solar fridges, getting physicists involved to enthuse young people with an understanding of the transformative importance of solar energy would be good too. Ethiopia’s ambitious growth and transformation plan will rely on unleashing the diversity and creativity of its population.
 89. While the PPR Project helping to build effective veterinary services is relevant, and an effective veterinary service will be able to eradicate PPR, social and economic evidence to show how these are helping Ethiopia’s growth and transformation agenda would help maintain interest in the programme in the face of competing priorities.
 90. Another vital area for attention is meat. This matters because PPR eradication is partly justified by the contribution pastoral meat contributes to the national economy. However in line with SDGs 12 & 13 (Responsible Production and Consumption and Climate Change) the UN and others have produced reports advocating for substantial reduction in meat consumption because meat production makes a significant contribution to greenhouse gas emissions. Yet global demand keeps rising, Ethiopia’s GTP pins economic hope on increasing international meat sales, and the PPR Project MTE suggested introducing intensification of pastoral meat production systems into a PPR Project theory of change. To square these competing challenges, Ethiopia and other countries in pastoral Africa need to make a strong case for why meat that is eaten should be from pastoral animals rather than those raised intensively on concentrate feeds in the western world and Asia. In ‘Meat production, consumption and marketing trade-offs and potentials in Ethiopia and its effect on GDP growth: a review’ (2018) published in the *Journal of Nutritional Health & Food Engineering*, Eshetie Tekeba et al. recommend the value of “branding of the Ethiopian meat

and breed of origin". The traditional pastoral sector needs to establish a strong brand identity and make a special case for meat from pastoral systems. In the face of global loss of biodiversity, pastoralists are the key to safeguarding the biodiversity of the lowland rangelands which cover 70 percent of Ethiopia's land area. Animal welfare in pastoral systems is far better than in most intensive systems around the world with animals living stimulating, socially diverse lives. Transport, a weak point, would be reduced by slaughtering closer to production. Improved animal health care systems are vital to optimising the system for niche international marketing. Disease is bad for welfare, it slows growth, reduces energy conversion, and thereby increases greenhouse emissions. Challenges for the veterinary profession in pastoral systems include extending high-quality disease prevention and treatment services to every animal; finding better control methods for parasites; and ensuring treatments are used correctly so that meat is safe to eat, the environment is not poisoned for other living beings, and antimicrobial resistance does not develop. Attention also needs to be given to how the meat that is produced gets to the right people, particularly children during the time of development, so that they can reach their potential and contribute most effectively to a transforming Ethiopia.

91. Similarly for SDG 15 (Life on Land), in specific recognition of pastoral stewardship of the ASAL rangelands, the 2016 World Bank Study: 'Prospects for Livestock-Based Livelihoods in Africa's Drylands' suggests "The narrow focus of past livestock development policies in drylands on producing milk and meat needs to shift and embrace greater multi-functionality, particularly with incentives to strengthen the environmental stewardship of pastoralists and agro-pastoralists."
92. Traditional pastoralists understand and look after the land, as well as their animals. They need now to be recognised for this and be rewarded for this aspect of their lives at least as much as for being producers of meat.
93. The excellent mid-term evaluation of the EC-SHARE Programme recommends "developing programme-wide Monitoring and Evaluation reporting overall progress and indicators". One more detailed recommendation is that every Project within EC-SHARE reports against a water audit as part of a more integrated approach to natural resource management. The EC-SHARE Programme has seven components: support to the Productive Safety Net Project; Integrated Nutrition Services; Integrated Recovery Support; the PPR Project; Sustainable Environmental Protection and Watershed Management in the Bale eco-system; Strengthening Institutionalized coordination structures and harmonisation mechanisms; and Ethiopia Strategy Support Programme Research.
94. Additionally there are many other projects involving, for example, the European Union, FAO, NAHDIC, World Bank, USAID, DfID, IGAD, IFAD, AU-IBAR, OIE, International Livestock Research Institute (ILRI), VSF-S, VSF-G, and other UN agencies. VSF-S implements several resilience projects but all are separate. This is because of the way donor projects are currently organized - each with its own internal LogFrame and theory of change, with very specific objectives, activities, budgets, key performance indicators, reporting points, and there is no mechanism to recognise and accrue benefit from combining, collaborating, and coordinating work across projects. OIE's recognition of 'One Welfare' in 2016 provides a simple conceptual framework for looking at how a project provides health and well-being to people, animals and the environment in the face of climate change, global biodiversity loss, and the range of SDGs. Particularly for projects that take animal health as a starting point, it provides a useful lens through which to look at all our work. Many projects are

contributing to the same overall 'One Welfare' aim; like different instruments in a musical group, they need to work together harmoniously.

UN agencies working together

95. Another opportunity available to all UN agencies is cross-agency collaboration, which should be the norm. A routine system of cross-agency peer-review would help all agencies engage better with the full range of SDGs, and might have helped the PPR Project to identify the potential benefit of women's involvement earlier, as well as helping provide possible ways to access it. By increasing operational effectiveness and efficiency this would save money. FAO already charges an overhead to cover technical support from FAO staff elsewhere in the world. This overhead could easily cover the incidental costs of a pro bono system of inter-UN-agency oversight over each other's projects in working to reach SDGs. This system of inter-agency cross-mentoring needs to be in place from project inception throughout the whole life of a project. This does not mean every agency listed as a co-facilitator, but a light-touch approach to ensuring that gender and other cross-cutting issues meet the best current practice in every project.
96. Development projects should in theory gain greater impact through convergence with other government and donor-financed programmes. For example, the evaluation team learned that PPR activities were intentionally implemented in sites that did not overlap with the long-running, multi-phased, Pastoral Community Development Project (PCDP). While the logic underpinning such decisions may be to ensure more equitable benefits from development projects across regions, there is a risk that benefits may become diluted and opportunities for holistic gains may be lost. The evaluation team was unable to check the veracity of this information or test the possible impact, but it provides an example of opportunities for collaboration that can be tested, perhaps through comparative pilot projects, in future programme planning.

3.2 Effectiveness and signs of impact

Evaluation Question 2: What outcomes, both intended and unintended, are being achieved? In particular: to what extent has the programme achieved or is expected to achieve its stated objective under the project results framework? To what extent has the project developed national capacities to plan and undertake vaccination campaigns and other disease control measures, as well as surveillance and diagnostic capacity to ensure early identification of suspected cases? To what extent has the project contributed to strengthening the capacities of pastoralists for self-alertness and reporting of potentially hazardous animal health events? What factors have contributed to the achievement or non-achievement of the intended outcomes? How have gender relations and equality been affected by the project?

Finding 4. The Project has been highly effective. It was well designed with a strong internal logic; its components complement each other. Once it finally started, it has been diligently and intelligently managed; it is excellent, straightforward and honest in its reporting including about challenges it has faced; and has worked hard to address shortcomings and weaknesses. In every Result Area it has moved forward the PPR control and eradication programme for Ethiopia and, with the help of four no-cost extensions it will have achieved almost all the activities it set out to achieve. However to progress to eradication, the government will need to address the separation

between Ethiopia's 'Competent Authority' (CA),⁹ a Federal Government appointee, and Ethiopia's Regional Veterinary Services, each of which is autonomous, and over whom the CA has no direct authority to enforce the conditions and protocols necessary to pursue a disease eradication campaign.

97. The section on effectiveness starts with disease control (the Project's intended purpose), before looking at NVS structure and the four project result areas.

Disease control

98. The Project's intended purpose and its objectively verifiable indicators are:

<p>Purpose/outcome – Reduced morbidity and mortality due to PPR and SGP among the small ruminant population owned by the pastoralist communities of Ethiopia.</p>	<p>Objectively verifiable indicator Mortality due to PPR reduced to zero in Afar Region by the end of year 4; The absence of PPR disease established in the young stock of Afar Region. The mortality due to PPR and SGP in small ruminants in the remaining project areas (i.e., Somali Region, Borena and Guji Zones of Oromiya and South Omo zone of SNNPR) reduced to less than 1 percent and 2 percent respectively by the end of the project.</p>
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99. At the time of Project inception (2013-2014), PPR disease was not detectable in the Afar Region, likely a result of repeated PPR vaccination conducted through emergency projects between 2010 and 2012. However, at the start of Project implementation in late 2015, PPR disease was reintroduced in Afar region from the adjacent highlands. So, in Afar the activity changed from verifying absence to controlling and eradicating PPR disease from many of its woredas. As large areas have been vaccinated, absence will have to be monitored through sero-monitoring young animals born after the last vaccination. So, while the activities of the Project have almost certainly reduced morbidity and mortality due to PPR and SGP significantly, evidence is not yet available. In addition, Afar appears to have had one confirmed case of PPR in each of 2018 and 2019, though these have apparently been quickly contained. Particularly in some parts of Somali, the status of the disease remains too uncertain to quantify mortality. Nevertheless, the Project has put in place processes that will allow the monitoring of PPR management and control.

NVS structure

100. The Project found effective ways to work within the current NVS structure. At Federal level, the Project established a Project Management Unit, situating most staff within the Ministry of Agriculture so they worked on a day-to-day-basis with government colleagues, with two-way mentoring and support, and shared directly any constraints including the effects of the Ministry restructures. At regional level, the Project established Branch Coordination Offices (BCO). BCOs were located within Regional Veterinary Laboratories primarily to take advantage of their relative operational, vehicle and budgetary independence. This mostly worked well, and the Project was able to get on with its work.

⁹ The Competent Authority in an OIE Member Country or Territory is the government-designated person with the Authority, responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification and other standards and recommendations in the Terrestrial Code and the OIE Aquatic Animal Health Code in the whole country or territory.

101. Ideally, the BCO would have been located within the Regional Bureau close to the Animal Health Director, with field work looked after by a veterinary service team. Then the RVL would have been better able to perform an independent epidemiology and monitoring role, instead of NAHDIC having to do all the independent monitoring from Addis Ababa. The original plan was to have a federal representative at each BCO to ensure programme quality control, but this idea was rejected by the State Minister and at regional level. Regionally designated BCO coordinators are also not accountable to the national PPR coordinator. This leaves a gap in the line of responsibility to the National Competent Authority for TAD control. There are presumably provisions made for national planning and coordination of human health, water, energy, and road/transport infrastructure; and it is not clear why animal disease control would be different. A Branch Coordination Officer at the RVL was appointed as PPR lead person, but this was not a dedicated position, instead the PPR coordination work was done alongside pre-existing responsibilities, which apparently led to conflicts over prioritising different areas of work. Again, in an integrated NVS, disease control functions would sit with dedicated staff.
102. The implementing partners, VSF-Suisse in Somali region and VSF-Germany in Afar region, with their established field coordination offices and relationships with the Bureaus and communities, and RVC with its PDS experience, all added to the effectiveness of the PPR Project. However, the most significant finding regarding Project effectiveness (and efficiency, see below) has been uncertainty about federal and regional commitment to PPR eradication, or to a strong effective NVS more generally. In this context, for all its work to integrate, the Project inevitably feels donor-driven rather than nationally owned.
103. GTP2 policy and targets have supported a public model of veterinary service through construction of veterinary offices to at least woreda level, with government paid staff, but with very limited operational budgets. This model of veterinary service delivery is generally recognised as being ineffective and inefficient. Nevertheless, it makes the government visible by providing jobs with salaries in every woreda in the country. Most structured action apparently happens with external donor funding, but that is transient and shifting in its priorities. GTP3 is an opportunity for a strong new vision for the NVS that would: guide all veterinary development; is communicated and understood across the whole country; has full support from the Minister and from the Regions; works; and inspires confidence in animal keeping communities. However, any new system would have to be seen to provide a better service to animal keepers than the old system.
104. Regulated national standards are essential to improved veterinary services. These need to be embedded in veterinary training from the first day in veterinary school to all post-graduate 'continuing professional development'.
105. National standards and coordinated planning and action are needed in the NVS because: the well-being of people, animals and the wider environment are interconnected; healthy animals and their products have a vital role in supporting livelihoods and helping feed Ethiopia's population, particularly for young people; animal production flows across political boundaries from kebele to international level; diseases do not respect political boundaries; Ethiopia has international obligations with neighbouring countries and more widely through OIE to control transboundary animal diseases; and high quality meat has a role in foreign trade.

106. Effective disease control, and eradication of PPR, will require evidence that national standards on disease, surveillance, detection, containment and reporting are being applied across Ethiopia in a timely, efficient and effective manner, with an accountability chain to the competent authority.
107. The Project has shown what an effective NVS could achieve and some of the components it needs. Capacity building has been one of the Projects' most celebrated contributions. Nearly everyone has felt positive about the Project and its achievements but has expressed uncertainty about whether these achievements will be sustained.
108. The Project has improved the timeliness of critical interventions such as case detection, sample collection and response. However, there is much more that still needs to be done to reach the stage that PPR could be eradicated.
109. However, Project experience shows that priorities and capacities are not fully aligned between the PPR Project, Federal Ministry and Regional Bureau. Nevertheless, Project staff have worked hard to develop Federal-Regional relationships. They have organized coordination committees; they have visited Regional Bureau whenever there have been staff changes to re-explain the need for national harmony in approach to a disease eradication programme; and they have been diligent in tailoring training and coaching based on monthly reports and feedback. Ultimately, the Project has little control over these relationships, which need to be agreed at a higher political level, but it has played its part in helping the relationships evolve constructively.
110. Despite the challenges, relationships between the Federal Ministry and Regional Bureaus, Regions and woredas, and between NAHDIC and Regional Veterinary Laboratories, are generally good. A notable exception remains the conflict around Moyale between Somali and Oromia. While this conflict will hopefully be short-lived, it highlights the potential challenges to the eradication programme of any volatility of the security situation within the country.
111. Memoranda of Understanding on cross-border TAD control have been signed with Kenya, Somalia, South Sudan, Sudan, Djibouti, the Karamoja Cluster but not yet with Eritrea. There are also examples of good local cross-border planning and collaboration. Some adjacent woredas plan coordinated vaccination campaigns (e.g. in South Omo and Afar); and there is local cross-border sharing of information and cooperation in some places along the borders with e.g. Eritrea, Kenya, Somalia and South Sudan.
112. The Chief Veterinary Officer has recognised the above points, and GTP3 is seen as an opportunity to audit the current system and move forward with achieving an NVS more fit-for-purpose - federal and regional systems working together so that the NVS can deliver 'One Welfare', safeguarding the health and well-being of people, animals and the environment.

Result 1. Improved real-time understanding of the transboundary animal diseases (PPR, SGP, FMD and CCP) status in the pastoralist areas of the country.

113. Real-time suggests everything is known as it happens. Technologies can reduce time delays but are just tools. The first disease eradicated was Smallpox in 1980; and the second to be eradicated was Rinderpest in 2011. Both were eradicated using technology available at that time. Real-time understanding of disease status requires two things - a process, and people

following the process diligently. The Project has significantly improved real-time understanding of animal disease status in Ethiopia, particularly TADs with a special focus on PPR:

- i. by moving forward technologies that support the reporting process, i.e. the two reporting systems DOVAR and ADNIS;
- ii. by improving the number and timeliness of reports coming in, monthly through DOVAR, and event-related through ADNIS;
- iii. by introducing Participatory Disease Searching (PDS) which, as the name suggests, involves actively going out into the communities and using participatory methods combined with examination of animals to search for specific diseases and to explore where they are likely to have come from and where they are likely to go next;
- iv. by funding the introduction of a Pen-Side Diagnostic Test for PPR which allows confirmation of the virus while with suspect animals in the field;
- v. by funding the National Animal Health and Disease Investigation Centre to plan and conduct seromonitoring and serosurveillance;
- vi. by funding NAHDIC to type the PPR virus which can help understand virus movement from a broader, more long-term perspective, and potentially to detect if the vaccinal strain has reverted to virulence. Virus characterization/typing helps elucidate the molecular epidemiology of the circulating virus type within Ethiopia in relation to the neighbouring countries, which helps substantiate the need for strengthening coordination and harmonization of efforts.

114. These points are now examined more closely.

DOVAR and ADNIS

Box 6: DOVAR (Disease Outbreak and Vaccination Activity Reporting)

DOVAR summary

Monthly Disease Outbreak and Vaccination Activity Reporting (DOVAR) is the core of Ethiopian animal disease monitoring, updating knowledge about animal diseases events in Ethiopia and animal health service responses on a monthly basis. The Project continues to take forward DOVAR technology to a web-based system in the face of significant challenges,¹⁰ and through training and support has helped raised the average national monthly reporting rate from 35 percent in 2015 to 73 percent in June 2019. The Project has specifically supported Afar, Jijiga, Yabello, Sodo and Jinka Regional Veterinary Laboratories (RVLs) and the transition zone centres.

115. Up to 2016, Disease Outbreak and Vaccination Activity Reporting in Ethiopia had relied on monthly paper reports from woreda level passed up to the central government veterinary authorities, with data transferred manually into a central Microsoft Access database.
116. The web-based DOVAR II system was initially developed under the 'Improving and Integrating Animal Health Services in the Livestock Value Chain through Public-Private

¹⁰ See, for example, paragraphs 120, and 131-139.

Dialogue in Ethiopia' (LVC-PPD)¹¹ Project and became operational in April 2016 in all regional laboratories, so that data needed only to be entered once at regional level, saving time and reducing data-transfer errors.

117. Trained woreda veterinary staff complete monthly DOVAR paper format reports within the first days of the following month and send them to their respective Regional Veterinary Laboratory. There, assigned and trained staff enter these paper reports into a web-form that uploads the data to a DOVAR database on a server at the Ministry of Agriculture.
118. The target level for monthly woreda report returns is at least ten months per year within ten days of the next month. The Project had (up to June 2019):
 - i. trained an epidemiologist within the Ministry of Agriculture Directorate of Disease Control to be the DOVAR Coordinator;
 - ii. identified 15 people from the target regions to be DOVAR focal persons; trained them on relevant epidemiology and as DOVAR trainers; around 79 animal health staff have been trained as DOVAR trainers, and around 450 more have been trained on how to use and fill out the DOVAR forms;
 - iii. extended the DOVAR paper format training to the woredas of the highland-lowland interface areas; thereby supporting the Epidemiology Directorate to achieve the target goal for the Project woredas.

When the system faced challenges, the Project adapted and provided additional support. After LVC-PPD ended, for example: "In 2018 the web-based reporting system completely halted, due to software and hardware issues as the expert who had been involved in the initial programming left the ministry without handing over the program code for other IT experts to make necessary improvements." The Project therefore had to start rewriting and improving the programme, with full functionality resuming in September 2019.

119. Web-submission problems led to a drop in reporting rate in 2018. However, the project provided a work-around with DOVAR reports now received by email from regional laboratories as attached Microsoft Excel spreadsheets, and submission rates are again rising.
120. The DOVAR coordinator oversees the functioning of the system, monitoring monthly report return rate and quality of reporting, and providing support and feedback to regional DOVAR focal persons. As a result: the National average monthly report return rate (not just for Project woredas), has increased significantly from 35 percent in 2015, to 73 percent in 2019, which approaches the OIE PVS standard of 80 percent, and in 2017 met the GTP2 target rate of 57 percent.

¹¹ LVC-PPD was a European Union-funded project that ran from May 2012 to January 2015 to foster and strengthen public-private dialogue in promoting an enabling environment to encourage and improve investment in the livestock sector with the final objective of adding value to the livestock commodity production chains by integrating strengthened animal health, advisory and regulatory services; supporting and to support the Government of Ethiopia in the rationalisation of veterinary services, especially in the field of: i) development of standards; ii) implementation of certification procedures; iii) improved environmental management to reduce adverse impact of production and processing activities; and iv) development and adoption of appropriate traceability systems.

121. However, there remains considerable variation between woredas and regions in reporting rate, with Somali lagging behind, as demonstrated in the Table below of DOVAR Excel Spreadsheet submissions January - May 2019, which has Somali missing completely.
122. Nonetheless, the most recent DOVAR submission data from Somali is revealing. As of early August, the numbers of 2019 monthly woreda reports from Somali received by the DOVAR coordinator are (out of 93 expected): Jan 70, Feb 71, Mar 64, Apr 61, May 40, June 19. This suggests that most woredas are reporting, but they have trouble getting them to Jijiga BCO in a timely manner. Considering the geographical challenge facing distant Somali woredas, this is understandable. VSF-S has been trialling innovative ways to help with submission, for example setting up dedicated 'report post-boxes' in-between posts. This remains an ongoing challenge.

Table 3: Biannual DOVAR monthly reporting rates

Bi-annual report	DOVAR Reporting rate	Remarks/reasons
12-2015	35%	Taken as baseline.
06-2016	Not available	Transition period from MS Access to DOVAR-II.
12-2016	40%	All RVLs except BG, DD and Harari.
06-2017	44%	All RVLs except BG, DD and Harari.
12-2017	57%	All RVLs except BG, DD and Harari.
06-2018	78.1%	Benshangul Gumuz joined the reporting system.
12-2018	71.5%	Dire Dawa joined the reporting, Harari still missing. Does not include the month of December as the submission was not complete.
06-2019	73%	All RVLs except Jijiga, Gambella, Diredawa; and Harari is not included as it was not acquired yet. Does not include the month of June as the submission was not complete.

Source: Project Biannual Reports

Table 4: Number of DOVAR monthly reports received (in MS Excel spreadsheet format as DOVAR server currently down) by calendar month by regional laboratory (January to May 2019)

2019	Oromia				SNNPR			Amhara		Afar	Tigray	AA	BG
	Bedelle	Assela	Hirna	Yabello	Soddo	Jinka	Mizan	Kombolcha	B/Dar	Semara	Mekele	Shola	Asosa
No of woredas	136	86	29	33	108	9	26	72	82	32	32	10	20
Expected	680	430	145	165	540	45	130	360	410	160	160	50	100

2019	Oromia				SNNPR			Amhara		Afar	Tigray	AA	BG
	Bedelle	Assela	Hirna	Yabello	Soddo	Jinka	Mizan	Kombolcha	B/Dar	Semara	Mekele	Shola	Asosa
Jan	110	75	26	25	98	9	21	73	75	23	23	9	18
Feb	112	81	26	18	100	9	25	65	65	29	29	10	19
Mar	127	80	27	18	103	9	23	60	75	31	29	10	22
Apr	0	79	28	21	98	8	23	0	75	25	29	9	0
May	0	80	29	24	0	9	21	0	63	28	30	9	0
Received	349	395	136	106	399	44	113	198	353	136	140	47	59
%¹	51%	92%	94%	64%	74%	98%	87%	55%	86%	85%	88%	94%	59%

¹ Percentage is calculated based on the number of reports received divided by the number of the months for which the report was sent on excel spreadsheet. Also note that the table does not include the month of June, as the data was not received.

Source: Project Jan-Jun 2019 Biannual Report

123. Once the reporting rate passed 60 percent, emphasis of feedback and training moved to improving report quality:
- the DOVAR instruction sheet was translated into all necessary local languages;
 - specific further training tailored to specific areas of weakness was rolled out across the Project areas through BCOs; and
 - internet facilities have been upgraded where necessary (e.g. Jinka and Jigiga) to ease uploading.

Box 7: ADNIS (Animal Disease Notification System)

ADNIS Summary

ADNIS is a mobile phone-based disease reporting system that can significantly speed up and streamline disease notification, epidemiological analysis and response.

In 2014 FAO trialled a pilot in 280 locations through a separate project before the start of the PPR Project and the PPR Project has taken it on and developed it.

The PPR Project has shown commendable flexibility in supporting ADNIS through the inevitable and various challenges that have emerged with such new technology.

ADNIS is being used but is still in its infancy. ADNIS functionality may one day supersede DOVAR, but for the foreseeable future, they will complement each other.

124. Below is an example of an ADNIS Disease Report which shows the advantages of ADNIS over just a voice call report of an outbreak.

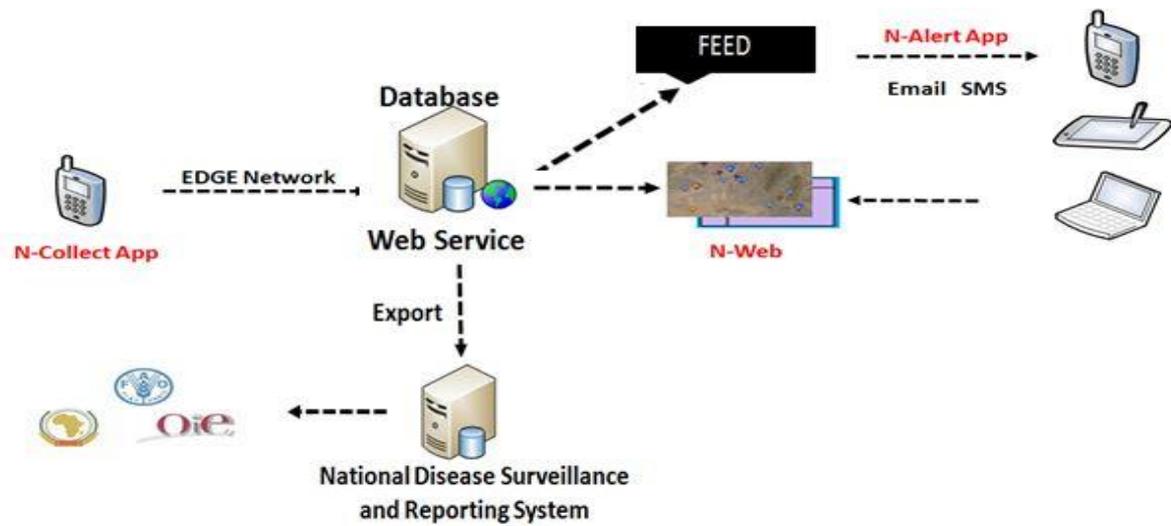
Figure 4: Example of an ADNIS disease report (a case of PPR)

ID	31186
Zero Report	False
Office or Field	Office
Date	Jan 6, 2017 6:00:00 PM
Woreda	Jijiga
Region	Somali
IMEI	866342025104505
Location	Latitude 9.3511448 Longitude 42.7999404 Altitude 0 Accuracy 2000
Data	Species ovine conjunctivitis1 abortion1 diarrhoea_Watery1 lachrymation1 Symptoms nasal_discharge1 salivation1 pyrexia1 mouth_lesions1 laboured_breathing1 cough1 Diseases PPR Cases 345 Deaths 23 Risk 23456

Source: Project document (GCP/ETH/083/EC)

125. Disease data that includes time and geographical location is presented in a form that can be incorporated into a database and used for epidemiological analysis, and exported, for example, into animations that map disease dispersion over time.
126. ADNIS has four components: N-collect, N-server, N-web, N-alert (see diagram below).
 - i. N-collect uses a Smartphone App to send disease notification messages to the N-server.
 - ii. N-server stores, and can push these notifications, for example, to N-web, to N-alert, and to the National Disease Surveillance and Reporting System.
 - iii. N web will have software that makes sense of the data in various ways (disease reports, maps) that can be accessed by anyone with an internet connected computer and authorisation.
 - iv. N alert is another Smartphone App used to alert everyone who needs to know about the outbreak, for example, for initiating further disease investigations or follow up vaccination.

Figure 5: Interrelationships between ADNIS components

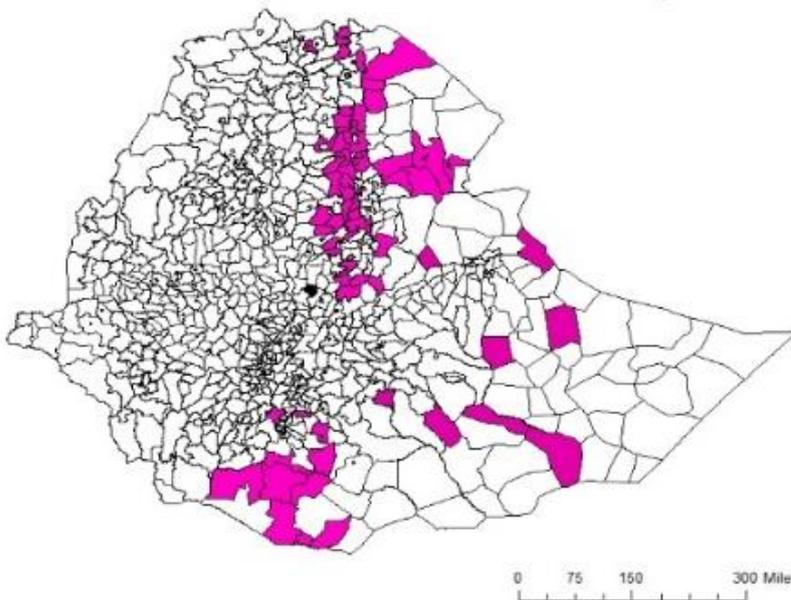


Source: Project document (GCP/ETH/083/EC)

127. ADNIS was developed in 2014 by FAO in 280 sites before the PPR Project. In 2017 it was then taken on by the PPR Project and expanded into a further 194 sites. Up to June 2019, ADNIS Training of Trainers has been given to 58 staff from six regions, who have cascaded the training to 686 further veterinary staff.

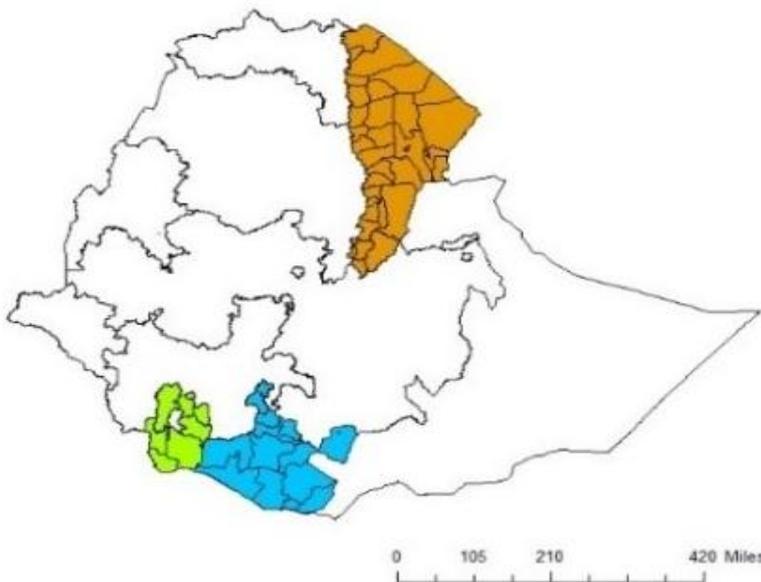
Box 8: Maps of 2014 ADNIS pilot area and new areas targeted in 2017 under PPR Project

Ethiopian ADNIS Pilot Areas



Legend: Internal divisions show woredas, those in purple were original ADNIS test woredas.

ADNIS Implementation Areas - 2017



Legend: Map showing ADNIS implementation areas under PPR Project, brown showing Afar woredas, blue showing Oromia woredas; green showing SNNPRS South Omo woredas.

Source: (maps from PPR Project 'Key Achievements and Strategic Impacts' PowerPoint Presentation, 11-15 February 2019, Dire Dawa)

128. During 2017 ADNIS was making good progress. For example, in November 2017, it received 412 notifications, with 46 (10.5 percent) reporting TADs that included Foot and Mouth Disease, Lumpy Skin Disease, Contagious Bovine Pleuro-Pneumonia, Haemorrhagic Septicaemia (HS), PPR, Sheep & Goat Pox, Contagious Caprine Pleuropneumonia, Bovine Tuberculosis (BT) and Camel Pox, alongside PPR, which was the most common notification. However, since 2018 it has faced significant technical and operational challenges.
129. On the technical side, the pilot was first intended to be on a serviced 'cloud-based' platform where the technical background side of things would have been looked after by a company dedicated to that sort of product. However, as explained in the Project mid-term evaluation, "the Ministry of Information and Communication Technology (MICT) forbade storage of government data in the cloud so the operation was interrupted. A server had to be procured, set up in the MoA and software transferred, which took over a year to materialise and even then with reduced functionality". The PPR Project procured a server. At the start of 2018, within the Ministry of Livestock and Fisheries there was an idea to take the server to the Ministry of Information and Communication Technology, but after the Ministry of Livestock and Fisheries remerged with the Ministry of Agriculture and Natural Resources, it was decided that it would be maintained with the IT unit of the newly formed Ministry of Agriculture and Livestock Resources' (which was renamed Ministry of Agriculture in September 2018). After some power-failure outages, it became apparent the server would need a dedicated back-up generator. When the system is up and running, there can be internet bandwidth problems; and the system cannot work at all when the Government takes down the internet for security or other reasons. A clever work-around allowing the outbreak report to be sent coded into an SMS (short message service) using Open Data Kit (ODK) software then ran into trouble with Ethio-Telecom (ETC) over IP addresses and a service contract. Although these problems are being gradually solved, technical challenges are likely to be ongoing to keep up with the speed at which the internet, computers and software evolve.

Table 5: Numbers of ADNIS end-users and notifications received by region (Mar-Jun 2019)

Region		March	April	May	Jun
Amhara	No. of reports	21	29	78	80
	No. end users	2	3	10	27
Oromia	Reports	159	83	93	133
	End Users	25	25	10	43
Afar	Reports	-	32	35	-
	End Users	-	3	2	-
Somali	Reports	8	12	53	51
	End Users	4	7	15	18
SNNP	Reports	115	121	136	109
	End Users	15	17	6	25

Region		March	April	May	Jun
Total	No. of Reports	303	277	395	373
	End Users	46	34	43	113

130. Operationally, the pilot project had already learned that giving out (280) free smartphones was not a viable long-term approach to addressing uneven distribution/a general lack of smartphones in the remote areas where TADs are likely to show up. Various ways have been trialled to improve diligence, reward accuracy, encourage long-term engagement, and reimburse users for airtime. Currently, monthly air-time is sent to active users, and guidelines for an incentive scheme have been developed, but have yet to be endorsed by the Ministry of Agriculture. Since the start of 2019, the SMS issue with ETC has been resolved, and necessary configurations have been completed by experts from ETC. However, the SMS system, which provides back-up when the internet is down, is not yet operational because of a remaining programming issue. The bandwidth problem has improved since the Ministry put in place a filter system to block use of social media during office hours. Individual smartphones have been reconnected, and refresher training given to end users. As a result of all this, since March 2019, field staff have restarted sending disease notifications using internet data (see Table 5 above). Nevertheless, the number of notifications received between March and June is low for the number of staff who had received refresher training or were newly trained.

Challenges for DOVAR and ADNIS

131. The Project has raised DOVAR reporting rates considerably in the lowland areas, and ADNIS has the potential to be a powerful epidemiological tool. Both require ongoing support.
132. However, as the figures above show, there remain challenges particularly in the more geographically remote areas or where access is otherwise difficult.
133. Disease reporting has in the past been considered an intrinsic duty of animal health workers. However, apart from in Oromia, disease reporting is not specifically mentioned on the Business Score Card (BSC) government staff assessment tool now adopted federally and regionally. This is an oversight that needs to be corrected. The Project has been working with regional bureaus who have committed to making this change, but in most cases have not yet acted on their commitment.
134. ADNIS and DOVAR suffer from the lack of dedicated IT staff within the IT unit of the Ministry with full capacity in programming and system follow-up. Both currently rely on Project recruited IT personnel, which will affect sustainability.
135. There is insufficient follow-up and support from epidemiologist/ADNIS focal points at regional level, which will demotivate ADNIS users.
136. It is sobering to note that one of the problems ADNIS has faced was internet bandwidth competition from staff using social media during working hours. However this issue has now been resolved by adding a filtering system to block the main social media sites.

137. As was mentioned in the mid-term evaluation, incentivising field staff with cash for reports is a short-term solution that could have negative long-term repercussions. Far better to recognise and incentivise diligence, and allow good staff the opportunity to use their skills in the field. Recognition also comes from routine feedback showing how reports have been used and valued. N-web functionality should include epidemiological animation, presenting disease outbreaks over time, with events attributed to the named informant. There will be other ways of incentivising staff through recognition and feedback rather than payment for reports.
138. The impending end of PPR Project support at such a critical time in building veterinary service capacity, including diligence and competence in DOVAR reporting and development of ADNIS, raises concerns that momentum in all Project areas will be lost.
139. DOVAR monthly reporting rate will be a key indicator of the functional capacity of the NVS generally, and the PPR eradication campaign more specifically, after the end of the PPR Project.

Box 9: Participatory Disease Searching and a Pen-Side Diagnostic Test for PPR

PDS & a Pen-Side Diagnostic Test for PPR Summary

PDS is an active epidemiology and surveillance methodology. Using participatory exercises alongside examination of animals, PDS practitioners work with communities to search out disease and explore where it is likely to have come from and where it is likely to go next. In the right hands, PDS can be a powerful tool, and will be essential if PPR is to be eradicated.

The Project has funded the purchase and supply of an excellent Pen-Side Diagnostic Test for PPR (the Pirbright Institute's PESTE-TEST: Rapid field test). This test detects PPR virus antigen on superficial swabs taken from live animals. It is easy to perform and provides an accurate diagnosis within 20 minutes, i.e. while still with the suspect animal. Because the test detects virus antigen, it can miss cases if the animal has already started producing antibodies that are masking antigen. However, it is sensitive enough to be a game-changer in diagnosis and response. Additional samples from positive cases can be sent to NAHDIC for further testing and typing.

Participatory Disease Searching (PDS)

140. Quality PDS requires practitioners with demonstrated knowledge, skills and attitudes, and the interest and motivation to continue using their skills locally, as well as a structure that enables good practitioners to thrive.
141. In 2016, in collaboration with the Royal Veterinary College of the United Kingdom of Great Britain and Northern Ireland, the Project trained around 20 federal, regional and VSF veterinary staff as PDS trainers. Since that time and up to June 2019, 376 others from across the Project area have been trained in PDS (see Table 6 below).
142. Initially intended to be recorded separately, for pragmatic reasons at this early stage in the PPR eradication pathway, PDS and disease outbreak investigations are being used and recorded together. Further along the PPR eradication pathway, when most areas are considered free of the disease, PDS will need to go at it alone, hunting out any remaining pockets of disease even if it is present only in mild form. By then, the quality of PDS will need to have improved.
143. As PPR is a relatively new disease, there is wide local variation in names for it, most of which are anyway syndromic. Currently this is causing confusion among some field staff about

what is or isn't PPR, because they are not familiar enough with the disease and are not probing deeply enough in their PDS practice. Where animals are suspected incorrectly of having PPR, the Pen-side Test will identify the error. However, in the opposite situation, cases of PPR might be overlooked. A case of misallocation of local names occurred during the field work. By chance the FAO PPR Project Deputy Team Leader was present and able to turn it into a refresher training opportunity.

144. This example also highlighted another aspect of PDS: in practice it should not stop at PPR. In this case, the disease that was being confused with PPR was a disease that mainly affected sheep. It seems to be a disease that is becoming more common along the border with Kenya and it needs to be diagnosed in order to develop a control strategy and to rule out Nairobi Sheep Disease.
145. As identified in the section above comparing PPR with Rinderpest, two things would help improve the quality of PDS for PPR:
- i. finding ways to value expertise and allow those good at PDS to specialise, as was the case in the time of RP - currently high staff turnover and the woreda level development approach work against this;
 - ii. bringing women centre-stage in the PPR eradication programme both as practitioners and key informants because they manage goats and sheep and have a greater stake in ending the disease.

Table 6: Total number of PDS practitioners trained from 2016 to June 2019, by regional state

Region	Zones	Woredas covered	Number of staff trained	Remark	Period
Somali	Erer, Fafan	9	18	BCO	Jan-Jun 2019
Oromia	Bale, West and East Hararghe	25	52	BCO	Jul-Dec, 2018
Tigray	Eastern, South Eastern and Southern	8	10	BCO	
SNNP	South Omo, Segen, Bench Maji, Gamogofa, Kefa, Wolaita	19	30	BCO	
Somali	Dolo, Fafen	5	15	VSF-S	
Amhara interface	S. Wollo, S. Wollo, N. Shoa, Oromia Sp	14	14	BCO	Jan-June, 2018
Somali	Dawa, Liban, Afder, Shebelle	30	60	VSF-S	July-Dec, 2017
Somali	Jarer, Qohah, Nogob Dollo	30	60	BCO	

Region	Zones	Woredas covered	Number of staff trained	Remark	Period
SNNPR	South Omo	8	25	BCO	
Afar	All	32	75	BCO and VSF-G	Jan-Jun, 2017
Borena/Guji	West Guji; Borana	17	17	BCO	

Source: Table extracted from PPR Project PMU Jan-Jun 2019 Biannual Report

146. The Project Management Unit is aware that PDS quality is not as high as it could be. Nevertheless, at this stage in the eradication pathway, PDS and the Pen-side Test together have increased the number of reports of pneumo-enteritis syndrome cases as well as other diseases, improved immediate notification of suspect cases, and when PPR is diagnosed, led quickly to vaccination. Although still far from perfect, PDS has also improved the experience of practitioners in delineating epi-zones. And while the PPR Project is active, there is a programme of continuing training.

National Animal Health Diagnostic and Investigation Centre (NAHDIC) and regional laboratories

147. As described in the LOAs, NAHDIC's role in the Project is to:
- i. Improve the epidemiological understanding of PPR and FMD through:
 - a. investigation of PPR and FMD outbreaks, with virus isolated and characterized;
 - b. sampling and testing of 80 percent of the reported outbreaks.
 - ii. Improve the diagnostic capacity in regional veterinary laboratory through:
 - a. training selected staff of RVLs on PPR and other small ruminant (goats and sheep) diseases (laboratory techniques including demonstration of how to use a rapid Pen-side Test kit for PPRV diagnosis; orientation on sample submission guide compiled by the NAHDIC);
 - b. organizing consultative meeting that involves RVL heads to enhance networking;
 - c. seromonitoring to assess the seroprevalence for PPR in small ruminants after a focused vaccination programme, and serosurvey of young stock in areas that have not observed PPR disease and have not received PPR vaccination for the last two years.
148. The Project has:
- i. supported NAHDIC to maintain its certification from the International Organization for Standardization (ISO);
 - ii. helped improve diagnostic capacity by purchasing laboratory equipment and various test kits, including rapid pen-side tests, PPR antigen capture ELISA, PPR antibody cELISA, FMD ELISA, polymerase chain reaction (PCR) primers.

149. NAHDIC has:
- i. completed and reported on an assessment of the capacity of seven Regional Veterinary Laboratories (Jijiga, Semera, Yabelo, Hirna, and Mekele, Jinka, Kombolcha);
 - ii. trained selected RVL staff on various laboratory techniques;
 - iii. organised and led a consultative meeting of RVL heads in order to strengthen the national veterinary laboratory network;
 - iv. undertaken a series of serosurveillance and seromonitoring sample surveys to check endemicity in apparently disease-free areas and to check efficacy of vaccination post-vaccination;
 - v. followed up some PPR and FMD outbreaks with further virus typing.
150. The Federal structure has changed the dynamic between NAHDIC and the RVLs. Previously RVLs were under NAHDIC but now they have to collaborate as equal partners. Despite the challenges, there are positives to this arrangement, and NAHDIC should be reassured that the RVLs value the training, coordination and leadership provided by NAHDIC.
151. However, NAHDIC's role seems poorly understood at field level, for example the logic of its serosurveillance and seromonitoring is not always clear. There is confusion about where responsibility lies between NAHDIC and the RVLs for follow-up diagnosis of diseases which turn out not to be PPR.
152. Field sampling is inevitably a challenge. NAHDIC staff comment that field teams need to send field samples in better condition; while field staff would like NAHDIC to negotiate, as the human medics have done, to allow veterinary samples to be sent by post. Apparently they currently courier samples at great expense, and even then the samples are arriving in an unacceptable state.
153. This is a challenge that a well-structured NVS with full buy-in at federal and regional level should be able to address.
154. NAHDIC and the RVLs raised another issue in common with staff at all levels: the feeling is that new projects are taken on with no regard to staff workload. NAHDIC staff say they love laboratory work during work hours, but not when having to do it through weekends and into the evenings. In a better structured NVS, there should not be staff sitting around in rural clinics that have no funding, while other staff are over-working.
155. And finally, NAHDIC staff requested that all veterinary vehicles be equipped with veterinary first aid kits so that veterinary staff are able to deal with veterinary emergencies wherever they find themselves. They say that an inability to do anything for sick animals when out collecting samples, undermines the credibility of the whole veterinary service.

Result 2. Improved quality (through production of PPR thermostable vaccine) and quantity of PPR vaccine production at the National Veterinary Institute.

National Veterinary Institute (NVI)

156. The Project, and its donor (the European Union), can be commended for going well beyond their original plans to ensure NVI is producing commercial scale quantities of thermostable PPR vaccine before the Project ends.

157. The NVI producing thermostable PPR vaccine in quantities large enough to supply Ethiopia and other countries, greatly increases the possibility that PPR can be eradicated in the Horn of Africa Region because it dispenses with the need for sophisticated cold chains, and opens up possibilities for more innovative community-based vaccination methods.
158. The idea of producing a thermostable PPR vaccine started during LVC-PPD though that project did not buy the lyophiliser that is required to prepare thermostable vaccine. As a follow-up to the idea, NVI indicated that they were able to be involved in the Global Alliance for Livestock Veterinary Medicines (GALVMED) programme and worked on the technology to develop thermostable PPR vaccine. A limiting factor was the absence of a lyophiliser. NVI therefore rejected the offer of the technology-transfer component of the vaccine production from ILRI and rather they requested the allocated funds be used for the procurement of a lyophiliser. FAO and the European Union approved NVI's request and revised the PPR project budget through a rider-1 to the project signed in November 2016. The delivery of the lyophiliser took 55 weeks and was installed in January 2018.
159. The lyophiliser is also used to produce other viral disease vaccines such as SGP, LSD, and poultry vaccines. The lyophiliser is being used twice a week.
160. Technicians from South Africa came to train the three NVI engineers (mechanical, electrical and electromechanical) to run and maintain the lyophiliser.
161. Alongside the new lyophiliser, a vaccine dispensing, stoppering, capping and labelling machine is also required for production of thermostable vaccine in quantities that make eradication of PPR a real possibility. This has been approved, procured and will be fully operational by the end of 2020.
162. The European Union has been admirably flexible in allowing these requisitions with their extended time frames because with one of its seven components extended, finalisation of the whole SHARE Programme will be delayed. Nevertheless, life doesn't always fit the timelines of programmes and projects and it is good to see a donor recognising when there is a compelling reason to be flexible.
163. NVI has now produced two test batches of thermostable vaccine (Batch 3/18 = 2 259 000.00 doses and Batch 4/18 = 2 387 800.00 doses). These have passed Pan-African Veterinary Vaccine Centre of the African Union (PANVAC) certification on quality and thermostability (5 days at 40°C). For these reasons, NVI has not been able to produce the 1, 5, and 10 million doses of thermostable vaccine per year for the last three years as detailed in the Project workplan. Production of commercial scale quantities will start at the end of 2020 when both pieces of equipment have been installed, and staff trained to use and maintain them.
164. Unfortunately, the test batches were not tested in the Project's lowland areas because they were inadvertently sent out as part of routine woreda vaccine orders alongside the thermolabile PPR vaccine which NVI has continued to produce up to now.
165. NVI has dispatched a total of 30.79 million doses of thermolabile PPR vaccine up to the end of June 2019 as a government contribution to the Project. This has required the procurement of additional cold chain equipment, which will continue to have a positive impact on the system of delivery for other vaccines.

166. Thus, the Project has procured 50 direct solar powered vaccine fridge/freezer to be installed in 31 woredas of Somali region, 10 woredas of Borena and Bale Zones of Oromia Region, 5 woredas of Afar Region and 4 woredas of South Omo Zone of SNNRP Region - locations either without, or with unreliable, cold chain facilities. Distribution and installation are underway. These will be used for other animal vaccines, and for routine storage of the thermostable PPR vaccine to extend its storage life.
167. Vaccine is distributed, using NVI cold trucks (regions only cover the fuel costs of the truck by calculating fuel consumption/km), to regional vaccine depots administered by regional veterinary departments. So far only 1 of the 16 vaccine depots distributed all over the country is functional in Woldiya. Currently two of three cold trucks are functional.

Result 3. Improved capacity to implement progressive disease control programmes, particularly PPR and SGP in small ruminants.

Communication

168. The Project has aimed to use Communication as a tool for raising the profile of PPR and as part of its strategy to implement progressive disease control with all stakeholders from animal keepers to policymakers, and
- i. to move these stakeholders from awareness of the disease to recognition and familiarity and to active engagement with the Project;
 - ii. with animal keepers to engage them in helping with PDS, notification of clinical cases and vaccination;
 - iii. with policymakers to support the eradication programme.
169. To that end it:
- i. introduced veterinarians, veterinary assistants (VAs), community animal health workers and communities to PPR through the infection trial that demonstrated clinical PPR during the syndromic surveillance and participatory disease surveillance trainings (targeting veterinarians) conducted at the beginning of 2016;
 - ii. prepared posters with photos from this trial which have been distributed in a wide range of local languages across the Project area in order to reach further stakeholders, particularly community members and CAHWs;
 - iii. developed a radio spot (in Afaan, Oromo and Amharic) which was broadcast for three months;
 - iv. commissioned further radio (broadcast through Fana Broadcasting Agency) and TV spots (through EBC) in Somali and Afar languages;
 - v. developed a range of PDS training materials;
 - vi. produced roll-up banners for government offices. Roll-up stands were also produced by VSFs for display at their offices and project sites.
170. However, as the Communications Officer explained, these were effective early on, but became less so as time went on. In our field work, we met no one who had seen the TV shows; the only person who said he'd heard the radio programme turned out to have heard something about CCP (vaccination that gave six months protection was the giveaway).

171. Posters were rarely seen. When we showed them to communities, they elicited little interest at first, but when shown again after a detailed conversation about disease, they immediately saw that they showed a goat with PPR. This highlights what has been widely recognised - that people who are not used to photographs take time to engage with them.
172. The PDS training manuals are thorough.
173. Communications goes beyond specific staff and materials. It is the responsibility of all staff to communicate effectively, and training is probably needed on this aspect of communication too. For example, keeping pastoralists informed about samples, what will happen next in disease investigation, etc., will all help build trust in the NVS.
174. Communications and extension are massively important areas that require more than just one person producing engaging content.
175. The EC-SHARE mid-term evaluation's recommendation that all EC-SHARE projects shared some common programme indicators can be adapted here. If projects shared a communication department they could widen their pool of creatives, and produce or commission from commercial media companies, common communication materials and training that strengthen interactions with target beneficiaries in a more holistic, efficient, effective and engaging way.

Understanding the epidemiology

176. The evaluation team took a simple approach to exploring epidemiology. They asked BCOs, regional laboratories and the Ministry of Agriculture for data on every positive PPR event during the time of the Project listed by date, with location (ideally village or grazing area), number and species of animals affected, and dates of all follow-up events - vaccination, seromonitoring or anything else. However, this information is not readily available.
177. Yet epidemiology is central to disease management and eradication; and is about how diseases and their pathogens move in time and space; and the PDS training manuals therefore have comprehensive sections on timelines and mapping.
178. Annex 10 presents three case studies by the evaluation team, using Project Biannual Reports and other related information, and cross-checking with local data:
 - i. to investigate how many positive PPR events there had been during the time of the Project;
 - ii. to sequence the available maps; and
 - iii. to make sense of the PDS and vaccination approaches.
179. There appeared to be some inconsistencies between centrally-reported and locally-supplied data. For example, Biannual Reports suggest 4 confirmed PPR events in South Omo over the timeline of the Project, while the Jinka Regional Laboratory listed 12. There may be a rational explanation, for example that some of the 12, though in different woredas, were considered as 1 spreading event. However, this highlights a need for: common understanding of an event/outbreak; each event to be described accurately by date and location; more consistent location-naming; accurate mapping at different levels of scale; and epidemiological data to be consistent, used and shared.

180. It was not possible during the evaluation to obtain a list of every PPR outbreak with its date and point location over the course of the PPR Project. It was unclear how date information is recorded in the field and centrally. Apparently most of the PDS, OI and vaccination data are recorded at PMU level with dates, and all the reports submitted by BCOs are documented, but this did not seem to be readily searchable. PDS/Outbreak Investigation data is mapped in six-monthly blocks, with date detail apparently more available at regional level. NAHDIC data tables, however, include sampling dates. Dates were absent or difficult to find in the PDS reports examined by the evaluation team. It would be helpful if date and point location data were easily accessible for monitoring and evaluation purposes.
181. One member of the evaluation team was active in the Ethiopian Rinderpest campaign and showed paper PDS maps from that time. Maps seen in the PDS reports examined were inconsistent and generally less detailed. Mapping helps develop geographical thinking and is central to PDS, so this needs to be addressed in future training. Yet there are good quality PDS reports from some practitioners. Those with a talent for mapping could be considered as exemplars, peer mentors or trainers.
182. Apart from one example, on p.56 of the Jul-Dec 2017 Project Biannual Report which showed spot mapping, all Project epidemiological maps seen during the evaluation mapped PPR events at woreda level. Again, NAHDIC data is more detailed in recording kebele. Each type of map has a role, but spot maps work even when woredas are split and the new woreda names and boundaries are not known.
183. ADNIS will help. Modern Geographical Information Systems (GIS) software is powerful but needs accurate, detailed data. ADNIS reports are time-tagged, and their geo-tagging pin-points locations on a global grid. The more comprehensive a database, the more it can be analysed and used in interesting ways, for example to produce engaging animations of the movement of PPR virus over time and space to gain insight into virus dispersal (in conjunction with virus-typing) for advocacy and other communications. It is unclear what role FAO's dedicated GIS officer has in the Project.
184. None of this is intended to imply the Project is not on top of epidemiology. Epidemiologists in the Project appear to be very familiar with the detail; however, a variety of maps, at different scales, with events in sequence and more localised in space, might increase engagement with different groups of stakeholders, and would help monitoring and evaluation.

Branch Coordination Offices (BCOs), field activities and vaccination

185. As Project Reports document:
- i. The Project has helped MoLF/MoA establish four branch coordination offices (BCOs) with designated coordinators in the main project regions/areas. FAO has assigned four (including communication and finance officer) experts to backstop and oversee the implementation of the project activities. At the start of the project, partners were provided with transport (24 vehicles), furniture, computer equipment, and laboratory consumables. Moreover, MoLF was provided with all necessary equipment (camping, vaccination, cold chain, marking, etc.) to support vaccination activities. Subsequently, one additional vehicle was procured and transferred to the Ministry. Based on the

- approval of the EU, an additional five vehicles were procured to support activities in the interface areas. The transfer process of those vehicles to the Ministry is underway.
- ii. By June 2019, PDS exercises and/or PPR outbreak investigations had been completed in 186 woredas. Guided by PDS findings/outbreak investigations and risk mapping, areas to be vaccinated were delineated and the following vaccinations undertaken in the project area:
 - a. 8 420 607 sheep and goats were vaccinated in 28 woredas of Afar,
 - b. 9 828 797 sheep and goats in 50 woredas of Somali,
 - c. 2 111 590 sheep and goats in 7 woredas of South Omo including interface areas (SNNPR),
 - d. 4 796 324 sheep and goats in woredas of Borena (7), East/West Hararge (10) and Bale (7) Zones (Oromia)
 - e. 1 001 307 sheep and goats in 11 woredas of Amhara interface area and,
 - f. 434 316 sheep and goats in 8 woredas of Tigray interface area
 - iii. The branch coordinators and experts from Project Management Unit (PMU) monitored the vaccination activities. In addition, sero-surveillance among young stock was conducted by NAHDIC in selected woredas of Borana and Guji Zones. In addition, more than 600 field staff and CAHWs were oriented on the vaccination strategy and vaccine management (transportation, storage, dilution, and animal marking and reporting).
186. The PPR Project is managing a change from sporadic, blanket vaccination, governed partly by local availability of vaccine and with little cross-woreda coordination, to an epidemiology-led approach of targeted vaccination based on outbreak investigations and PDS, with greater zonal coordination across groups of woredas, ("risk-based, ecosystem-based and time-bound with high coverage vaccination approaches depending on the assessment and surveillance data" as recommended in international coordination meetings).
187. During the evaluation, each of the visited BCOs praised the capacity development work of the Project, training and equipment, and explained in detail their strategies and activities for cascading DOVAR, ADNIS, PDS, and for vaccination. Vaccination strategies generally sounded rational, usually a broadly targeted approach based on the geography of the area and the likely time between outbreak notification and vaccine response. This in some areas involved whole woredas, or several adjacent whole woredas, vaccinated.
188. Quality of vaccination and speed of response are the keys to reducing disease spread. Distance from the responsible BCO, vaccine availability, etc. can delay vaccination response by several weeks. Before the PPR Project, vaccine distribution was apparently inefficient with regard to disease control. Regions bought animal vaccines depending on budget allocation, and distributed them to woredas based on previous year disease outbreaks. A woreda may thereby have a disease outbreak but no vaccine allocation for that disease; another may have vaccine for the disease sitting unused. While vaccine is now theoretically available, in various places we heard that campaigns had inadequate supplies. It seems there will be delays in supply until there are functioning regional vaccine depots and rational distribution networks that minimise delivery distances. Thermostable vaccine less

dependent on cold chains will help. Outbreaks therefore can spread before vaccination starts, involving greater logistical challenges, and requiring wider coverage, greater epidemiological insight, more vaccine, staff time and daily subsistence allowance (DSA).

189. The evaluation team witnessed vaccination in two places and the Project's clearly set out protocols were being followed. BCO staff have to be at every vaccination to monitor the process. Project vehicles are used to carry staff and ice as necessary to the vaccination site, supported by motorbikes from the woreda office. It seems that everyone in the woreda animal health team goes on every possible activity. It was unclear why they are all needed, and it seems likely that in at least some cases, it is seen as an opportunity for DSA. CAHWs get less DSA than staff, which can be a problem, e.g. in parts of Somali, where day labour is available and the daily day labour rate is higher than PPR DSA. On one occasion, an informant indicated far off hills and gave the impression that the animals in the more remote places might be vaccinated by CAHWs who went there by themselves. Targeted vaccination should be more economical, less wasteful of staff time and resources, and provide better epidemiological data; however, it requires well-trained staff. Blanket vaccination loses these advantages, but requires less staff training and could, it is argued by some staff, have a role if the benefits of the PPR Project are abandoned when the Project ends, and PPR-free areas become vulnerable to epidemic outbreaks.
190. The Project is aware of variability of practice recognizing, for example, that "in areas where outbreaks were detected, proper trace back and forward was not conducted in many cases. Therefore the origin of the disease and the anticipated spread of disease were poorly described, which consequently led to poor delineation of the epidemiological zone to be vaccinated and hence missing of flocks supposed to be vaccinated". The Project also describes examples of poorly understood practice where vaccination fails to encircle the disease allowing it to spread forward. These issues are discussed in coordination meetings and built into staff training.
191. Variability in quality is inevitable across so wide an area and with so many different teams. It provides a training challenge which can be embraced if the work continues. This will work best where those with skills and ability are recognised and allowed to take mentoring, training and leadership roles. It won't work as well where there is little motivation to do good work, and there is high staff turnover. It is currently a challenge for government to address this. GTP3 provides an opportunity to develop a different type of NVS.
192. PPR eradication will require continuing staff training. Thermostable vaccine will open up new ways of delivering vaccination, including more involvement of women.

Additional points about long-term effectiveness

193. The following three sub-sections report and discuss important evaluation findings related to long term effectiveness. Trust and good will have emerged as a critical feature in disease eradication campaigns worldwide, including with measles the human morbillivirus disease, particularly when the disease is controlled but not finally eradicated. Pastoralism is under threat and with it the biodiversity and climate mitigation value of the extensive semi-arid rangelands in which it has thrived. As the GSCEP document has identified, PPR eradication will need to understand and respond to wider issues if it to get the support and funding it needs to succeed. FAO's role as secretariat for 'The Global Agenda for Sustainable Livestock' initiative to link the roles of livestock to the new Sustainable Development Goals

(SDGs) set by the United Nations in 2015, and the major review by the MoA of Ethiopia's NVS in advance of GTP3, make these points particularly relevant.

Trust and support between the NVS and pastoralists

194. During the evaluation, field staff at various levels, and pastoralists in South Omo, mentioned frustration that the outcome of a disease outbreak investigation might, if the PPR Pen-side Test says 'no PPR', be no further action. The Project Outcome statement ends: "...contribute to the control of Sheep & Goat Pox, and through improved disease surveillance contribute to the control of other transboundary animal diseases". This is in line with the GSCEP document which notes: "the potential for achieving economies of scale and a subsequent relative reduction of programme costs by combining PPR control with activities against other major diseases of small ruminants". These aspirations require trust between the NVS and pastoralists.
195. While there is frustration, there does not seem to be a serious breakdown in trust between the veterinary services and the animal keepers. Pastoralists survive by being pragmatic and they will make their own assessments of what different parts of the veterinary service can realistically provide. This is why women informants in Somali Borena explained that they keep buying from the pharmacists (without seemingly much advice) and using 'oxy' (Oxytetracycline injectable), Albendazole tablets and acaricides on their animals (even though they worry about drug residues and apparently therefore may not eat the meat from treated animals); however, they say they are not sure what exactly they are supposed to do or how they should be used, and that they rarely work.
196. Nevertheless, trust cannot be taken for granted. The group of men interviewed in the same place put 'ineffective treatments' among their most serious challenges. The PPR project is not about just maintaining current levels of confidence in the veterinary service, but about contributing to a growth and transformation agenda that radically increases it.
197. The evaluation identified two areas relevant to trust: disease investigation processes specifically, and pastoralism more generally.

Disease investigation processes

198. Pastoralists need to trust that when they identify a problem, there will be a meaningful response. An NVS pursuing PPR eradication will not contribute to 'growth and transformation' if it cannot show that it cares about other diseases. In PPR investigations, NVS staff will almost certainly be taking samples regarding other TADs. If nothing can be done clinically at the time, animal keepers need to understand what is being done and when they can expect feedback. CAHWs and animal keepers are the 'peripheral nerve endings' in an NVS. All higher intelligence leads from their sensory inputs, therefore they need to know they are valued.
199. Staff travelling to the field raised a related point. They feel they lose the trust of animal keepers when, despite travelling from a distant laboratory to see sick animals (or previously sick animals), they are unable to do anything immediately useful in the face of clinical illness. They request flexibility of donor funding to cover the cost of maintaining a field animal first aid kit in every veterinary vehicle irrespective of which donor project is taking them to the field.

200. National capacity for field diagnosis is still low. This is partly because Ethiopia has a lot of animals and animal keepers in remote places and definitive diagnosis of disease in remote places is extremely difficult. However, it is partly structural. Disease investigation is the responsibility of NAHDIC working together with regional veterinary laboratories in partnership with field services. While RVLs have a degree of functional autonomy and control their own budgets, they remain affected by changes in local priorities, staffing, etc. A strong NVS co-owned at federal and regional level will support and value excellent secure laboratory staff spread between NAHDIC and RVLs allowing diagnosis to move closer to animal keepers. The Project has contributed to this vision with highly regarded organizational and individual capacity building. PPR benefits greatly from the Project facilitated introduction of the excellent Pen-side Test, but diagnosis of other diseases will remain a more complex challenge. Meanwhile a well communicated, well understood strategy about field diagnosis will help maintain and build animal keeper trust.

Pastoralism

201. RP eradication succeeded because its community-related innovations accommodated the realities of pastoralist life, adding to its resilience mechanisms without inadvertently harming the system itself.
202. Developments in global meat production and trading since Rinderpest time, primarily related to issues that have arisen from intensive production, do not fit easily with pastoral production systems. Pastoralism needs international champions to explain the added value of buying meat raised in pastoral production systems, including in relation to the OIE PVS pathways section II-12 Identification, traceability and movement control.
203. In the summary of its SWOT analysis, the Executive Summary of the GSECP, comments: "Unfortunately, there are numerous negative factors that can hamper effective control and eradication of PPR, such as the insufficient control of live small ruminant movements, poor information on the size of their populations and the absence of identification of animals in most developing countries."
204. Measures to control disease that include putting in place methods to 'control live small ruminant movements' and for 'identification of animals' risk damaging the pastoral production system they are supposed to serve - the tail wagging the dog - and need to be considered very carefully in a system that relies on herd mobility and exchanges of animals for various social reasons apart from sale. The first sentence might be better written as: "There are numerous challenges to the effective control and eradication of PPR, such as the freedom of movement of live small ruminants necessary for the health of pastoral production systems, lack of information on the size of their populations, and the absence of systems of external identification for small ruminants that do not unrealistically overburden animal keepers in pastoral and small-holder production systems."
205. Following the above quote, the Executive Summary of the GSECP goes on to say: "Vaccine delivery systems are often not very effective in reaching all small ruminant holders in certain types of production system and the VS can face numerous logistical problems" which reinforces the need for innovative thinking such as bringing women more holistically into the process.

206. In summary, pastoral production systems require special consideration within NVS planning if an increasingly trusting partnership is to grow between pastoralists and service providers.

Result 4. Improved national and subregional animal disease control coordination and knowledge exchange.

207. The Project has established a PPR Steering Committee that included other donor projects working in the animal health sector, and has organized regular coordination meetings and workshops at regional, national and international levels, i.e.:
- i. in 2016, one national, four regional start-up workshops and a Steering Committee meeting;
 - ii. in 2017, two national, eight regional and one Steering Committee meetings;
 - iii. in 2018, two national, seven regional (including three in the interface areas for the first time), and one Steering Committee meetings; and following a mid-term evaluation recommendation, a stakeholder's consultative meeting of the findings in Adama;
 - iv. in 2019 to June, one national, three regional and one Steering Committee meeting.
208. To facilitate international and cross-border cooperation and collaboration, up to June 2019 the Project has facilitated various veterinary service staff, including: the State Minister, Chief Veterinary Officer, Directors of Epidemiology, NVI and NAHDIC in participating in international or regional meetings, such as:
- i. the Office International des Epizooties/World Organization for Animal Health annual meeting;
 - ii. regional meetings like the PPR-CCC/PPR-TEC meetings, and the Regional Animal Health Network Meeting (RAHN);
 - iii. other international meetings like the PPR vaccine producer workshop and Brussels PPR pledging conference.
209. Moreover, the Project has hosted and/or organized two subregional PPR Coordination meetings in Addis Ababa and in Naivasha, Kenya, in consultation with the Intergovernmental Authority on Development Centre for Pastoral Areas and Livestock Development IGAD/ICPALD, in October 2018 and June 2019. These have allowed countries in East Africa and beyond to share their experience and progress along the Global PPR Eradication pathway, as well as to learn from countries such as Morocco that have successfully eliminated PPR without donor support (see section on Sustainability below).
210. Within Ethiopia, Project Management Unit staff have built individual relationships with counterparts in donor projects whose work has components in the animal health and welfare sector to lobby for alignment of strategy with the Projects PPR/TADs work.
211. In their Biannual Reports, the Project Management Unit recognises the following ongoing coordination challenges:
- i. ownership of the project: project mentality vs national programme;
 - ii. weak technical and administrative linkages between federal and regional livestock services;

- iii. variation in the implementation capacity of regional bureaus/BCOs;
 - iv. weak interregional state coordination to control and eradicate disease and PPR in particular;
 - v. weak coordination with neighbouring countries to control and eradicate PPR;
 - vi. uncontrolled livestock mobility for different reasons (trade, seasonal, drought, conflict etc.);
 - vii. security issues in some regions.
212. It is unclear how PPR work will be coordinated after the PPR Project. The Ministry has assigned a National Coordinator for the National PPR Control and Eradication Program, who is supposed to coordinate the National PPR control and eradication program, including initiatives under the different projects. However it is unclear what level of authority and empowerment (for example regarding budget) the coordinator has to execute his duties and responsibilities. It is unclear what part the Rural Economic, Development & Food Security committee, a donor/government coordination platform, has in helping facilitate PPR strategy.

3.3 Efficiency

Evaluation Question 3: How effective was the project management and implementation? (Including an assessment of the implementation gaps and delays (if any, their causes and consequences), and quality and use of monitoring and evaluation data in informing project implementation.)

Finding 5. After it started, the Project was generally efficient despite some structural and implementational challenges. The start was delayed because key building blocks that should have been in place from previous projects weren't delivered; and there were disagreements about key appointments, and problems internal to the FAO Office in Ethiopia. These were overcome with some excellent results, and with the donor deserving particular praise for pragmatic flexibility. The lengthy and inflexible LOA process was widely criticized, although the Project minimized disruption where it could by pragmatic work arounds. Overall the Project has made significant progress in five years against all its intended outcomes.

NVS structure

213. Ministry restructures affected the efficiency of the Project in various ways: the Minister of Livestock and Fisheries had greater authority than the current State Minister for Livestock Resources and could therefore act more quickly; the structural and administrative changes accompanying each restructure required the attention of the Ministers and State Ministers, diverting their attention from operational work; there were inevitable changes to established money transfer and other logistical arrangements which delayed some LOA payments; and physical restructuring affected the DOVAR/ADNIS servers and IT support.
214. Although a Government Cooperation Project working towards targets set out in the Government of Ethiopia Growth and Transformation Plan 2, the Project feels like a donor project rather than Government-owned. Lack of buy-in from, and integration between, the Federal Ministry and Regional Bureaus challenges efficiency, particularly in the face of high staff turnover.

215. Had there been a Federal officer in each region to expedite technical and administrative issues of the PPR project implementation, it might have been possible to minimize the delays in response and avoid the apparent inconsistency in following the strategy in the different regions. Without federal representatives, senior PPR project leaders have needed to engage continually in a number of negotiations and technical brokering with subnational authorities, which is demanding in terms of project time, resources and energy.
216. It is not clear why Animal Health Services do not enjoy the same level of national integration as the human health service.
217. In an ideal world, geographical efficiencies would be realised:
- i. the two most westerly Somali zones are supported and supplied with vaccine from the BCO in Jijiga, around 1,000km away over rough roads, instead of by Yabello laboratory (Oromia BCO) which is only 200km away;
 - ii. Bale zone of Oromia is currently coordinated from Yabelo BCO while the region has another laboratory in more strategically located Asela;
 - iii. South Omo woredas in SNNPRS are coordinated from the Sodo laboratory BCO when there is now a closer regional laboratory in Jinka (which became fully functional after the start of the Project).
218. The new thermostable PPR vaccine will greatly increase efficiency, but distribution of vaccine generally is hindered by delays in building and maintaining an efficient vaccine distribution network.
219. High staff turnover has affected efficiency at all levels:
- i. At woreda level, it undermines relationships built with local communities, works against building local animal health and welfare knowledge, and leads to loss of experience and expertise for example in PDS.
 - ii. At regional level, it can lead to misunderstandings about international responsibilities, use of resources and delays in ongoing disease control work. Particularly in Somali, political appointees can change frequently, sometimes every six months, and new appointees may try to divert Project resources to other areas. This requires Project Management Unit staff to revisit and re-explain national and international obligations.
 - iii. At National level, it results in loss of expertise in core areas such as epidemiology and IT. Failure to retain skilled IT professionals has had a huge impact on development of the DOVAR and ADNIS systems. And the PPR programme is losing a key epidemiologist.
220. Woreda and kebele level staff have limited operating budget, and for transport may only have one motorbike, and are therefore limited in their capacity to move away from the building and do routine work. Vaccine campaigns using thermolabile vaccines rely on shuttling ice from woreda centres to vaccine sites.
221. At every level, staff expressed gratitude to the PPR Project for providing continuing professional development training, daily subsistence allowance and transport support (through vehicles based at BCOs and regional laboratories), and thereby motivating and

enabling them to be more active professionals. But there needs to be a more fundamental rethink of the NVS if staff are to function effectively even when there are no projects.

222. New woredas created by splitting other woredas has been an unexpected challenge, especially in Somali Region. Unknown woreda names appear in monthly reports with no official notification. Regions can be slow to respond when asked to explain. The Ethiopian Central Statistics Authority requires time to update the Geographical Information Systems woreda shape files. These all complicate record keeping and epidemiological mapping. Solutions might include a regional state woreda map in the monthly DOVAR pack allowing woreda divisions to be marked as a routine part of filling in the form; or to provide a text box for the same purpose.

Public-private partnership

223. A previous project was to have tested a veterinary public-private partnership model for the pastoral lowlands but this did not come to pass. Had this trial been completed and found effective, the PPR Project was to have trialled the use of private practitioners in the vaccination campaigns using thermostable vaccine. The late arrival of the thermostable vaccine also conspired against this trial. Nevertheless, PPP models remain part of the PPR eradication plan so it is worth flagging up the comments from pastoralists interviewed during the evaluation about the quality of veterinary field services. Ideally, private practitioners would earn money from their clinical skills, not just from selling pharmaceuticals. Pastoralists during the field visits were open about their awareness of the potential human health and environmental harms of the treatments they are sold, with ticks remaining one of the most intractable problems. Resistance to antibiotics and parasiticides is becoming an increasing problem. The catastrophic loss of South Asian vultures resulting from veterinary use of the non-steroidal anti-inflammatory drug diclofenac highlights the speed and scale of potential harms. These are challenges for an effective PPP model and for the NVS more generally.
224. However, these challenges are at the heart of what it is to be an animal health worker, and therefore are to be embraced. The way forward has to include all stakeholders working in open partnership. Any funding put into PPR eradication, or into any other focussed animal health project, has to help take forward solutions to the longer term needs both for SDGs, and for an NVS fit for the 21st Century. The transition from GTP2 to GTP3 provides an opportunity to put a vision for NVS into government planning.

Monitoring and evaluation (M&E)

225. The Project has provided numerous examples of reflective practice, monitoring its work and using the lessons learned, as shown in the following examples.
226. DOVAR is an evolving system. Monthly reports are reviewed, and training adapted accordingly. ADNIS has been learning from previous and current experience regarding private mobile phone use and incentives, and continues to evolve ideas. PDS reports are examined and further training tailored to lessons learned. Communications materials were tested in the field and take-up monitored, with the Communication Officer aware of further work that could be done. Epidemiology and vaccination practice are studied, and Project Management Unit staff travel across the Project area to provide mentoring support. Structural shortcomings are recognised, and again Project Management Unit staff travel

when needed to provide encouragement to better practice. NAHDIC staff work closely with RVL staff and provide Project-funded routine refresher training on diagnostics and epidemiology. Project coordination meetings at all levels have been organized to encourage shared reflection on progress in PPR control. Bureau and Ministry staff including the Chief Veterinary Officers are aware of the lessons learned from the Project and talk of feeding these lessons into the GTP3 planning process.

227. There was an excellent mid-term evaluation in May 2018, when the Evaluator spent 22 days in country to provide adequate time to examine the Project in detail. Responding to a recommendation in the mid-term evaluation, the Project held a stakeholder's consultative meeting of the findings. This final evaluation takes place just a year after the mid-term evaluation, draws on its work, and responds specifically to some of its observations about how the project fits with intensification of pastoral meat production.

Project delays

228. The PPR Project was formulated on the assumption that previous donor projects would have delivered, as they had committed to, various essential building blocks for the Project. Building blocks that were not delivered included: expensive highly specialised and essential equipment for making thermostable vaccine; transport for regional laboratories; early stages and components of ADNIS; a pilot public-private partnership project; an epidemiological baseline. Compensating for these points has slowed Project progress. The first three of the above examples were essential for Project progress, so the European Union agreed to allow their procurement. In the case of the vaccine equipment, this proved highly technical, extremely expensive and enormously time-consuming. However, it also means that the equipment procured is the best for thermostable vaccine production at a scale that can supply Eastern Africa as it moves to PPR eradication.
229. The Project was also significantly delayed by various other unexpected challenges. Major management problems within the FAO Office in Ethiopia, and disagreements with the Ministry of Agriculture, led to a stalemate regarding key appointments which required donor intervention and delayed the start of the project by over a year, but the situation has been comprehensively sorted out and the Project has worked well since. All of this has contributed to the project running well past its intended end-date (November 2017), and will have contributed to FAO not taking the lead role in European Union-funded follow-up work. With the installation and training for the NVI's new vaccine dispensing, stoppering, capping and labelling machine now expected to end in November 2020, the Project will continue till then, although field operations end in December 2019. The European Union as donor deserves praise for its patience, flexibility and pragmatism in accommodating these expensive and inconvenient adaptations with regard to procurement, budget and timeline; and the Project Management Unit has done well to work through these unexpected and complex challenges.

Implementing partners

230. The Project works through implementing partners, managed and funded by FAO mainly through Letters of Agreement. FAO bureaucracy, particularly the Letter of Agreement process, and particularly when conflated with additional European Union requirements, was criticised for causing implementation gaps and delays. For the VSFs, this led to periods when staff could not be paid. The need to budget for daily subsistence allowance and

'guesstimate' vaccination figures complicates the LOA process. In the future, in the move to eradication, it would be better to have a more responsive draw-down fund available to facilitate vaccination wherever and whenever it is needed.

231. Despite government's initial scepticism, VSF-Suisse in Somali and VSF-Germany in Afar, as NGO implementing partners, appear to have played a useful role in the PPR Project, although the role of NGOs in the NVS deserves further study, particularly in relation to developing public-private partnerships. More detailed epidemiological records would allow more straightforward comparison of effectiveness and efficiency (for example in PDS and speed and quality of vaccination response to confirmed PPR events), and cost-benefit analysis.

Vétérinaire sans Frontières, Suisse (VSF-S) and Vétérinaire sans Frontières, Germany (VSF-G): the role of international non-governmental organizations in Veterinary Service Delivery

232. VSF-S in Somali and VSF-G in Afar are international NGO partners in the PPR Project. Both organizations help implement similar animal health and pastoral resilience projects in neighbouring countries that are also starting down the PPR disease eradication pathway. International NGOs are helping to implement donor-funded projects across many sectors and in many countries of the world, and have become part of National Veterinary Service Structures, helping deliver major outcomes. They played an essential role in the eradication of Rinderpest and are doing the same with PPR. The Government of Ethiopia questioned the involvement of VSF-G and VSF-S at the start of the PPR Project, preferring for the Project to be delivered through Regional Government Veterinary services alone, but after discussion with the donor they eventually agreed.
233. As the pastoral lowlands of Ethiopia are very different in geographical, historical and political detail, it is not possible to compare and draw conclusions regarding efficacy and efficiency between the places where the PPR Project is delivered by Regional Government alone (in SNNPRS, Oromia, parts of Somali) and where it is by Regional Government in partnership with VSF-G (Afar) or VSF-S (parts of Somali). A deep analysis of this situation is beyond the scope of this evaluation, but the following points suggest some of the reasons why the VSFs have been involved.
- i. The issue of easy bureaucracy and quick response: the VSFs operate in relatively smaller areas in a focussed manner.
 - ii. VSF's have been seen using the opportunity of their flexible and quick decision-making process in looking for alternative financing mechanisms to cater for costly delays in the PPR project activities fund transfers in the face of challenging times of disease outbreak which must be responded to in no time. This has somehow enabled them to cope with delays related to the LOA of FAO.
 - iii. The issue of community-level presence, institutional memory, understanding the ground situation and ongoing connection with the beneficiary community and the CAHWs: VSF's have been operational in the pastoral lowlands of Ethiopia for many years implementing various community-based projects; they have organized community-based structures such as groups of agrovet shops, Pastoral Field School (PFS) groups and Village Community Banks (VICOBA) groups; they have conducted several field studies and project related documentations of their respective areas. For example, VSF Suisse had commissioned a baseline study on PPR at the very beginning

of the project. This offers the VSF's with a better understanding of the ground situation; better connection with the beneficiary community and the CAHWs network which are all relevant for the success of projects like PPR control and eradication.

- iv. PPR was a serious duty: staff of NGO's could only maintain their work based on their deliverables and thus are serious in their PPR duty as opposed to government pay role-based staff for whom the PPR project was an additional burden and who were often complaining of inadequate benefits; VSF's offer a relatively stable working environment and management; have assigned full-time staff on the ground with full fledged office and field environment and the pay scale is also by far better than government staff for a similar work. This condition, on the other hand, may disincentivize government staff.
- v. Strong accountability and collaborative spirit: the VSF's are relatively small, have one line of command, and share an organizational culture based on common principles. These help good working relationships to develop between staff even when they are from different areas of the country; allow recognition and valuing of competence alongside accountability; and contribute to greater effectiveness and efficiency. Accountability means more when poor performance can lead to the ending of a contract. The scale of the government system makes all of these more difficult and leads to wide variance in quality of work.
- vi. As one informant said in summary: "VSFs are more efficient considering the fact that they have less complicated bureaucracy in managing project resources, less chance of abuse of resources, recruited more qualified and experienced experts, operate in a relatively smaller area etc."

234. The role of NGOs in the NVS deserves further study.

Royal Veterinary College (United Kingdom of Great Britain and Northern Ireland): RVC and PDS training

- 235. The Royal Veterinary College was chosen because it has staff associates with experience of PDS from the Global Rinderpest Eradication Programme/Pan-African Rinderpest Campaign in a range of countries to complement the skills already available in Ethiopia.
- 236. RVC staff were co-trainers on the first PDS Training of Trainers trainings (alongside one member of the evaluation team) and helped with the development of the PDS training manuals. One RVC staff member, Dr Bryony Jones, who played a leading role in the final stages of RP eradication in southern Sudan, spent much of 2014 finishing field work for a PhD on 'Small ruminant production, marketing and health in the Afar Region of Ethiopia: implications for control of infectious disease'. Had the Project started as planned in 2014, there would have been overlap, and the opportunity for cross-fertilisation of ideas. The PhD has recently been completed and is now available as a resource for future PPR eradication work.
- 237. The Project has recognized the challenges of poor PDS quality in its Biannual Reports, for example that differences between field teams in their understanding of PDS/OI can affect the quality and timeliness of disease response with variability in efficiency and effectiveness of vaccination, and can lead to poor quality reporting. However, these issues are discussed in PPR coordination meetings and are addressed through specifically tailored follow-up training.

238. PDS involves a complex set of skills, and these are essentially training challenges.
239. The FAO guidelines on Evaluation of Capacity Building provide useful frameworks and guidance for higher level capacity building including, for example, the roles of:



240. It is unclear why the RVC has only been involved once in the Project, but it has a veterinary education department as well as PDS skills so it could still be asked to help develop a higher level PDS training strategy particularly for the more remote areas, especially if the Project is extended into 2020.

3.4 Sustainability

Evaluation Question 4: To what extent are project results sustainable? What are the prospects for sustaining and scaling up project results after the completion of the project? What systems need to be in place to ensure that the Government's national programme on PPR, and other activities (e.g. the HERD programme) can continue to build on the project's results?

Finding 6. It is important not to lose the momentum and progress that has been made by the project in PPR control and staff motivation. Government ownership is the key to sustainability. Donor money cannot be taken for granted. Social and economic studies looking at costs of disease against control and eradication would help support policy. Eradication will take time. The pace of the eradication campaign needs to be in balance with other government priorities for veterinary service restructuring under GPT3, such as public-private partnership, which aim to increase the effectiveness of the NVS, otherwise there is a risk of undermining the animal keeper trust.

241. Interviewees everywhere express concern that the momentum and progress that has been made in Ethiopia in PPR control and staff motivation will be lost once the PPR Project ends. Government ownership of and investment in NVS development and control of transboundary diseases, including eradication of PPR, will be determining factors in the long-term sustainability of the Project's legacy.
242. Globally there appears to be a lack of confidence that the estimated funds needed for PPR eradication will be raised. The 2018 GSCEP Global Meeting concluded, for the 2015-2020 phase of the Programme: "While the majority of the allocated resources – 61 percent - have been provided by affected and at risk countries, there is still a gap of USD 340 million to preserve critical investments and eradicate a pest that is causing more than USD 2.1 billion in economic losses per year. Therefore, we strongly encourage resource partners to walk with us the last mile to definitively eradicate PPR within the expected time limit." The PPR Project appears to be the only donor programme in the East Africa region focussed on PPR eradication and has shown the advantages of a dedicated approach. Elsewhere, including in adjacent countries, PPR control has been a component of a wider project, which has not provided the joined up, nationwide cover needed for disease eradication. Eradication is possible with a well-structured and resourced NVS with no donor input, as Morocco has

shown by eliminating PPR after it entered from a neighbouring country. However, there are many detail differences between the Moroccan and Ethiopian situations. At the time the PPR Project was conceived, it was assumed that there would be sufficient global momentum (and funding) for a follow-up project, or at least international funding to support the implementation of the national PPR strategy. However, this now doesn't seem to be available, or even likely.

243. In Ethiopia it seems the work pioneered by the PPR Project will now be taken over by two different donor-funded initiatives, one in the lowlands (the four-year 2019-2022 European Union-funded 'Health of Ethiopian Animals for Rural Development' (HEARD) project in Amhara, Oromia and Somali regional states) and one in the highlands (a World Bank project). These will need to be monitored carefully to assess whether they are as effective at taking forward PPR control as the PPR Project has been.
244. The most obviously sustainable part of the Project is in Result Area 2 (Improved quality and quantity of PPR vaccine production at the National Veterinary Institute (NVI) through production of PPR Thermostable vaccine - and other vaccines). NVI's new lyophiliser and vaccine dispensing, stoppering, capping and labelling machine will allow production to be on a scale large enough to benefit the wider East Africa region. Production costs should be covered by sales as vaccines have clear cost-benefit ratios. OIE recognises the valuable contribution this will make to GSCEP.
245. The other Result Areas are more questionable. Result Areas 1 and 3 have involved capacity building; internet-related equipment, field equipment and vehicles; and field work. Benefits from individual and organizational capacity building has been highly regarded and the benefits will persist. However, continuing professional development plays a vital part in maintaining a healthy profession, and it is not clear who will be providing it in future. DOVAR, ADNIS, PDS and vaccination planning and response, for example, have not yet reached the required level and need further support and staff training. More worrying, the Project has provided a daily subsistence allowance budget for all PPR-related field work (Ministry staff, NAHDIC, Regional Laboratory and Bureau staff, woreda staff, and even CAHWs). Without DSA, it is unlikely staff will spend much time in the field. Time will tell how effectively other Projects cover this.
246. The project has purchased 30 vehicles (24 for the original lowland regions, one at Federal level, and five more recently for the additional transition zone). They were bought on preferential UN terms, but transferring them for continued use after the Project may involve paying duty to the Ministry of Finance. It is not yet clear how this will be managed. Their re-allocation to other work would be a blow to the sustainability of the PPR work.
247. Under Result Area 4, the Project has established within Ethiopia a PPR Steering Committee and organized and funded regular coordination meetings and workshops at federal and regional level. The Project Management Unit have invested time and energy lobbying other donor-funded animal health projects to align themselves with PPR work; federal government to commit to PPR eradication; and regional bureau to continue supporting the work when senior staff have changed. All of this has been praised and valued, but it is unclear who will now do this work, or even if there is the political will for it to continue.
248. In a region where goats and sheep cross international borders so freely, the Project has facilitated transboundary coordination through LOAs with IGAD. While transboundary

coordination can continue through East African Animal Health Network (EAAHN) meetings, this will not provide the focus needed for disease eradication. Little or no donor money has been forthcoming for higher level PPR coordination or leadership by AU-IBAR, IGAD or EAC. AU-IBAR, which played a central role in Rinderpest eradication, has not been able to take the same role for PPR. There is no independent verification of national progress along the PPR eradication pathway.

249. The East African Community considers PPR endemic in its member states and has drafted PPR contingency plans with support of AU-IBAR, but has not implemented any other PPR-focused activities (other than assessment of an outbreak of PPR in Burundi at the end of 2017 in conjunction with AU-IBAR and AU-PANVAC). Five EAC member states (Burundi, Kenya, South Sudan, Tanzania, Uganda) have developed road maps for control and eradication of PPR based on the Progressive Control Pathway (Rwanda's status is uncertain). South Sudan has a functioning NVS with a good cold-chain network, but has secured little government funding and no donor funding for PPR activities. PPR funding in East Africa is inadequately joined-up.
250. Animal keeper trust in the NVS (see paragraphs 193-199) will be better served if PPR eradication is treated as a flagship project within a more widely improving NVS under GTP3.

4. Cross-cutting issues

4.1 Gender

Key points:

- PPR is a disease of goats and sheep which are almost entirely the domain of women.
- It is assumed that the project will have a positive impact on women's livelihoods but this needs to be quantified in social and economic studies.
- The PPR eradication programme is currently a male-dominated programme. Education and empowerment of women is intrinsically linked to sustainable development. Visible female professionals inspire young girls. The project needs to lead on increasing the numbers of female field professionals, possibly through student placements or internship programmes.
- It should also lead on encouraging creativity for successful transformation in line with SDGs and in the face of biodiversity loss and climate change.
- NGO implementing partners provide an opportunity to trial innovative approaches to these issues.

251. Seven out of eight technical staff working in the Project Management Unit and associated members of the Epidemiology Directorate are male. The Project financial officer is female. All BCOs are male. There are a small number of female Animal Health Assistants in the VSFs and in regional government woreda services, and Paragraph 74 provides details on some field initiatives involving of women.
252. Nevertheless, the need for greater involvement of women to make PPR eradication a success has been one of the main findings of this evaluation, and therefore gender is mentioned in various points throughout the report, particularly in the section on 'Rinderpest and PPR' under Relevance.
253. Women need to be at the heart of every part of PPR control and eradication. PPR is a disease of goats and sheep which are looked after primarily by women. This is not just about equality - UN projects should be working actively for that anyway - but straightforward pragmatism. As the primary caretakers of goats and sheep, women see signs of illness first, look after the animals in sickness and in health, collect their milk to feed their children, and appear able to market their animals across lines of conflict. The programme is likely to be more effective, efficient and sustainable if they are at its heart.
254. Together, there are nine people between the Project Management Unit and Project-facilitated staff in the Directorate of Epidemiology, two of whom are women; all Branch Coordination Officers are men. It is difficult to know the exact number/proportion of females involved in the delivery of the project activities at field level. One project staff member estimated 15-20 percent but the evaluation team did not see that number. Within the communities, we heard of various female local government staff and a few female CAHWs, but they are generally rare exceptions. Apparently, the Ministry of Agriculture, as it is the case for all government institutions in Ethiopia, has affirmative criteria to favour female applicants while recruiting staff. This is good to hear; however, with such a low current baseline, and with such a need to set an example for young pastoralists, donor projects need to be imaginative in finding ways to bring more women into visible positions of responsibility within the PPR programme.

255. While government is a huge organization to change, implementing partners need to have active plans in place to encourage appropriate gender balance within their programme before Agreements are signed. The word appropriate is used because in the PPR case, there should probably be more women than men in the programme. With Rinderpest cattle vaccination, it was probably appropriate that there were more men than women, but this would have to be justified on a case by case basis.

Other SDGs

256. For full advantage, donor projects should leverage value across all SDG areas. This requires cross-disciplinary collaboration with social science alongside technical expertise. UN managed projects are able to draw on expertise across all UN agencies and should do so routinely, with cross-mentoring on a pro bono basis.
257. Pastoralists husband the biodiversity of rangelands that make up around 60 percent of Ethiopia's land area. Therefore environment, biodiversity and water management are particularly important. With population increase, more and more people, particularly youngsters, are having to leave the pastoral way of life, so any opportunities to engage and inspire school children should also be taken. For example, solar fridges provide an opportunity to teach the physics of solar energy capture, and biodiversity surveys lend themselves to nationwide citizen science projects. Such projects can tap into the creativity and diversity needed for Ethiopia's growth and transformation agenda.
258. Donor projects working harmoniously can help build effective national services with opportunities for added educational value across multiple educational disciplines. Working with contradictory approaches they can pull services apart, and educational opportunities are less apparent, unless these are structured, monitored and evaluated specifically as contrasting case studies.

5. Conclusions and recommendations

6.1 Conclusions

Conclusion 1. Relevance. Overall, the Project was highly relevant given the context and challenges currently confronting lowland Ethiopia. The Project was coherent, as the four result areas are logically interconnected and essential components of a functioning animal health and welfare system. It has developed and taken forward a national PPR control and eradication strategy that has strengthened and revitalised the NVS structure. The Project is about both PPR eradication and pastoral resilience. The evaluation's most important finding was that, even in the short time available, pastoral animal keepers consistently raised issues related to resilience. These covered all the SDGs, specifically climate change, water, biodiversity changes, gender, the effects of population increase, opportunities for their children, as well as the overall quality of veterinary services and how TAD control fitted alongside more day-to-day challenges. This suggests that UN agencies are providing inadequate support to each other to ensure all UN projects fully address the SDGs. These points provide the context for all other findings and for the recommendations below. It also highlighted that to understand better its contribution to resilience, the Project should have worked to qualify and quantify its social and economic impact.

Conclusion 2. Efficiency. The Project was generally efficient. Significant delays at the start, because of disagreements about key appointments and problems internal to the FAO Office in Ethiopia, and because key building blocks that should have been in place from previous projects weren't delivered, were overcome with the donor deserving particular praise for patience and pragmatic flexibility. Inefficiencies related to the lengthy and inflexible LOA process were widely criticized, but the Project minimized disruption where it could by pragmatic work arounds.

Conclusion 3. Effectiveness. Nevertheless, the Project appears to have been highly effective and has made significant progress in five years against all its intended outcomes. It was well designed with a strong internal logic; and its components complement each other. It has been diligently and intelligently managed; it is excellent, straightforward and honest in its reporting including about challenges it has faced; and has worked hard to address shortcomings and weaknesses. In every Result Area it has moved forward the PPR control and eradication programme for Ethiopia and, with the help of three no-cost extensions, will have achieved almost all the activities it set out to achieve, and gone further in some areas, e.g. procuring vaccine-making equipment.

259. The Project has shown that: it is possible to manage and control the PPR disease in goats and sheep in lowland areas of Ethiopia; Ethiopia has the technical capability and human competence and commitment to do this; stakeholders at all levels feel strongly that a momentum for improved animal health and welfare services should not be lost.
260. Nevertheless, the Project has identified, through its work and the many coordination meetings it has facilitated, that the greater ambition to eradicate PPR across the whole country by 2027, and across Africa by 2030, faces enormous challenges.
261. To progress to eradication, the Government will need to address the separation between Ethiopia's Competent Authority, a federal Government appointee, and Ethiopia's Regional Veterinary Services, each of which is autonomous and over whom the Competent Authority has no direct authority to enforce the conditions and protocols necessary to pursue a disease eradication campaign.

Conclusion 4. Sustainability. Despite being embedded in the Ministry of Agriculture, many informants commented that the Project still feels more like a donor project than government owned. While Government of Ethiopia contribution to this Government Cooperation Project includes vaccine and NVS staff employment costs, contribution to recurrent costs would demonstrate greater ownership of the process, and in the period after the Project with little donor funding on the horizon, Government of Ethiopia is encouraged to make PPR eradication a national flagship project within a GTP3 NVS.

262. There are a number of donor projects with components related to PPR work that will continue after the PPR Project ends. The government believes that these together will be able to continue the work of the PPR Project. However, the Rinderpest campaign required direct leadership from Minister and State Minister level together with an unbroken chain of authority to field level. Without this there is a risk that the progress made under the PPR Project will stall.
263. The Global Strategy for Control and Eradication of PPR document acknowledges the risk that donor money will be more difficult to raise for PPR than it was for Rinderpest because of changed global priorities. Therefore, future applications for donor funding would be stronger if the PPR work was more clearly integrated with the Sustainable Development Goals. This is particularly important for FAO projects now that it is the secretariat for 'The Global Agenda for Sustainable Livestock' a multi-stakeholder partnership that has taken the initiative to link the roles of livestock to the new Sustainable Development Goals (SDGs) set by the United Nations in 2015.
264. The final eradication of Rinderpest required significant social and technical innovations. This level of innovation has not yet emerged strongly within the PPR programme; for example, PPR is a disease of goats and sheep which are looked after primarily by women, yet women are poorly represented in the programme. Innovative ways to bring women into the Project's heart are likely to bring benefits in effectiveness, efficiency and sustainability.
265. Concentrating on the eradication of one disease when field services are generally poor risks losing the trust of pastoral animal keepers. The generally low quality of NVS field services outside places with an effective donor project suggests there is inadequate or inefficiently targeted investment or engagement in the NVS by the public or private sectors, and that there needs to be further testing of public-private partnership models. PPR eradication moving forward alongside more general NVS improvement may lead to better long-term results.
266. Pastoralists explain they still buy 'oxy', albendazole tablets and acaricides even though they do not really know how to use them, they do not have faith in them, they know they can be harmful in meat, but it is all they can do; this seems not to have changed since the 1990s apart from their observations about how global issues such as climate change are affecting their lives; and that this is a situation common to many places around the world. The global veterinary profession needs to look carefully at how it serves remote or otherwise marginalised animal keepers, and at the effectiveness of endless three to five year tightly circumscribed development projects as a model to deliver an NVS fit for purpose.

6.2 Recommendations

Recommendation 1. Future FAO projects and programmes should be aligned more actively with all SDGs to maximize project value for all stakeholders, by e.g.:

- a) adding a specific SDG alignment Result section within all project log frames, with Objectively Verifiable Indicators in common with other projects working in the same geographical areas, and with specific activities;
- b) Establishing coordination mechanisms with other projects working in the same geographical areas to agree common SDG indicators, increase efficiency and improve the beneficiary experience;
- c) Commissioning reviews of the project from experts in complementary disciplines, ideally through reciprocal pro bono agreements with other UN agencies or NGOs.

Recommendation 2. FAO should support the Government of Ethiopia to continue TAD control and PPR eradication as a government-funded flagship project within a National Veterinary Service (NVS) that meets the day-to-day needs of animal keepers and their animals, by working with government and other stakeholders in the following actions:

- a) continue to encourage ratification of Ethiopia's PPR eradication strategy with an associated budget;
- b) consolidate and institutionalise lessons from the PPR project, including greater involvement of women, development of Public-private partnership, and development of CAHW roles in pastoral areas;
- c) establish a national secretariat for PPR and animal disease control, and functioning Regional vaccine distribution centres stocked with supplies of the necessary vaccines, and serving the needs of the local field veterinary services;
- d) harness the resources and fragmented initiatives of donors, researchers, NGOs etc. to enhance the NVS rather than pull it apart;
- e) find lasting solutions to the Federal-Regional challenges of the NVS; revisiting institutional arrangement at federal and regional levels to ensure direct chains of command for implementation of national programmes, with vertical (federal-to-region) and horizontal (region-to-region) linkages, functional integration, technical harmonization and optimal coordination to achieve an effective NVS with common national objectives;
- f) review the veterinary rationalization road map and engage the private sector in effective public-private partnership models;
- g) ensure vehicles bought under the PPR Project continue to be used for PPR / NVS strengthening work after the end of the PPR Project;
- h) equip every NVS vehicle with a basic animal first aid kit;
- i) create and foster complementarities and synergies (both programmatically and geographically) with other development projects focusing on pastoral resilience to maximise results for the realization of the Sustainable Development Goals.

Recommendation 3. FAO should assist the government in developing epidemiology, disease surveillance and response capacity as the cornerstone of an NVS capable of controlling TADs, by:

- a) streamlining epidemiological data management with a single database containing all relevant disease event data (time, location, event, response, follow-up) owned, shared, and used by Ministry, NAHDIC and regional laboratories and bureau, To track likely routes of infection, where outbreaks are originating from, and how TADs are circulating within the wider sub-region (thereby enhancing the efficacy of response and control);
- b) continuing development of DOVAR and ADNIS by, for example:
 - i. providing, or contracting in, dedicated IT professionals to solve the ongoing technical problems and to ensure consistency and continuity;
 - ii. finding a simple modality for incentivizing ADNIS reporting;
- c) continuing development of PDS capacity and vaccination response capability;
- d) ensuring there is follow-up diagnosis of diseases when PPR is ruled out (i.e. when there is a negative pen-side test result), to control for potential outbreaks of other diseases, and to instill confidence amongst livestock owners;
- e) improving the use of GIS and infographics for more effective communication;
- f) increasingly good working relationships between NAHDIC and RVLs developed through the PPR Project to improve timely diagnosis of all diseases, not just for TADs, to help build animal keeper trust in the NVS.

Recommendation 4. FAO should assist the development of the communication aspect of the NVS, e.g.:

- a) pool communications resources across projects to enable a wider pool of communications professionals producing integrated content for e.g. advocacy and public awareness, as well as more specialised content for e.g. training;
- b) prioritize two-way communication, ensuring feedback on all work reports, including to animal keepers about local disease investigations, sero-surveillance, sero-monitoring, and virus typing;
- c) develop communication strategies based on continuous monitoring of the effectiveness of communication and outreach activities, with differentiated and specialised communications products for different target groups (e.g. appropriately timed radio shows based on an analysis of listenership habits; handout flyers and posters with mostly photos and images, rather than text, etc.).

Recommendation 5. FAO should continue using its comparative advantage in leading international coordination for TADs Control and PPR eradication, as well as assisting with internal coordination wherever possible, e.g.:

- a) developing more effective, flexible cross-border veterinary coordination so pastoralism as a highly effective natural resource use strategy can continue, but with better disease control;

- b) helping strengthen coordination at woreda, regional, national and international level, for more efficient implementation of disease control;
- c) continuing to push for technical and financial support/resource mobilization for IGAD and AU IBAR for alignment of member state disease control and eradication initiatives;
- d) ensuring internal financial procedures are streamlined for more efficient project implementation by reducing delays in disbursement of funds and in some cases to reduce inappropriate use of project resources.

Recommendation 6. Gender - FAO should work with donors, government and NGOs to bring women more actively into all aspects of the NVS, particularly for animal health and PPR-related projects, e.g.:

- a) exploring studentships, internships, mentoring programmes for women to engage in project activities;
- b) building innovative gender-based pilot studies into all NGO implementing partner agreements.

Recommendation 7. As part of continuing the TAD control and PPR eradication as a national funded flagship project, FAO and the Ministry of Agriculture should help address high staff turnover at federal, regional and woreda levels, e.g.:

- a) promote an organisational culture that recognises, values, celebrates, and rewards competence, as much by allowing it to achieve its potential (within a normal working week) as through financial incentives;
- b) continue to build staff capacity through coaching, mentoring, refresher training;
- c) use education professionals to help develop higher-level capacity building strategies;
- d) continue to review with Regional Bureau the Business Score Card evaluation for all veterinary staff in line with the needs of NVS, and specifically regarding disease reporting;
- e) reorient the veterinary curriculum to produce more practical, service-oriented graduates, and provide refresher training for current vets, for more effective veterinary services.

Recommendation 8. As part of continuing PPR eradication as a national flagship project, FAO and the Ministry of Agriculture should lobby for adequate funding to the NVS:

- a) to provide a clear budget line for PPR control and eradication programme which is currently using other projects and government budget lines for e.g. TADs vaccine costs, in line with commitments under the national PPR eradication strategy, and in line with commitments to the Malabo Declaration of the African Heads of States to allocate over 10 percent of their GDP to agricultural development;
- b) based on rigorous and credible evidence-based studies that quantify and qualify social and economic benefits.

Recommendation 9. In future country programming, FAO should support pastoralism as a special case given the inextricable role it plays in the effective use and management of rangeland biodiversity, water resources and productivity of animal resources:

- a) help trial and develop more veterinary services that include the private sector but are driven by the need to control disease and deliver safe, effective, appropriate and timely veterinary treatments to all animal species and all animal keepers however remote or resource-poor;
- b) helping make a case for Ethiopia having a comparative advantage in producing and supplying pastoral meat as an ecological and economical alternative to the prevailing model of intensive, high-input, low-welfare animal production systems;
- c) as part of future programming, commission evidence-based studies to quantify and qualify social and economic benefit for more effective advocacy and planning of future NVS work including disease control programmes.

6. Lessons learned

267. Resilience programmes require closer partnership between UN agencies, as well as with other government and NGO projects and programmes, to ensure all implemented projects work harmoniously for the realization of the Sustainable Development Goals, e.g.:
- i. pro bono cross-mentoring to ensure common indicators for best social, economic and technical practice, as well as gender, water management, biodiversity etc., are embedded in all projects;
 - ii. maximize opportunities for engaging and inspiring school children, and students generally;
 - iii. quantify and qualify social and economic benefit in every project for more effective advocacy and planning of all future work;
 - iv. ensure development is perceived by beneficiaries as a joined-up process with real long-term benefits.
268. The Rinderpest-PPR comparison provided a reminder of the importance of innovation in achieving Rinderpest eradication, and the need for more of it to achieve PPR eradication.
269. The lack of attention to bringing women centre stage in PPR eradication provides an example of why UN agencies should cross-mentor on a pro bono basis to ensure better attention to SDGs in every long-term project.
270. When NGOs are used as part of a project of this sort, they provide an opportunity to trial innovative approaches, e.g. to One Welfare or cross-sectoral SDG approaches that may not be so easily trialled within government services, or innovative school engagement or citizen science projects, and should therefore be used actively for this purpose to add greater value.
271. When evaluation teams have more than one person, they should include a variety of genders and perspectives across technical, economic and social science, etc.
272. FAO seems already to have acted on lessons from the internal problems within the Country Office in Ethiopia that lead to the long delay at the start of the PPR project, and the reputational damage that went with it.

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Appendix 1. List of people interviewed

No.	Surname	Name	Gender	Role/Title	Organization/Department
FAO meetings					
1	Belihu	Kelay	M	Epidemiologist	FAO-Ethiopia
2	Chaka	Hassen	M	National Expert - Epidemiology	FAO Ethiopia
3	Seid	Fatouma Djama	F	FAO Representative in Ethiopia	FAO Ethiopia
4	VantKlooster	Gijs	M	Head Livestock and Pastoralism Thematic Programme	FAO Ethiopia
Meetings with FAO stakeholders					
5	Abdi	Edris	M	Gad Kebele Chairman	Gad Kebele Shinile woreda
6	Abdi	Isaac Aden	M	Water Point Collector	Teshoma Village, Lay Kebele, Moyale Woreda, Leben Zone, Somali
7	Abdi	Musa	M	Development Agent (DA)	Gad Kebele Shinile woreda
8	Abdikarim	Abdulahi	M	LRBPD PPR Coordinator	Jijiga Regional Veterinary Laboratory
9	Abdo	Mohamud	M	Community Animal Health Worker	Duba Kebele, Ewa Woreda, Afar Region
10	Abdu	Momina	F	Animal Health Assistant	Regden, Duba Kebele, Ewa Woreda, Afar Region
11	Abdula	Ali Ibrahim	M	Animal Health Assistant	Lay kebele
12	Abdulkader	Issa	M	Livestock Development office head	Livestock Development Office, Moyale Woreda, Borena Zone
13	Adugna	Wesinew	M	Programme Support Specialist	VSF Suisse, Ethiopia
14	Ahmed	Mohamed	M	Agriculture Officer	Erer woreda, Siti zone, Somal Region
15	Ahmed	Mohammed	M	Animal Health Assistant	Regden, Duba Kebele, Ewa woreda, Afar Region
16	Ahmedai	Hamid Jemal	M	Head of Bureau of Livestock and Fishery Resources	SNNPRS Bureau of Livestock and Fishery Resources
17	Aklilu	Fasil	M	PPR Project lead	National Animal Health Diagnostic and Investigation Centre
18	Alemayehu	Berhanu	M	Animal Health Director	SNNPRS Bureau of Livestock and Fishery Resources
19	Ali	Abdi	M	Woreda Expert	Livestock Development Office, Moyale Woreda, Borena Zone

No.	Surname	Name	Gender	Role/Title	Organization/Department
20	Ali	Ebrahim	M	Community Animal Health Worker	Duba Kebele, Ewa Woreda, Afar Region
21	Ali	Mohammed	M	Extension Office Head/FAO Focal person	Dewe Woreda
22	Balikowa	David	M	Senior Livestock Officer	East African Community (EAC)
23	Bastiaensen	Patrick	M	Programme Officer	Eastern Africa Sub-Regional Office, World Organisation for Animal Health (OIE)
24	Bekele	Mosissa	M	Livelihoods Officer	VSF Suisse, Moyale office
25	Belay	Ayalew	M	Animal Health Assistant	Regden, Duba Kebele, Ewa Woreda, Afar Region
26	Beyene	Gashaki	M	ADNIS Lead Epidemiologist	Directorates of Epidemiology & Disease Prevention and Control
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95	Ziad	Ahmed	M	Animal health	Jijiga Livetsock and Pastoral Bureau

Annexes

Annex 1. Terms of Reference

<http://www.fao.org/3/ca8131en/ca8131en.pdf>

Annex 2. Evaluation team timetable and itinerary

<http://www.fao.org/3/ca8132en/ca8132en.pdf>

Annex 3. Evaluation matrix

<http://www.fao.org/3/ca8133en/ca8133en.pdf>

Annex 4. Stakeholder analysis from inception report

<http://www.fao.org/3/ca8134en/ca8134en.pdf>

Annex 5. Guide question lists for semi-structured interviews

<http://www.fao.org/3/ca8135en/ca8135en.pdf>

Annex 6. PPR project logical frame

<http://www.fao.org/3/ca8136en/ca8136en.pdf>

Annex 7. Commentary on PPR Project logical frame

<http://www.fao.org/3/ca8137en/ca8137en.pdf>

Annex 8. SWOT analysis from OIE/FAO Global Strategy for the control and eradication of PPR

<http://www.fao.org/3/ca8138en/ca8138en.pdf>

Annex 9. PPR project theories of change

<http://www.fao.org/3/ca8139en/ca8139en.pdf>

Annex 10. Three case studies: understanding the epidemiology

<http://www.fao.org/3/ca8140en/ca8140en.pdf>

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