## Factors and conditions enabling the establishment of a network of village veterinary workers in Laos

Example of the Village Veterinary Worker Network in Saysathan district, Sayabouly province Practical recommendations for the replication of the network



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## I. Executive summary

The Poverty Alleviation in Remote Upland Areas (PARUA) project implemented by CARE and funded by the Swiss Agency for Development and Cooperation (2003-2015)<sup>1</sup> has been supporting Prai communities in Saysathan district, Sayabouly province<sup>2</sup> to develop a network of independent village veterinary workers (VVWs) working as private entrepreneurs.

This network of independent VVWs now covers 80% of the district without services being subsidized. These services include:

- The organization and implementation of animal vaccination campaigns (with cattle vaccination rates being well above national average since 2010)
- The provision of veterinary advises, treatment of sick animals and control of parasites (with services being extensively used by communities in at least 25 to 30% of the villages of the district).

As a result, improved animal health has likely contributed to the sharp increase in livestock ownership observed over the past years. Since livestock raising has been one of the main source of income generation in the area, the VVW network has contributed to positively impact on communities' livelihoods.

The present report aims to introduce approaches that have contributed to the development of the veterinary network in Saysathan district. Constraints that had to be overcome to enable the development of the VVW network in Saysathan are probably similar to those met in other parts of Laos. They included: remoteness of the area and lack of communication access, ethnic/lao language barrier, low literacy rate and poverty of communities. Approaches used for the development of the VVW network in Saysathan have found to be effective in overcoming these constraints. Similar approaches could therefore probably facilitate the development of VVW networks in other areas of Laos. These approaches have included:

- A commercial approach designed to generate a fair income for local VVWs,
- A peer to peer approach used to train VVWs on the job and raise villager's awareness on improved livestock raising practices,
- The set up and follow up of sample groups to demonstrate the positive impacts of improved animal care.
- The use of relevant training aid materials such as videos for the training of VVWs and videos in Prai ethnic language for villager's awareness raising sessions,
- The use of above mentioned approaches to foster the inclusion of female VVWs in order to develop care and vaccination of small animals.

The Saysathan VVW network can already be deemed as sustainable. It is still developing. However this network would most certainly be negatively impacted if some conditions that have enabled its set up disappeared. This could be the case for instance if external restrictions were put on VVWs activities. Externally driven and large scale subsidized vaccination campaigns would also definitely be highly detrimental to the existing network and a good coordination with Government of Laos and other projects are essential to prevent these happening.

<sup>&</sup>lt;sup>1</sup> The project has also been funded by the International Fund for Agricultural Development (2012-2013, through the MAF-coordinated Soum Son Seun Jai project) and a private donor.

<sup>&</sup>lt;sup>2</sup> Administrative boundaries of Saysathan district exits since 2009. The district encompasses 21 administrative villages.

## II. Example of the village Veterinary network in Saysathan

### A. Background

Saysathan district was created in 2009. It encompasses twenty one administrative villages. Before 2009, eighteen of these villages were administered by Sayabouly district authorities while three of them where administered by Hongsa district authorities.

Project baseline data showed that only one village out of eighteen had ever vaccinated animals before 2003. Provision of other veterinary services was also inexistent in the area. Main animal species farmed in the area were cattle, pig and chicken. Most animals were (and still are) farmed free range. Availability of land has not seemed to be a limiting factor for extensive cattle farming so far. Only one village was cultivating wetland rice in 2008. On some years, upland rice production is not sufficient to cover needs of communities. This has probably been a limiting factor for pig and chicken farming.

According to villagers, opium was grown in half of the villages located along the Thai border until its eradication in 2003. Because of lack of access between Sayabouly town and the area, commercial activities mainly took place with other Prai villages located along the Thai border. The road network has been progressively developed over the years but until 2009, more than 50% of the villages were only accessible by foot most of the year. The area remained inaccessible during most of the rainy season until 2011. Until few years ago, a high proportion of inhabitants could not speak Lao (especially women).

According to the 2004 project data, the distribution of animals across villages of the area was highly uneven since three villages out of eighteen owned most of the cows, buffaloes, pigs and chicken. Goat farming was limited to very few villages and was not developed yet. No data is available in terms of number of dogs raised in the area at that time.

	Number of anima	ls per speci	es per village in 18 villages of Saysathan area in 2004
Species	Number of animals	Median value	Remarks
Cow	1,168	56	29% (334 animals) raised in one village (Samet Gnai)
Buffalo	718	23	42% (302 animals) raised in 2 villages (Mixay and Sama)
Goat	451	11	25% (113 animals) raised in one village (Santae),
			50 % of villages raise less than 11 animals
Pig	3,564	152	41% (1476 animals) raised in the three villages
			of Samet Gnai, Mixay and Sama
Chicken	22,217	941	47 % (10463 animals) raised in the three villages of Samet Gnai,
			Mixay and Sama

In 2008, the project carried out a baseline study for its second phase. The baseline was carried out across 11 villages and hamlets in a representative sample of 208 families disaggregated per wealth category. Part of the data pertained to livestock sector. The table below summarizes the mean number of animals per family according to their wealth category:

Mean number of animals per household per wealth category							
Wealth category	goat	pig	poultry	Total nb HH (sample)			
Poor	0.1	0.02	0.2	0.7	3.2	51	
Middle-class	2.2	0.5	1.2	2.3	12.7	104	
Wealthy:	3.2	1.6	4.2	3.2	21.0	52	

Note: as far as the poor were concerned, median values were 0 for cow, buffalo and goat; 1 for pig and 2 for chicken.

In 2008, the baseline also showed that livestock farming was by far the main source of income since it represented 51% of the total yearly incomes, followed by the sales of tea products (20%) and NTFPs (mostly broom grass and mulberry paper) 13%.

The average annual income was Lak 3,680,000 (USD 460) per family with a median value of Lak 1,680,000 (USD 210) per family.

## B. Prevalence of epidemics and animal diseases in Saysathan district

Hemorrhagic septicaemia epidemics which stroke between 2000 and 2005 in several villages caused very important cattle losses. It is probably one important factor that has helped to initially develop cattle vaccination in the area. In 2012, another hemorrhagic septicaemia epidemic is suspected<sup>3</sup> to be the cause of death of most cattle in one village (Samakhixay village in which cattle vaccination was not taking place yet). Few sporadic cases of hemorrhagic septicaemia were also reported by villagers between 2008 and 2012.

No foot and mouth disease case was reported over the period 2008-2013. An important FMD outbreak affecting several districts in Sayabouly province occurred in 2012 but no incidence was recorded in Saysathan (several Saysathan villages vaccinated their animals during the outbreak in Sayabouly province which may in turn have helped to prevent a similar outbreak to occur in Saysathan).

Few cases with symptoms similar to blackleg disease symptoms were reported by one villager but could not be confirmed.

Parasite infestation has been responsible for high morbidity (and mortality) levels. Worms, tiques, leeches (including nasal leeches), anaplasmosis and coccidia infestations are recurrent. Coccidiosis and worms were directly responsible for very important losses between say 2008 and 2011 in goat herds. Few villages that were farming a significant number of animals at that time even started to sell goats they still owned and stop goat farming. Anaplasmosis infestation was confirmed several times in blood samples of goats. A number of miscarriages were reported in a limited number of villages. Few cases with symptoms similar to tetanus symptoms were also reported but not confirmed through sample analysis. A number of goats were reported to die with symptoms similar to pustular dermatitis or goat pox but sample analysis could not be made (please refer to limitations concerning disease identification). The project tried to procure (without success) goat vaccines for tetanus and clostridium perfringens C+D to test if this vaccine would have a positive impact on mortality rates.

<sup>&</sup>lt;sup>3</sup> A sample could not be collected for this event by DAFO to confirm that it was a hemorrhagic septicaemia epidemic.

Recurrent swine fever epidemics are responsible for high pig mortality. Other pig diseases may have a high prevalence in Saysathan but were not investigated. Poultry epidemics are also recurrent especially Newcastle epidemics which were confirmed on several occasions by sample analysis from the Vientiane laboratory unit. The recurrence of epidemics has increased in recent years probably as a direct consequence of the development of the road network.

Diarrhoea epidemics causing high mortality rates among populations of young dogs would probably be prevented thanks to a parvo virus vaccine (available in Vientiane). However the relatively high cost of this vaccine may deter villagers from using it.

A rabies outbreak (confirmed by sample analysis at the Vientiane laboratory unit) decimated dogs in the first half of 2013. Just after the identification of the outbreak, data from 13 villages indicated that 413 dogs with symptoms of dog rabies had been culled by villagers (out of 1128 animals). 50 of these dogs had bitten pigs or other animals and 50 had bitten people. In total seventy people were been bitten by dogs in the area in the weeks or months preceding the identification of the outbreak.

**Limitations on disease identification**: The project mainly focused on goat disease identification to reduce high mortality rates among goat populations. Several poultry and pig samples were also sent to the national laboratory. However disease identification was limited since:

- A number of diseases could not be determined at that time at the Vientiane laboratory unit (goat diseases),
- In some instances, the project did not received any result from the Vientiane laboratory unit after having sent samples for analysis
- The project via one of its consultant could not be granted authorisations from the Lao government to perform laboratory sample analysis abroad

### C. Scope of project activities relating to livestock sector

In the livestock sector, several project activities have been implemented that have been complimentary to the development of the veterinary network. Among these, the two main activities were the followings:

- Village revolving goat funds. This activity was launched in 2005 and has targeted ten villages until 2008. Three additional villages have been targeted in 2013. Revolving goat funds have been very effective in propagating goat farming across the district. An evaluation carried out by Steeve Daviau in November 2011 showed that communities were still revolving goats in eight of the ten villages initially targeted by this activity. In four of these villages over 90 % of the households had already benefited from the fund as a result of the revolving mechanism. In 2011, high mortality problems however needed to be addressed for the sustainability of the funds to be maintained.
- **Goat farms** (village safety nets). These farms are operated by one or two farmers who earn a share of the total farm income. The remaining part of the total income is shared among poorest families of the village where the fund has been set up. This fund was set up in 7 villages over the period 2008-2011. Four of these funds have stopped since then (with remaining goats being redistributed to individual poor

families or with a specific village revolving bank for the poorest scheme being created). Some of these funds were stopped because of high animal mortality rates that could not be dealt with timely (since appropriate treatment and prevention mechanisms had not been identified by the project at that time yet). More than 50% of these funds have therefore not been effective in meeting outcomes that they had initially been designed for. However, since a high number of animals (up to 60) were farmed in specific locations and taken care of according to project recommendations, this enabled the project to a) test and identify appropriate prevention mechanisms (through VVWs subcontracted to make the veterinary follow up of these funds) and b) demonstrate positive impact of appropriate veterinary care to VVWs and communities. This outcome was not expected in the first place but it is believed that these funds have contributed to a large extent to the development of animal disease prevention in several villages. Thanks to these good show cases, villagers have in turn started to reduce goat mortality across the district.



Goat farms

## *D. Progressive set up of the commercial veterinary network thanks to cattle vaccination*

The project chose to first develop the veterinary network thanks to cattle vaccination because villager demand was initially higher for cattle vaccination than for other veterinary services. Cattle vaccination can provide rewarding incomes to VVWs.

As far as the set up of the veterinary network is concerned four different phases can be distinguished over the period 2004-2014:

#### 1. Year 2004 until November 2008

Veterinary activities started in six (out of eighteen) villages in 2004-2005 (with the training of ten VVWs). Between 2005 and 2008, twelve additional VVWs from five additional villages were trained. Seven new villages were targeted by veterinary activities from 2008 onwards.

During this four year period, CARE and DAFO organized and implemented vaccination campaigns. DAFO would first go to all villages to collect data about the number of animals that communities wished to vaccinate. CARE and DAFO staffs would then go to each

village to deliver vaccines and vaccinate animals with VVWs. During the last campaign of that period, vaccination was proposed in 18 villages (whereas vaccination campaigns had only targeted 11 villages until that date). This last vaccination campaign took between one to two months and mobilized significant logistic means (one project car and driver, 30 working days of DAFO and CARE staffs...). Vaccines were paid for by revolving funds set up at the village level. Village committees were supposed to then collect vaccination fees from villagers (revolving funds had previously been set up on the basis that villagers had not enough cash facilities to pay for animal vaccination fees on a given date). A survey however showed that this system of revolving fund was not working well as some village funds did not exist anymore. Village veterinary tools were broken and had not been replaced in most cases. The system was therefore not sustainable. The project decided to stop supporting such a system and test a commercial system instead. Under this new system, vaccination had to a) generate a fair income for local people involved in vaccination and b) pay for implementation costs induced by vaccination campaigns.

At that time, the project considered it would stop supporting veterinary activities and spare its resources for other activities if this new system was to fail as well.

#### 2. November 2009 until May 2011

The commercial approach was set up and immediately resulted in increased cattle vaccination rates. The commercial system was set up as follows:

DAFO was awarded a revolving fund (USD 500) to purchase vaccines. DAFO staff delivered and sold vaccine bottles to VVWs at a set price and hence made about 150 USD of turn over per vaccination campaign (about USD 1.5 per vaccine bottle). This amount was used by DAFO staffs to pay costs associated with the vaccine delivery at village level. Once running costs were paid, the remaining amount was kept as a replacement of per diem incentives (all these costs used to be paid for by the project until 2009). As a result of this approach, the number of working days of DAFO staffs went down from 30 days (in 2008) to 4 days per vaccination campaign (remote villages were however not well supplied with vaccines).

Fund management committees at village level were abolished. Remaining funds were handed over to VVWs with the agreement of villagers. Prices of veterinary services were increased to a) pay for the cost of vaccine delivery by DAFO at village level and b) provide a fair income to VVWs. It is worth noting that there were some initial concerns that the increase in vaccination prices (from Lak 3000 to Lak 4000- 5000 per cattle and from Lak 2000 to Lak 3000 per pig) may induce a decrease in vaccination numbers. However it is actually quite the contrary that occurred since vaccination rates increased following the set up of the commercial approach.

In May 2011, three villages previously within Hongsa district boundaries that had been included in Saysathan district boundaries in 2009 were proposed to be included in the VVW network for the first time (these 3 villages had however been targeted for veterinary activities by other projects while they still belonged to Hongsa district).

#### 3. November 2011 until May 2013

In November 2011, the project understood that the system was still not sustainable since it seemed that DAFO's revolving fund was probably not available anymore. Another problem was that other veterinary products were not available in the area despite growing demand.

Overall the system was however working well since few VVWs had already started to go to Sayabouly town to purchase vaccines on their own to increase their profit margins. The project therefore decided to organize VVWs in a network that would have the capacity to supply vaccines and veterinary products to the whole area. Small grants (under the form of vaccine bottles) were first awarded to few selected VVWs who had been provided a solar fridge. This grant encouraged selected VVWs to contact other VVW counterparts to sell them vaccines (in the meantime the financial risk associated with unsold vaccines was inexistent since the latter had been granted by the project). The project helped them to coordinate with other VVWs.

Since that date, the project and DAFO have not been directly involved in vaccination campaigns which have been independently run by VVWs.

Similarly, the project helped VVWs to procure veterinary products for the network. One VVW near Sayabouly procured products in bulk quantities in Sayabouly and sold them to other VVWs. This VVW was later on trained to procure products and vaccines directly from the Vientiane Veterinary Supply Unit. He has done so on several occasions since then. He was provided a cash facility by the project for the purchase of the first batch of products. A number of VVWs were also supported with a motorbike driving course and passed their motorbike driving licence. Three VVWs who did not own a motorbike before the training subsequently bought one engine with their own funds.

The following schematic shows the veterinary product supply chain in Saysathan district taking the example of Hemorragic septicaemia vaccines. The system is dynamic and evolves regularly. VVWs either supply their products from VVW2 (himself supplied by VVW1 who procure products from Vientiane) or from VVW1 or from PAFO office in Sayabouly. Choice of suppliers is mainly dictated by the quantity of products to be procured and the relative importance of travel costs which themselves depend on village location. Several VVWs now have the capacity to procure and supply veterinary products which is a very good aspect in terms of system sustainability.



#### 4. November 2013 - ?

In November 2013, another project provided free vaccines to DAFO to vaccinate animals across the district. This has had a negative impact since:

- The number of vaccinated cattle went below 1500 heads which had not occurred since May 2010 (The number of vaccinated pigs and chicken also decreased).
- $\circ$   $\,$  It deprived VVWs from earning the income they were used to earn
- It may have more negative consequences on the long run since villagers may wait for such a subsidized campaign next time (and not vaccinate animals through VVWs). VVWs may therefore loose their motivation.

This negative impact of subsidized vaccination campaigns had already been reported to DAFO and PAFO in previous years (DAFO vaccinated animals at a subsidized price in a limited number of villages each year as part of the "vaccination day"). It is hoped that such campaigns will not take place in the future. One way to solve this issue would be that DAFO provides vaccines for free to VVWs instead of implementing vaccination campaigns. The project was however told that this solution was not an option since free vaccines can not be sold. VVWs could however charge villagers a reduced price (not including the cost of vaccines for instance but only a vaccination or supply service cost which would after all correspond to DAFO per diem). This solution could prove to be useful for expensive vaccines such as FMD. The network would then be further strengthened since VVWs would generate a regular income. If this solution is not possible either, then not providing any subsidized vaccines would probably be a more sustainable option the long run.

## E. Training of village veterinary workers

#### 1. Formal training

Several formal trainings were implemented by the project. Given that most trainees had a low level of literacy, the project tried to:

- Simplify as much as possible the theory of the overall curriculum and stick to problem solving of operational issues,
- Limit the curriculum of each training to a minimum and focus on specific aspects (from experience most VVWs will often solely use their memory to apply what they have learned and will not refer to manuals).
- Limit training duration to three days (and most of the time trainings were one and a half day long).
- Limit the number of trainees per training to ten to twelve participants.
- Always include practical applications and provide trainees with the opportunity to take care of live animals during the training.

Manuals are thought not to be that relevant for VVWs since people hardly refer to them afterwards (partly because of their low level of education). A training aid DVD was therefore produced (that features Saysathan VVWs) and handed over to VVWs. For the overall curriculum taught to VVWs, please refer to chapter V of this report that provides "Website links to CARE Laos awareness and training aid materials". The training aid video does not include all aspects of the overall curriculum but is a good base that enables to deal with most veterinary issues. Some of the issues taught to VVWs and that have not been featured in the video include:

- Cattle vaccination against black leg disease,
- Parvo virus vaccination of dogs

- Using the temperature of animals as a diagnosis tool
- Administering bioanticoc to pigs and chicken
- Makiing of rehydratation solutions
- Helping animals to give birth
- Solving the issue of foreign body stuck in oesophagus

Of note some aspects have been simplified in the video to take into account field constraints in Saysathan. For instance the Fowl Cholera vaccine is injected two times a year at most in Saysathan whereas recommended vaccination schedule is quarterly. It would realistically not be possible to implement chicken vaccination on a quarterly basis for the time being in Saysathan.

#### 2. Peer to peer approach

The peer to peer approach has been used extensively by the project and has proven to be a very efficient and effective way of developing the veterinary network. Please find below a description of some the trainings that have been implemented using the peer to peer approach.

#### a) Community awareness raising on animal care.

Few VVWs were subcontracted by the project to carry out awareness raising sessions on livestock care in all villages of the district. VVWs displayed the awareness raising DVD in Prai language, proposed to cure a limited number of animals for demonstration purposes and exchanged on past experiences. Veterinary products were also proposed for sale (for the own benefit of the VVWs doing awareness sessions).

#### b) Training of goat farmers

Few VVWs were subcontracted to follow up goat farms during several successive rainy seasons. They provided advises to farmers and helped them to administer veterinary products. VVWs reported morbidity and mortality rates to project staffs hence enabling the project to set up corrective measures when required (this follow up would not have been possible without VVWs since roads were cut off most of the rainy season at that time).

#### c) Upgrading of VVW capacity

Some VVWs were subcontracted by the project to upgrade the level of other VVW counterparts on specific technical aspects. For instance few trainees would be invited to attend on the job training sessions in goat farms. One VVW trainer would then administer preventive treatments (and cured animals when required) with trainees on a high number of animals.

#### d) Training of new VVWs

Peer to peer trainings of new assistant village veterinarians have actually been made spontaneously by four VVWs of the area. They have trained relatives in order to be helped for the implementation of vaccination campaigns. This phenomenon has occurred in villages where animal vaccination was already well developed.

The project has tried to foster the inclusion of female VVW workers thanks to the peer to peer training. Please refer to page 14 "Inclusion of female veterinary workers.

More lately, the project has also started to experiment an approach that combines the peer to peer approach with the commercial approach. A VVW already supplying veterinary products

to the area will train a person of his choice (a relative) on animal vaccination in a neighbouring village where cattle vaccination has been inexistent so far. From his perspective, this may bring him additional returns in the future if he supplies the community with vaccines. From the project perspective this may help to improve animal care in the area.



Training new VVWs on the job thanks to the peer to peer approach

#### e) Inclusion of peer to peer approach in formal trainings

In 2012, groups of two to three VVWs were made at the start of a training. These groups were then taught a specific veterinary topic and were asked in turn to teach this topic to other VVWs with background support from project staff. This training of trainer approach proved to be highly motivating for VVWs.

The peer to peer approach is probably essential for the development of the early stages of the veterinary network. It fosters a relation of trust between VVWs and villagers. It enables the sharing of experiences between local communities. Another outcome of the peer to peer approach is that it fosters relations between VVWs which is essential for the development of the network. Generally speaking, VVWs are very proud to be entrusted with responsibilities. Becoming a respected VVW (trainer) has a positive impact on social status which is also a source of motivation for VVWs.

## *F.* Increasing villager's awareness on animal care and inducing demand for services

Several different means were used by the project to raise the awareness of communities on improved animal care and try to induce an increased demand for veterinary services.

#### 1. DVD awareness sessions

Given that the average village population is above 600 in Saysathan, it is not possible to effectively raise the awareness of a significant percentage of the population thanks to village meetings. The language barrier (Lao/Prai) had furthermore to be overcome to reach female inhabitants. A video in Prai language featuring local VVWs was therefore produced. It included advises on animal vaccination and care as well as testimonies from local veterinarians. The project has not assessed if these videos have effectively induced an increased demand for services yet. However, these sessions have at least succeeded in reaching an important proportion of the population. The video was watched by a cumulative number of 4800 people (of which 50% were females) between 2012 and 2013. This

represents an average of 100 people per awareness session per village. Moreover, this figure does not take into account the number of people who viewed the video afterwards (copies of DVDs were given to village authorities and in some villages, villagers apparently asked for the video to be displayed during several subsequent evenings). The Lao version of the three segments of this video has been uploaded on you tube by CARE Laos. Please refer to chapter IV, page 39 for website links to these videos.

#### 2. Exchange visits between villages

Only very few group exchange visits were made and mainly for other purposes than the development of the VVW network. Generally speaking these visits require significant logistics means while only targeting a limited number of beneficiaries. They were therefore not prioritized for the development of the VVW network.

#### 3. Demonstrations farms and control groups

Demonstrations farms and control groups were used widely to try to demonstrate the potential impact of proper animal care. Control group related initiatives have included:

• The support to six fenced chicken farms of improved chicken species. Overall impact was limited since only one of these farms has been really successful with chicken vaccination still being done regularly. Chicken in this farm survived several epidemics thanks to vaccination. This activity nevertheless required too much follow up when compared with its final impact. Finally chicken died during one epidemic but identification of disease could not be made for lack of feedback from the Vientiane laboratory on analysis of sample sent (pigs also died in high numbers during the same event).

• The provision of improved chicken to one female VVW (on the condition that vaccination had to be made in the following years). This female VVW is still vaccinating chicken after 2 years.

• The provision of 2 chicken per family to thirty poor families in one village on the condition that vaccination would be subsequently done. Vaccination was done for one year only. Chicken are said to have died.

• The set up of regulations imposing goat bank revolving fund beneficiaries to pay upfront a small yearly financial fee for the purchase of required veterinary products (parasite control treatment, Bio-anticocc..). This contribution set up as a pre requisite to be able to become a beneficiary of the village revolving goat banks has been very successful so far. Yearly fees are paid to village VVWs who then treat animals. These regulations foster the VVW network and help reducing goat mortality in the meantime hence setting up positive show cases. This system is recent since it was set up in 2013. However it is anticipated that this system is likely to be sustainable since it was readily accepted by communities.

• VVW's animals. Few VVWs have also probably contributed on their own and to a large extent to the development of awareness thanks to control groups made of their own animals. Few VVWs have indeed been regularly vaccinating their own animals in their village for several years. In several villages their animals did not die during chicken or pig epidemics which has helped to demonstrate the positive impact of vaccination. Please refer to testimonies recorded in the CARE awareness DVD for further details.

• Goat farms (village safety nets). Please refer to page 6, chapter "Scope of project activities relating to livestock sector" for a description of these farms. Preventive measures including the control of parasites loads thanks to several (three) successive

treatments<sup>4</sup> made two months apart during the rainy season have proven to be the most efficient in reducing very high mortality among young animals. As the follow up of these farms was made by some VVWs subcontracted by the project they then started to apply recommendations on their own animals and later convinced other villagers about the positive impact of these preventive treatments (especially de-worming treatments).

a) "I saw with my own eyes what impact prevention can bring. In 2011, in the goat farm of my village, 50 animals were raised and not a single animal died. They had been treated against parasites and coccidiosis as recommended by the project. In one area just on the other side of the farm fence, 20 goats owned by other villagers were farmed without being treated against parasites. At the end of the rainy season only 7 of these 20 animals had survived. Since then, I also tried to treat some of my young chicken with bio anticoc and it works very well". A VVW, Samet Noi village

b) "I treat my own goats against parasites and coccidia. So do villagers in my village. Goats don't die anymore. This year I could manage to sell 3 goats because mortality had been low. Another villager had treated his goats last year but did not do it again this year. Last year they did not die. This year they died and he could not generate any profit". A VVW, Phouleurn village. Note: in Phouleurn village mortality in the goat farm is now very low. Besides, most villager-owned goats are now de-wormed up to two times during each rainy season as a prevention measure.

Since VVWs were subcontracted by the project to carry awareness sessions in all the villages of the district, this has facilitated the dissemination of information about the efficiency of prevention treatments across the district. **Control groups have therefore proven to be very effective in raising awareness about impact of veterinary care.** 

#### G. Inclusion of female veterinary workers.

Since the care of chicken is traditionally a women task in Saysathan, the project made the assumption that low vaccination rates maybe related to a gender issue.

Male VVWs probably focus on care of cattle and mainly discuss veterinary issues with other male counterparts and as a result:

- Less attention is paid to small animals,
- Information about small animal care especially chicken may not reach female villagers,
- When data is collected about the number of animals to be vaccinated, data is probably collected from male villagers who are themselves likely not to focus on small animals.

The project therefore tried to foster the emergence of female veterinary workers taking into account the fact that most females of the area:

- do not speak Lao (at least in half of the district area) and are illiterate
- are reluctant to travel between villages
- do not wish to be involved in animal care of cattle

Moreover, small animal vaccination provides less returns since genuine demand is still very low and small animal vaccination is less profitable. In the case of pig vaccination the price at

<sup>&</sup>lt;sup>4</sup> The technical follow up of goat herds showed that internal parasite loads would still increase and reach high levels two months after a de-worming treatment applied during the rainy season. For this reason, a more limited treatment schedule that had been applied the year before had had a limited impact since animals still died towards the end of the rainy season. Other management measures were obviously recommended such as the rotation of pastures but were more difficult to apply for goat farmers.

which VVWs purchase vaccine bottles is determinant and limiting the number of intermediary suppliers is probably required to maintain vaccination profitability to acceptable levels (please refer to page 29 "Determination of vaccination prices that will generate a fair profit for VVWs.")

Therefore there is limited scope for establishing a profitable VVW enterprise run by a female worker that focuses exclusively on small animal care.

Taking into account these constraints, the project invited male VVWs and their wife to a meeting in late 2011 to submit the idea that small animal vaccination would maybe increase in their respective villages if the VVW's wife who wished to were more actively involved in the process (awareness raising and data collection from other female villages and animal vaccination). VVW's household income would then increase accordingly. Following this initiative, few VVWs have started to work in pair with their wife and have delegated them the vaccination of chicken. Results are still limited but indicate that this approach is likely to prove successful in a number of villages.

However the profitability of small animal vaccination is still low in Saysathan. This aspect has been overseen by the project so far but it is likely to be a strong hindering factor that requires more attention.

#### H. Outcomes of the village veterinary network

#### 1. Outcomes relating to cattle vaccination

The evolution of the number of cattle which are vaccinated in Saysathan district can be seen on the chart below. The most important rise in numbers of vaccinated animals took place following the set up of the commercial approach in 2009. About 1700 cattle have been vaccinated twice a year since 2009 which means that livestock worth about USD 580,000<sup>5</sup> is better protected in 18 villages<sup>6</sup>. Cattle vaccination rate can be estimated as ranging between 40% to 50%<sup>7</sup>. In comparison the national average was 26.9% in 2010 according to data from the Ministry of Agriculture and Forestry.

<sup>&</sup>lt;sup>5</sup> Cattle value (cow) taken as Thai Baht 11,000 baht per animal (adult) at an exchange rate of 32.3Bath per USD. Note: value of adult buffaloes is actually higher

<sup>&</sup>lt;sup>6</sup> These figures do not take into account the fact that 6 villages vaccinated 600 cattle against FMD during the 2012 FMD outbreak in Sayabouly province (cattle vaccines were not subsidized).

<sup>&</sup>lt;sup>7</sup> DAFO data indicates that in 2014 the total number of cattle across 18 villages is 4100, out of which the number of juvenile aged 6 months or less should be theoretically withdrawn for the calculation of the vaccination rate.



(\*\*): Note: the 2011 figure of 2149 vaccinated animals was provided by DAFO but the actual figure is less since a number of vaccine bottles delivered to few villages were not used. The November 2011 peak should therefore be truncated. No significant decrease has occurred since Feb 2011 (at the exception of the November 2013 campaign).

#### 2. Outcomes relating to pig and chicken vaccination

As mentioned earlier, the project chose not to focus on pig and chicken vaccination to start with. Pig and chicken vaccination rates are generally very low across Laos. The 2010 data from the Ministry of Agriculture indicates for instance that national average vaccination rates were at that time 16% and 10% for pigs and poultry respectively.

Following the set up of the commercial approach, small animal vaccination rates decreased for two years. Since pig and chicken vaccination is less profitable than cattle vaccination DAFO staff and VVWs probably focused even less than before on small animal vaccination (as the project also did).

The project mainly started to try to address low vaccination rates in Saysathan in 2012 by trying to increase villager's awareness on vaccination and fostering the inclusion of females as VVWs or VVW assistants. Vaccination numbers have since then increased especially in the three villages where female workers are active (half of the chicken of the district have been vaccinated in these villages). The role of few outstanding VVWs who have been vaccinating animals of their own for few years should nevertheless not be overlooked since their efforts may have been determinant in convincing other villagers that small animal vaccination was worthwhile.

Interestingly, small animal vaccination has started to spread across the area since few animals have been vaccinated in an increasing number of villages. In 2012-2013, pigs were vaccinated across 16 villages (out of 21) and chicken were vaccinated in 10 villages.



It is worth noting that the majority of pigs and chicken are however vaccinated by VVWs who purchase vaccine bottles at a low price. Simulations made to investigate the profitability of small animal vaccination suggest that low profitability might be an important factor hindering vaccination given current vaccines and vaccination service prices in Saysathan (please refer to chapter III.B page 27 for simulations).

Vaccination of small animals has therefore been developing but it is probably too early to say how it will evolve in the future. The number of vaccinated animals still remains limited. However vaccination rates are already comparable to national rates. More than 1000 pigs<sup>8</sup> and 2000 chicken were vaccinated in 2012. If we approximate the number of pigs and chicken as being 4,500 and 26,000 respectively the vaccination rate can be roughly estimated as being 24% for pigs (2010 national average rate of 16%) and 8% for chicken<sup>9</sup> (2010 national average rate of 10%).

#### 3. Outcomes relating to the use of veterinary products

As a reminder, availability of veterinary products was really limited in the area until 2009 and demand was very scarce before that date. Use of veterinary products has risen sharply since 2011 and the VVW network has been able to respond independently to this demand. Main products used by villagers include 2 types of antibiotics, 2 types of products for the control of external and/or internal parasites, and products for the care of wounds and umbilical cords after birth.

The list below shows quantities purchased by the main VVW supplier in Saysathan district over twenty months (DAFO and few other VVWs also procure or supply products which are not taken into account in the table below).

<sup>&</sup>lt;sup>8</sup> On the chart a specific year corresponds to the number of animals vaccinated in November of the previous year + the number of animals vaccinated in May of that year (since animals should be vaccinated once a year). Vaccination numbers are estimated from the number of vaccine bottles purchased by VVWs (actual capacity of bottles \*90% to take into account probable losses).

<sup>&</sup>lt;sup>9</sup> Vaccination rates are however difficult to estimate since very young animals should not be included in total numbers of animals.

	Quantities of veterinary medicine and tools purchased by the main VVW supplier in Saysathan district										
	Product	Mar-	Jun-	Oct-	Nov-	Mar-	May-	Nov-	TOTAL	Domosile	
1	Ivermectin 50 ml	9	8	12	2	12	7	17	55	Also exists in 10 ml bottles which were used by VVWs in the first place. Because of their lower cost, 50 ml bottles are much preferred since the use of Ivomectin has developed	
2	Mebendazole, 500mg (tablets)	200	40	10		220	80	17	550	Mebendazole is mainly used for the deworming of goats.	
3	Bio-anticoc 100 g	50	21			44	20		135	Treatment of coccidia.	
4	Oxytetracycine L.A 50 ml	8	6		2	11	5	6	38	Antibiotics. Should be preferred under this long acting form (3 days)	
5	Penstrep 100 ml	5	9			11		5	30	Antibiotics	
8	Multivitamin				2			2	4		
6	Negasun 20 g	12	17			33			62	Treatment of wounds	
7	Gauze (10 unit) + plastic gloves		30			25			55		
8	Betadine			6		15			21	Treatment of wounds	
9	Syringe 5cc		25			15			40		
10	Syringe 50cc		15						15		
11	Needle No 16	3	2						5		
12	Needle No 18	3	1						4		

Note: towards the end of 2013, less medicine was purchased by VVWs probably as a consequence of subsidized treatments proposed by another project.

Use of antibiotics is on the rise as shown in the table below.

Quantities of antibiotics purchased by the main VVW supplier	2012	2013	Total
Oxytetracycline (50 cc)	16	22	38
Penstrep (100 cc) Theoretical number of animals treated thanks to antibiotics quantities supplied to Saysathan district	14	16	30
Theoretical number of 25kg goats treated (*)	432	568	1000
Or Theoretical number of 250kg cow treated (**)	75	101	152
(*) Oxytetracycline LA: goat: 1cc/10kg and cattle: 0.5 cc /10kg			
(**) Penstrep: 1 cc /10 kg *5 days			

The table and chart below show the theoretical number of adult animals (250 kg cow or 25 kg goat) that could have been treated given the quantities of parasite control products sold by the main VVW supplier of the area in 2012 and 2013.

Quantities of parasite control products purchased by the main VVW supplier	2012	2013	Total
Ivermectin 50cc (bottle)	19	36	55
Mebendazole 500 mg (tab)	250	300	550
Resulting theoretical number of treated animals			
Theoretical number of 25kg goats treated(*)	1467	2640	4107
OR Theoretical number of 250kg cows treated(*)	220	396	617
(*) hyperacting aget: 0.3cc/10kg and cattle: 0.2cc/10kg			

(\*) Ivomectin: goat: 0.3cc/10kg and cattle: 0.2cc/10kg (\*\*) Mebendazole: 0.5 tab/10 kg (mainly for goats)

As such quantities purchased by VVWs in 2013 would have enabled to treat more than 100% of the goats within the whole district or 396 adult cows (11%). The real figure is actually higher since:

- A significant proportion of animals that were treated weighted less that the weights used for this simulation (25 kg for goats and 250 kg for cows). Hence a greater number of animals were treated,
- Some VVWs directly purchased de-worming products from Sayabouly and corresponding product quantities could not be taken into account in this simulation,
- The project provided some VVWs with cattle pour on Ivernectin and Cidectin bottles for trial purposes in 2012. Corresponding quantities were not taken into account in this simulation and have enabled to treat at least 250 to 300 adult cows.

These numbers are in line with the fact that about 25% of the villages use parasite control products on a regular basis as a prevention mechanism. In one of these villages 80% of the cattle is said to be treated. In another village most goats are treated twice during the rainy season to prevent mortality. These products are also regularly used in all goat banks set up by the project since 2011 (goat farms for the poorest and revolving goat banks).

The fact that some communities have started to use treatments such as parasite control treatments to this extent is a significant breakthrough since these treatments are now mostly used as prevention means (as opposed to curative treatments which villagers are often ready to pay for but mainly when it is the last possible chance for them to keep the animal alive). The negative impact of severe weather events such as the March 2011 cold spell which often cause the death of weak animals may therefore be much lower in the future.

#### 4. Outcomes relating to VVW's incomes

#### a) VVWs supplying the area with veterinary products

Five to six VVWs travel to Sayabouly town to purchase vaccines and veterinary products. Two of them purchase products and vaccines in bulk quantities to sale them to other VVW counterparts. One of them has been purchasing products directly from the Vientiane supply unit (VSU). The table below lists the 10 items which he has procured over the period 06/03/12 - 26/11/13 (21 months) and have enabled him to generate the highest turn over. His total turn over (excluding income from veterinary services) was about Kip 6 millions over the 21 month period.

	Product	Quantity purchased	VSU unit Price (kip)	Total purchase value (kip)	Unit sale price (kip)	Total sale price (kip)	Turn over (kip)
1	Ivermectin, 50 ml	54	50,000	2,700,000	60,000	3,240,000	540,000
2	PEN-STREP 100 ml	30	65,000	1,950,000	80,000	2,400,000	450,000
3	Oxytetracycline L.A 50 ml	38	35,000	1,330,000	45,000	1,710,000	380,000
4	Bio-anticcoc 100 g	135	13,000	1,755,000	17,000	2,295,000	540,000
5	MEBENDAZOLE, 500mg, tablets	550	2,000	1,100,000	3,000	1,650,000	550,000
6	NEGASUNT 20 g	62	18,000	1,116,000	27,000	1,674,000	558,000
7	Hemorragic septicemia vaccine (bottle)	136	9,000	1,224,000	20,000	2,720,000	1,496,000
8	Swine fever vaccine (bottle)	80	11,000	880,000	20,000	1,600,000	720,000
9	Newcatle vaccine (bottle)	14	9,000	126,000	20,000	280,000	154,000
10	Chicken cholera vaccine (bottle)	14	10,000	140,000	20,000	280,000	140,000
	Total			12,321,000		17,849,000	5,528,000

Note: the turn over amount includes the value of his current stock. However the latter only represents a small proportion of the total turn over since total quantities were procured on six different occasions to refurbish his stock.

#### **b)** VVW income from vaccination

The table below shows a yearly turn over generated by VVWs thanks to animal vaccination<sup>10</sup>.

	VVW name	Village	Estimated number of vaccine injections Nov 2012- May 2013			Estimat N	ed turn o vaccin ov 2012-	ver from a ation May 2013	animal	Total turn	Relative % of HS in	HS, CSF, N and FC	
		C	HS	CSF	N	FC	HS	CSF	N	FC		income origin	abbreviations correspond to Hemorragic Septicaemia, Swine Fever, Newcastle and
1	Mr Santisouk	Paklong	378	108	270	180	1,647,000	192,000	123,000		2,026,000	81%	Fowl Cholera vaccines
2	Mr, Kouy	Meexay	378	72	270	90	1,485,000	96,000	105,000		1,706,000	87%	respectively. Vaccine
3	Mr Biengden	Pouleun	378	270	180	180	1,431,000	300,000	66,000		1,829,000	78%	purchase cost is taken at 25 000 kip per bottle (sold by
4	Mr, Teur	Huaysalot	392	63	450	225	1,092,000	70,000	165,000		1,367,000	80%	one VVW) and price of
5	Mr, Man	Samet Noi	364	162	180	45	1,066,000	216,000	70,000		1,362,000	78%	service per injection is taken
6	Mr May	Kewkor	252	9	0	0	558,000	2,000	0	-	560,000	100%	as Kip 4,000 per cattle; Kip
7	Mr Bieng	Korloum	238	81	180	180	527,000	18,000	50,000	-	595,000	89%	3,000 per pig and Kip 500
8	Mr Nah	Sathan	154	9	90	0	451,000	12,000	35,000	-	498,000	91%	shaded cells Blue shaded
9	Mr Khamkone	Kewpor	182	27	0	0	403,000	6,000	0	-	409,000	99%	cells indicate that vaccine
10	DAFO free vaccir	nation 2	140	54	180	180	310,000	12,000	50,000	-	372,000	83%	costs or service prices are the
11	Mr Keut	Sama	112	18	0	0	248,000	4,000	0	-	252,000	98%	followings: cost per vaccine
12	Mr Bounlop	Doikao	98	0	0	0	217,000	0	0	-	217,000	100%	bottle of Kip 9,000 (No1), Kip 15,000 (No 2 and 8)
13	Mr Phone	Saodiaw	84	117	0	0	186,000	26,000	0	-	212,000	88%	Kip 17,000 (No 3, 4, 5 & 16).
14	Mr Leuy	Kor noi	70	0	90	90	155,000	0	25,000	-	180,000	86%	Price of injection of Kip
16	Mr Bounheung	Santae	28	0	0	0	78,000	0	0	-	78,000	100%	5,000 for HS (No 1, 2, 3).
15	Mr Vant	Huaysalot	28	9	0	0	62,000	2,000	0	-	64,000	97%	These annual turn overs are
17	Mr Nit	Sala	28	0	0	0	62,000	0	0	-	62,000	100%	campaigns.
18	Ms Bon	Samet yai	0	27	180	135	0	6,000	50,000	-	56,000	0%	ro
Total			3,304	1,026	2,070	1,305	9,978,000	962,000	739,000	166,000	11,845,000	84%	

<sup>&</sup>lt;sup>10</sup> Data from the November 2013 vaccination campaign is not presented here since it was negatively impacted by a DAFO free vaccination campaign in a high number of villages

Given that it only takes few days of work per vaccination campaign, this activity is therefore profitable for most VVWs and compares very well with local daily average rates for unskilled labour. Unfortunately the number of days of work required per campaign could not be updated for each VVW. This number of days mainly varies according to distances between different cattle grazing areas, the number of areas, their distance to the village and the capacity of VVWs to organize other villagers (to regroup cattle for vaccination purpose for instance). Data from an external evaluation made in 2012<sup>11</sup> indicates that this number of days roughly varied between two days (n° 9) and eleven days (n° 11). 2014 data indicates that it usually takes 5 days or less to vaccinate 200 cattle. As such it may still be profitable for a veterinarian such as n° 9 to implement vaccination campaigns although he only generates 200,000 kip per campaign because a) vaccines are delivered near his village and b) it takes him only 2 days per campaign to vaccinate all the cattle hence earning a daily income of 100,000 kip (2011 average daily wage of Kip 40,000 for unskilled labour in Sayabouly provincial town). Such a VVW has not tried to develop his commercial activity but the income generated by few days of work seems to be sufficient for him since he has been vaccinating cattle in this way for several years. The best performing VVWs ( $n^{\circ}$  1 to 5) have already actively and successfully developed their commercial activities in view of increasing their respective profits. Some initiatives were induced by the project but others were also self initiated by VVWs. Such initiatives have included so far:

- Purchase of motorbike after obtaining a driving licence and direct procurement of vaccines in Sayabouly town or from Vientiane Veterinary Supply Unit.
- Bargaining and sale of vaccines to VVW counterparts,
- Door to door selling trials in villages not vaccinating animals yet
- Training of village assistants (wife, relative...)
- Increase in price per cattle injection from kip 4,000 to kip 5,000...

#### c) VVW income generated by other veterinary services

The level of incomes generated by VVWs thanks to other services (than vaccination) is more difficult to assess at the village level because a) quantities of products purchased by each VVW has not been monitored and b) prices vary from one village to another. The table below shows a rough calculation of the overall income generated by VVWs across the whole area. This calculation has been made thanks to the quantity of three products supplied to the area by the main VVW supplier and from a VVW's price list of veterinary services.

	Product	Quantity purchased	Purchase price (kip)	Total purchase price (kip)	Unit price (ml of product injected)	VVW income for vet service(kip)
1	Ivermectin, 50 ml	54	65,000	3,510,000	3000	4,590,000
2	PEN-STREP 100 ml	30	85,000	2,550,000	5000	12,450,000
3	Oxytetracycline L.A 50 ml	38	50,000	1,900,000	5000	7,600,000
	Total			15,705,000		24,640,000

<sup>&</sup>lt;sup>11</sup> Evaluation of the village veterinary network, Saysathan district, January 2012, Stuart Ling and Viphone Thammavong

The overall income for veterinary services relating to the three main products (parasite control and antibiotics) used in the area can therefore be estimated at Kip 24 millions over two years (21 months)- ie 12 millions per year. One additional million kip is earned by one intermediary VVW supplier.

 $\rightarrow$  Therefore, the actual income generated by the use of all kinds of veterinary products other than vaccines probably ranges between 12 and 24 millions per year.

#### d) Total yearly income generated by veterinary activies

The total yearly income generated by VVWs all together thanks to their veterinary activities can be summarized as follows:

Activity	Yearly income (kip)	Remark
Supply of veterinary	3,500,000	3,000,000 kip are generated by the main
products		VVW supplier and 500,000 kip by a
		secondary supplier.
Animal vaccination	12,000,000	80% of income derives from cattle
		vaccination. Income generated by 18
		VVWs
Parasite control and	> 12,000,000	Income mostly generated by 5 to 10
use of antibiotics		VVWs
Other veterinary	0 to 12,000,000	Estimation.
products		
Total per year	Kip 27.5 to 40 million	us (USD 3500 to 5000)

Therefore veterinary activities can not generate a sufficient level of income to become the sole VVW occupation. However, since daily VVW's return are relatively high when compared with local daily labour rates, veterinary activities can provide an interesting secondary source of income for VVWs. This aspect probably explains why a) the number of active VVWs has increased over the recent years in Saysathan district b) several VVWs have actively developed the scope of their activities.

### I. Impact of the veterinary network

## 1. Evolution of number of animals over the period 2004-2014

As a result of improved animal care, animal mortality has decreased. Numerous testimonies from communities make a direct link between veterinary services and reduced animal mortality. Some of these testimonies have been recorded on the awareness DVD produced by CARE (vaccination, control of parasites...).

Some of the new testimonies gathered by the project in Saysathan indicate for instance that:

- Goat mortality during the rainy season has drastically reduced across the district and is not such an issue anymore.
- In 2012, a HS epidemic was certainly avoided thanks to HS vaccination in at least one community that owns more than 200 cattle (est. value > USD 65,000). An outbreak occurred in a neighbouring village and caused the death of almost all cattle (100 to 150 heads). Cattle grazing areas of the two villages were close to each other. But in the village where vaccination had been made, the only animal that died was one that

villagers could not find the day they vaccinated all the others. The VVW told the project he had been warmly congratulated by his fellow villagers for having vaccinated animals.

As a result, improved animal health has enabled increases in livestock ownership. From 2004 to 2014, the numbers of cows in 18 villages increased by 156% while the number of goats increased by 290%.

	Number of animals										
	2004	2008	2010	2012	2014	Increase (%)					
Buffalo	718	721	960	832	1,129	57.2%					
Cow	1,168	1,958	2,130	2,258	2,993	156.3%					
Pig	3,564	1,065	2,938	4,570	4,480	25.7%					
Chicken	22,217	13,936	15,506	20,816	32,830	47.8%					
Goat	451	2,294	2,261	1,457	1,759	290.0%					

Goat numbers have made the sharpest increase between 2004 and 2014 although mortality rates were very high during rainy seasons between 2008 and 2011. Goat numbers seem to be on the rise again which corroborates the fact that mortality is said to have reduced significantly thanks to veterinary care.



Pigs and chicken numbers have increased but to a lesser extent probably due to a high recurrence of epidemics. In 2008, the rice production of several villages was also highly deficient.



Moreover, animals are distributed more evenly across villages in the area since median values have increased significantly:

	Median	Median value in 18 villages									
	2004	2004 2012 2014 Increase (%									
Buffalo	23	63	51	124%							
Cow	56	128	164	195%							
Pig	152	202	215	42%							
Chicken	941	908	1238	32%							
Goat	11	49	93	741%							

Again the main increase in median value has occurred for goats. Goat farming was initially developed by the project and is now widespread across the district.

Livestock value has also increased significantly. Value of adult goats in 2010 was around 1500 baht (USD 44) per goat. It is now over Baht 3,000 (USD 88). Similarly value of adult cattle went up from Baht 7,500 (USD 220) to Baht 11,000 (USD 323) per animal. Demand for livestock and number of sales have also increased with the set up of the Hongsa lignite plant in the adjacent district and the development of communication accesses. Income generated by livestock sales have therefore also increased.

If we roughly estimate the increase in asset value (cattle and goat) across the district over the period 2004-2014, this increase roughly amounts USD 850,000<sup>12</sup>. The overall increase in the value of livestock assets from 2008 to 2011 for 203 sample families of the project baseline was estimated at USD 55,420, corresponding to an increase of USD 273 per family over 3 years. This figure is more accurate and reflects an increase in value that is even higher than the above estimation.

<sup>&</sup>lt;sup>12</sup> Very rough estimate using: 1 USD = 34 Thai Baht, goat value = 1500 TB in 2004 and 3000 TB in 2014 /animal; Cattle value = 7500 TB in 2004 a nd 11,000 TB in 2014. Value not corrected with inflation.

# III.Recommendations for the replication of the commercial network approach

### A. Planning phase

#### 1. Coordination with Government and other projects

As a first step, the project should coordinate with relevant Government departments to seek agreement for the proposed system. Such a system will have numerous implications for DAFO staffs since vaccination campaigns will be implemented directly by VVWs (and not by DAFO staffs anymore). At DAFO level, budget spared by this system could maybe be redirected towards a strengthened mission of surveillance and disease identification. This mission could for instance include the early detection of epidemics in coordination with VVWs and the collection of animal samples for laboratory analysis. Feedback to VVWs should then be made once disease identification will have been made. This feedback may have to include the identification of remedy measures to be taken such as warning of other communities, quarantine, veterinary treatment protocol for a disease not common in area, issues relating to human health etc...)<sup>13</sup>.

If DAFO staffs deliver vaccines at the village level, they should perceive a percentage of the vaccine and veterinary product costs to cover their running costs and replace incentives. This will enable them to plan vaccine supply independently from budget availability at DAFO level and will later on motivate some VVWs to travel and supply products themselves. As DAFO staffs will not perceive any incentive anymore, the set up of this approach should obviously be agreed at PAFO and DAFO level.

It is important to note that vaccination rates may decrease for some time after the set up of the system. It may be an issue for Government staffs since Government animal vaccination targets will not be met anymore. Free vaccination campaigns implemented by DAFO staffs should however be banned as they have a negative impact on VVW's business. Subsidized vaccines could however be handed over to VVWs in some cases. For instance such cases could be limited to products which are expensive and usually not supplied to the area (eg FMD vaccines; vaccines against epidemic disease not common in area so far ...). VVWs would then be able to reduce the price they charge villagers. However, in any case, price charged by VVWs should still include supply and vaccination service costs in order not to impact the network supply chain nor the VVWs activity (the vaccination service price would therefore be reduced but only of the vaccine value). A good coordination with other projects financing livestock activities in the same area will therefore be also important for the success of the system.

Agreement from Government should also be sought to obtain authorizations for VVWs to sell veterinary products and propose their services on their own to communities other than theirs.

<sup>&</sup>lt;sup>13</sup> Nevertheless external support will likely be needed and should be planned by the project (use for instance of international veterinarian consultants for technical support).

#### 2. Project design phase

During the project design phase, anticipating the outputs/outcomes may be difficult since the demand for veterinary services often does not exist at the community level yet. Inducing a genuine demand for these services can take several years. One should therefore be careful when setting up project OVIs targets. Setting up optimistic OVIs may be counterproductive as field staffs may then be tempted to subsidize activities too heavily in order to meet short term project objectives.

#### 3. Data collection and mapping of area characteristics

In order to get an idea of how the system could be set up the following data should be collected and put on a sketch map:

- Access and travel time during the dry season and rainy season between a) villages b) villages and one existing and reliable vaccine supplier/office. Ideally VVWs can easily communicate with this vaccine supplier and order vaccines before travelling.
- The number of animals per species and per village as well as known existing demand for veterinary services (vaccination data if any....)
- Existing fridges and deep freezers within area, if any, that could help to support the cold chain
- List of existing male and female village veterinary workers together with comments on their past activity and performance (motivation, reliability...).
- Cost of veterinary services up to date.
- List of past epidemics and known veterinary issues.

This map sketching will provide a rough idea on how the system could be organized. Depending on area characteristics and project capacity it may be preferable to target a restricted number of villages to start with. Targeting communities owning a high number of cattle and not being highly reluctant to vaccination may enable to quickly establish a reliable skeleton for the network (since the activity will be quickly profitable for VVWs). Ideally these villages will be more or less scattered across the area in view of the future development of the network. VVWs from these villages will then be able to help the project to foster demand from other villages (peer to peer approach, awareness...) and eventually supply them with veterinary products.

Expecting VVWs to procure vaccines on their own at the district or provincial level for the first vaccination campaign maybe premature and DAFO support could be required to deliver vaccines at village level (at a price that includes transportation and service of supply costs).

## *B.* Determination of vaccination prices that will generate a fair profit for VVWs.

A simple cost analysis should be made to roughly evaluate the price of animal vaccination service per animal species (noting that in the end prices will be set up by VVWs themselves).

To approximate vaccination service prices, a supply cost should first be determined. This will then enable the determination of vaccination service prices per animal species.

#### 1. Determination of supply cost

The supply cost will aim to cover running costs and service costs associated with the supply of vaccines within the area (at the village level or in neighbouring villages). For instance, in Saysathan, vaccine bottle prices were initially increased by 13,000 kip per bottle between the

PAFO office at provincial level (11,000 kip in 2009) and villages in the target area (24,000 kip). Supply of vaccines in villages can then be either done by DAFO officers (as part of a transition phase for instance) or done directly by some reliable VVWs (which should be the preferred option if deemed possible). This supply cost is very important as it may quickly motivate few VVWs to purchase vaccines on their own at the district/provincial level and even procure vaccines for other neighbouring villages - hence contributing to the development of the overall VVW network.

#### 2. Cattle vaccination

Simulations can be made to determine profit generated by VVWs depending on the price at which they procure vaccine bottles, the price they charge for their vaccination services and the number of animal vaccinated per vaccination campaign.

The chart below shows results from such a simulation with three different hypothesis:

- HS vaccine bottles are purchased by the VVW at the price of 15,000 kip per bottle (current price at PAFO office in Sayabouly) and the price of VVW vaccination service is set at 4,000 kip per vaccinated animal.
- HS vaccine bottles are purchased by the VVW at the price of 25,000 kip per bottle (current price in Saysathan at village level) and the price of VVW vaccination service is set at 4,000 kip per animal.
- HS vaccine bottles are purchased by the VVW at the price of 25,000 kip per bottle (current price in Saysathan at the village level) and the price of VVW vaccination service is set at 5,000 kip per animal (current price in three villages of Saysathan).



(\*) Assumptions: 14 cattle are vaccinated per vaccine bottle (theoretical bottle capacity of 15 vaccines) and the number of bottles purchased by the VVW is rounded at the nearest higher integer.

As it can be seen on the chart, income generated by cattle vaccination quickly reaches levels that may be seen as interesting by VVWs. Since cattle owners are generally the most well off, they are often ready to pay for a vaccination cost that remains very limited when compared with the value of animals. Cattle vaccination is the most profitable for VVWs. For this reason, this veterinary activity can be used to set up the skeleton of the VVW network.

If a high number of cattle are vaccinated, VVWs may even wish to travel to procure vaccines at a cheaper price in order to increase their profit margin (which is the case in Saysathan district).

For cattle vaccination, the number of days spent by the VVW to vaccinate animals is nevertheless an important parameter that contributes to determine whether the activity is worthwhile or not. This number of days varies from one village to another depending on the location and number of grazing areas as well as the capacity of VVWs to organize villagers. In Saysathan it seems that the majority of VVWs vaccinate more than 40 to 50 cattle per day which provides a fair daily return. In one to two villages though, the low number of animals combined with the remoteness of pasture areas probably explains why the VVW does not vaccinate animals. Depending on the characteristics of the area where the system is to be replicated it may therefore be necessary to take this parameter into account and help VVWs to organize villagers if possible (regroup animals in one area for vaccination purpose, organize the rotation of grazing areas at the same time as vaccination....).

#### 3. Chicken vaccination

Poultry vaccine bottles enable to vaccinate 100 animals for Newcastle disease and 50 animals for Fowl Cholera. Therefore, the price at which VVWs procure vaccine bottles will have a lower incidence on their returns (when compared with the price of vaccination services). The chart below shows VVW returns as a function of the number of vaccinated animals. This calculation is made for different prices at which VVWs may purchase vaccine bottles (VB) and different prices that they may charge for their vaccination services (VS).



N: vaccination against Newcastle disease FC: vaccination against Fowl Cholera

From this chart, it is clear that a price of 500 kip per injection (kip 1000 for vaccination against both Newcastle and Fowl Cholera diseases) does not generate a sufficient profit for VVWs even if the number of vaccinated animals is high (current price in Saysathan).

Generating only 25,000 kip of profit after having vaccinated 150 animals will indeed not motivate VVWs to implement chicken vaccination.

A service price of kip 1000 per injection (top curves) would surely motivate VVWs in Saysathan and in other districts of Laos but the cost of vaccination may be seen as too high by villagers (when compared with the value of animals). If it is not possible to increase vaccination service costs to this level, 1500 kip per animal (for 2 injections) should however probably be the minimum price to ensure that VVWs generate an income that they may deem acceptable. Vaccination takes place in the mornings and evenings. A VVW can vaccinate say 100 animals per day. Vaccination schedules against the two diseases are not similar since vaccination against Newcastle should be made once a year and vaccination against Fowl Cholera should be made quarterly. All animals will therefore not receive two injections each time. Prices could therefore be set up as kip 1000 for one injection and kip 1500 for two simultaneous injections on the same animal. The table below shows VVW income based on this hypothesis:

VVW income (hypothesis VB=25,000 kip)	Number of animals							
Price of vaccination service								
(VS)	10	25	50	75	100	125	150	200
VS= 1000 (N only)	-15000	0	25000	50000	75000	75000	100000	150000
VS= 1000 (N) or 1500 (N+FC for								
50% of animals)	-37500	-18750	12500	43750	75000	56250	87500	150000
VS= 1500 (N+FC for 100% of								
animals)	-35000	-12500	25000	37500	75000	62500	100000	150000

Besides the actual cost of vaccination services, another important parameter is the number of vaccinated animals. Income is very low if the number of animals does not reach at least 75. VVWs will even loose money if this number is below 34 animals (VB=25,000 kip). If demand for vaccination is not high yet, VVWs may therefore simply not be interested in chicken vaccination. In order to develop chicken vaccination, the project could therefore subsidize 1 bottle of Newcastle vaccine and one bottle of Fowl Cholera vaccine per VVW until vaccination numbers durably reach at least 100 animals. This may encourage VVWs to develop chicken vaccination without bearing the risk of systematically loosing money during the first vaccination campaigns.

#### 4. Pig vaccination

The capacity of CSF vaccine bottles is relatively low when compared with other vaccines supplied by the Vientiane supply unit (in theory 10 animals can be vaccinated from one bottle). The price at which VVWs purchase vaccine bottles will therefore have an important impact on their returns. This vaccine is a bit more expensive than others (Kip 11,000 per bottle against Kip 9,000 for other vaccines when purchased directly from the Vientiane supply veterinary unit).

The price of CSF vaccine bottles is presented below (example of Saysathan):

Supplier	Price per bottle of CSF vaccine (Kip)
Vientiane supply unit	11,000
PAFO office	15,000
DAFO office Saysathan (2014)	> 20,000
VVW procuring vaccines at the Vientiane	17,000
Supply unit and reselling them in his village	
VVW supplying remote villages	25,000

As it can be seen on the chart below, procuring vaccine bottles at a cost above 20,000 kip should imply for the VVW that the vaccination service price (VS) is costed 3,500 to 4000 kip per animal. If the vaccination service price is Kip 3,000 (current price in Saysathan), little margin is left for VVWs.

To increase the profitability of pig vaccination to an acceptable level for VVWs, solutions may include:

- The reduction of numbers of intermediary suppliers and/or their margins to reduce the cost of bottles purchased by VVWs at the end of the supply chain. Supplying CSF vaccines directly from the Vientiane supply unit therefore makes sense especially if orders are made based on the exact number of animals to be vaccinated<sup>14</sup>. Margins applied by the successive vaccine suppliers should however also be lower than for other vaccines if the suppliers wish to sell a fairly high number of vaccine bottles (otherwise vaccination will not be profitable for VVWs at the end of the supply chain and pig vaccination may simply not take place).
- An increase in vaccination service cost. Villagers may not vaccinate their animals if price is too high. However they may accept to vaccinate adult pigs at a cost of Kip 3,500 to 4,000. A differentiation could therefore be made between adults (reproducers) and small animals. This would in turn help to increase VVW profit to an acceptable level.

If we assume that the VVW vaccinates 75 animals per day, the top five curves (including the pink one) seem to provide an income that would probably be deemed acceptable or even high by most VVWs (daily income of LAK 80,000 to 120,000). These curves correspond to price of vaccine bottles (VB) ranging between Kip 17,000 and 20,000 while price of vaccination service (VS) ranges between Kip 3000 to 4000.



<sup>&</sup>lt;sup>14</sup> Furthermore, conservation of CSF vaccines is weaker than other vaccines and ordering CSF vaccines directly from the Vientiane supply unit may help increasing vaccine quality

### 5. Parasite control and use of antibiotics

The price of veterinary services for parasite control and antibiotics injection can be set up per millilitre of product injected. Prices may increase if animals are injected outside the village.

	Product	Price per bottle (kip)	Injection service cost (per ml)	VVW income per bottle (kip)	Remark
1	Iverrmectin, 50 ml (parasite control)	65,000	3,000	85,000	Several animals maybe injected periodically at the same time
			4,000	135,000	Price for injection outside village
2	PEN-STREP 100 ml	85,000	5,000	415,000	
3	Oxytetracycline L.A 50 ml	50,000	5,000	200,000	

The table below summarizes some of the prices applied in Saysathan:

Villagers tend to stop antibiotics injections when animal health improves (and before the completion of the recommended schedule). In order to limit this, maybe it should be suggested that VVWs collect the amount of the full treatment course upfront. Partial reimbursement would then take place but only if the animal dies before all injections were made.

Use of veterinary products (other than vaccines) can generate incomes that go well beyond the level of incomes generated by vaccination. However time may be needed before demand is high for treatments such as parasite control treatments. Such treatments are truly effective when they are used in a prevention manner. Developing genuine demand will probably require significant efforts on awareness raising. The set up of demonstration farms and/or control groups may help to achieve this.

## C. Set up of cold chain

Setting up a cold chain that suits VVW needs may not require an important budget. Firstly one should ensure that all VVWs are equipped with an appropriate short range cool box. This will enable VVWs to transport vaccines within their village and from one grazing area to another. In Saysathan, a short range cool box of good quality (40 hours autonomy)<sup>15</sup> was provided to each VVW together with dry ice packs. Such cool boxes proved to be suitable for cattle vaccination in most villages. However deep freezers should be made available in neighbouring villages to produce ice locally especially if cattle numbers are high and/or if VVWs wish to vaccinate other animal species.

Few fridges with deep freeze compartment should therefore be dispatched in the area. Obviously, if the electricity grid reaches the target area it will be much cheaper to equip few VVWs with fridges and deep freezers. As far as solar fridges are concerned some Chinese fridges are relatively cheap. Solar panel capacity should be high enough (oversized) to ensure that electricity supply is sufficient during the rainy season. If no fridge is available, long range cool boxes maybe relevant for villages that are only accessible by foot, (autonomy of seven days). However these can not be transported by motorbike.

<sup>&</sup>lt;sup>15</sup> In 2009, unit price was USD 48 for the short range vaccine carriers and USD 653 for the long range cool boxes

As an example the project in Saysathan initially purchased 2 solar fridges that were set up in the area to enable DAFO to store vaccines and freeze dry ice packs during campaigns. As the area targeted by the project started to encompass the whole district, 2 long range cool boxes (7 days autonomy) were used to store vaccines in sub areas and to transport vaccines to remote villages that were only accessible by foot. Subsequently the lack of fridges at village level hindered VVWs from vaccinating all the animals villagers wished to vaccinate. 6 solar fridges were therefore provided to VVWs across the district<sup>16</sup>. Solar fridges were provided to performing vets selected in villages spread across the area (to facilitate the development of the network). Before the award of fridges, a "competition" was organized among pre-selected VVWs. A meeting was organised with VVWs and village chiefs during which the project explained that fridges would be awarded to VVWs who would make the best use of them. VVWs who wished a fridge had to make a proposal with their village chiefs in which they had to detail how many additional animals they would vaccinate if they had a fridge, how many vaccine bottles they could sell to other villages and so on. This approach proved to be useful as villagers and VVWs then organised meetings. VVWs started to discuss possible cooperation mechanisms with other VVWs. Problems were however initially met during the rainy season because the capacity of solar panels was not sufficient to enable proper battery charge.

#### D. Other material support to VVWs enterprises

VVWs should be provided with an initial veterinary tool set (syringes, set of products etc...). During trainings they should also be provided with new specific items relating to trainings (e.g. betadine, negasun, brushes soap and razor blades after the training on wound care)...These products should not be provided twice as it must be VVW's responsibility to then procure materials needed for their activity. One should however ensure that they are locally available and that VVW supplier know where to procure them.

As the network develops, some other forms of support to VVWs enterprises may be relevant:

- Grant or cash facility especially if some VVWs start to purchase a high number of vaccines or veterinary products to supply other villages than theirs. For instance a grant in kind (vaccine bottles) was awarded for the first vaccination campaign during which several VVWs undertook to sell vaccines to other villages. This grant motivated VVWS to develop their network to increase their profit and in the meantime reduced risks associated with unsold vaccines.
- When relevant, the award of cash facilities should probably be preferred. In line with the commercial approach, some VVWs were as such allowed to borrow money from the project when it was clear that money would be reimbursed on a short term. Cash facilities were awarded to two VVWs for the initial procurement of bulk quantities of veterinary products from the Vientiane Veterinary Supply unit, and to one VVW for the purchase of a motorbike.

<sup>&</sup>lt;sup>16</sup> The cost of solar fridges often deters projects from procuring them. However, if a high number of fridges are to be procured, importing them from China has proven to be affordable. In 2011, the project procured 6 units at a price of 4500 USD – this price included transportation to the Lao – Chinese border.

### E. Selection of VVWs

Once the planning preparation phase has been completed meetings should take place with villagers. The first phase of meetings will aim to present the approach and select VVWs. One should stress that:

- 1) This approach is demand based. Treatments and vaccination will not be imposed.
- 2) Prices of vaccines and treatments should include a fair margin for VVWs to reward them for the work they do. For this reason, vaccination prices may increase when compared with a subsidized system if such a system was implemented in the past. A presentation of the prices estimated by the project is made noting that ultimately these prices will be set up between VVWS and villagers. For instance vaccination prices may need to be increased if cattle are disseminated across several remote areas. An estimation of the number of animals that will be regularly vaccinated at the proposed price is made together with villagers. VVW income should then be estimated.
- 3) For the village it is obviously important that the selected VVW(s) are truly interested in performing their job. Anyone can apply for this VVW position including villagers who were not trained in the past. Ideally one female VVW becomes active in each village. VVW couples are more likely to be successful because the male VVW and his wife can be complimentary (cattle/small animals) and VVWs may have a high workload few days per year. The income generated by the VVW couple will be higher. On principle illiterate people can also apply for the position especially if they wish to help another VVW during vaccination campaigns to start with.
- 4) The job position of a VVW should be explained. The project should make the list of diseases that VVWs will be able to deal with after having been trained. Ultimately a VVW may provide services in his village but also sell products to other villages hence generating more income. Best VVWs may also be subcontracted by the project for some time to train new VVWs in neighbouring villages.
- 5) Communities should be made aware of the support that will realistically be provided by the project: technical support on relevant media aid (video, practical support...), trainings, initial veterinary equipment, materials for the cold chain.
- 6) Testimonies of VVWs already working under the commercial approach should be provided to communities. Ideally a couple of VVWs of the same ethnic group stays in the village during few days after the first meeting and before the actual selection of candidates is made. They will answer questions from people who might be interested in applying for this position but should also actively advertise about the VVW position within the village and help in the recruitment process.
- 7) During a second village visit candidate interviews will then take place with communities to evaluate the motivation and capacity of the different candidates. Final selection will be made afterwards with DAFO, village chiefs, project staffs and VVWs of the same ethnic group who stayed in the village for few days. If the project wishes to support few villages to start with, final response about the final selection could be postponed to select the best potential VVWs within target area (presenting the selection process as a competition between villages may actually be a source of motivation for the communities and potential VVWs). In any case, it should be stressed to communities that the project only wishes to invest in VVWs and villages in which a) there is demand for veterinary services and b) at least one VVW deemed as suitable can be identified. If these two conditions are not met it would be better to postpone the inclusion of the village in the vet network.

### F. Training of Village Veterinary Workers

#### 1. Technical training

Training aid materials have been produced by CARE and include training manuals and DVDs. These materials were made based on some of the most recurrent livestock issues in Saysathan district. By using these materials, especially the DVD, VVWs can be efficiently trained to deal with a number of recurrent problems that have a clear negative impact on animal health. The content of DVDs was voluntarily adapted so that they remain accessible to the majority of villagers. Illiterate people can for instance access the content of these DVDs.

Several distinct trainings must be organized to encompass the whole curriculum. Each training MUST include practical on the job training:

- relevant DAFO and project staffs (or other VVWS as part of the peer to peer approach) should supervise and implement one full cattle vaccination campaign together with newly trained VVWs
- During trainings, animals from surrounding villages could be purchased or taken care of for free for on the job training purposes (and paid for to villagers in case they die).
- Trainings must also include practical exercises to train VVWs on how to calculate doses to be administered.

Overall technical training is not the main difficulty. Using the DVD can enable to teach VVWs most of the required basics. However a number of periodic refresher trainings are needed during the first years of implementation. The peer to peer approach should be used whenever possible.

#### 2. Non technical trainings

It is very likely that other non technical trainings will be needed before the network is fully operational:

- Coordination between VVWs: VVW meetings could be organised to foster the initial development of the network. If some VVWs supply others with veterinary products, orders from different villages should be made at the same time. One could refer to CARE's DVD for this issue (recommendations about dates of data collection, order and delivery of products...). On the job trainings may also be required (as in Saysathan) on how to collect data, make phone calls... To ease effective coordination between VVWs, few selected individuals could be supported with motorbike driving lessons in view of obtaining a proper motorbike driving licence. It will improve VVW's safety but will also limit the risk associated with police fines (which at one stage deterred Saysathan VVWs from travelling).
- Procurement of vaccines. For VVWs supplying products to others, more substantial on the job support should be provided especially if they order products to the Vientiane Veterinary Supply Unit (VVSU). This support may for instance include the opening of a bank account, order of products, money bank transfer... Several orders should be made along with VVWs to train them on the job.

## G. Raising awareness and increasing demand for veterinary services

Raising villager's awareness will help to increase local demand for veterinary services. Video media is well adapted for this purpose especially in remote areas since village video displays are often attended by a significant proportion of the population that includes females. CARE awareness videos could be used for this purpose. If the target group belongs to another ethnic group than the Prai ethnic group, and if most women of this target group can not speak Lao, these videos would however need to be translated into ethnic language (CARE videos are available in Prai and Lao languages). The display of these videos by VVWs subcontracted by the project as part of the peer to peer approach was found to be very efficient in Saysathan district.

If local awareness about livestock care is low, control groups and demonstration farms maybe essential to develop small animal vaccination and preventive control of parasites among goats and cattle. Great impact can be achieved thanks to demonstration farms. However setting up and running demonstration farms is time and resource consuming. An alternative could consist of fostering the set up of control groups among animals farmed by local communities:

- As far as cattle are concerned, parasite control treatments could for instance be subsidized for say two years on a given percentage of a herd farmed by villagers. Treatment service costs should also be paid for to the VVW but such costs would remain limited. Treated cattle could be ear tagged to enable visual comparison between treated and non treated animals (or all animals farmed in one grazing area could be treated and then compared with non treated animals from another grazing area which would be an alternative that would be even better). For cattle, control of parasites may not have an incidence on mortality that can be easily seen quickly However it is likely that treated animals will end up being much fatter than untreated animals. This will result in an increase in animal value. This aspect may be sufficient to make parasite control treatments seen as worthwhile by communities (as in Saysathan). A similar approach could be used for goats. Bio- anticocc and parasite control treatments will have a more direct incidence on mortality rates. One should nevertheless keep in mind that if goat mortality is usually high in the rainy season up to three treatments per rainy season could be needed for young animals to achieve tangible results.
- As far as poultry is concerned, in line with one of the recommendations that VVWs receive one free vaccine bottle until service demand is sufficient for them to earn benefits, VVWs could commit to vaccinate their own animals regularly using part of the vaccine media provided for free by the project. Based on the experience in Saysathan and given the high recurrence of chicken epidemics it is likely that the control group method will provide results within two or three years. Providing female VVWs with few animals of an improved chicken species could help visual comparison between control group and other chicken in the village but the project should in this case be very careful when introducing new animals (strict application of quarantine requirement and quarantine made outside the target area).
- A similar approach could be applied to pigs

#### H. Conclusion

Following the introduction by CARE in 2009 of a commercial approach for the provision of veterinary services in Saysathan district, Sayabouly province, a village veterinary network has developed and has generated positive and sustainable outcomes. The network now covers 80% of the villages of the district. Veterinary products are supplied by independent veterinary workers. Cattle vaccination rates have increased to reach 50% which is almost twice as much as the 2010 national average for Laos. 1700 cattle (of estimated value USD 580,000) are regularly vaccinated and better protected against hemorragic septicaemia epidemics. Small animal vaccination rates have also recently started to increase (although they remain limited). Use of antibiotics and parasite control treatments has sharply increased. For instance 25% of the district villages are already extensively using parasite control treatments in a preventive manner.

Community awareness sessions implemented by VVWs using CARE's awareness videos in ethnic language have probably contributed to these positive changes (awareness sessions have attracted a cumulative number of people representing 35% of the total district population within two years). However, the breakthrough achieved on improved animal care thanks to parasite control would have not been possible without the successful follow up of control groups and demonstration farms set up by the project. Similarly, the peer to peer approach which has been used extensively over a period of five years has proven to be a key in the success of the network.

Veterinary activities can not generate a sufficient level of income to become the sole occupation for VVWs. However, since daily returns generally compare well with local daily labour rates, veterinary activities still provide an interesting source of income for VVWs.

In line with testimonies gathered from beneficiary communities, improved animal health has contributed to sharp increases in livestock ownership observed over the years. In Saysathan, the numbers of cows increased by 156% while the number of goats increased by 290% over a ten year period. A very rough estimate of the corresponding increase in asset value amounts USD 850,000. The VVW network therefore contribute to improve villager's livelihoods and contribute to the Millennium Development Goal 1 - to eradicate extreme poverty and hunger.

Given initial constraints that had to be overcome in Saysathan district, the VVW network could probably be easily developed in other districts of Laos and lead to similar results.

Recommendations made in this report for the selection of VVWs, the calculation of vaccination service prices and the overall logistic set up of the network could be used for this purpose. CARE's video materials could be readily used for the training of village veterinary workers and the implementation of raising awareness campaigns. One component relating to veterinary activities and associated risks in terms of health should however be added to the existing curriculum (eg: dog rabies, tetanus...).

To start with, the set up of the network skeleton could be made in few villages thanks to cattle vaccination. Based on CARE's most recent field trials, the following recommendations may enable small animal vaccination to develop faster than in Saysathan:

- Whenever possible female veterinary worker vocations should be encouraged. As in Saysathan, this task may prove difficult since several constraints may hinder the

establishment of a profitable female VVW enterprise focusing on small animal care. However most of these constraints will be easily overcome if the female worker is the wife or a relative of the VVW. During the initial VVW selection process, such potential VVW pairs should therefore be actively looked for.

- Small animal vaccination prices should be increased (while remaining acceptable for villagers) in order to ensure higher returns for VVWs. For pig vaccination limiting the number of intermediary suppliers in order to increase VVW margins may also be required.

- A faster development of poultry vaccination in villages where demand is very low probably requires that the project subsidizes one vaccine bottle per VVW until demand has grown to a sufficient level. Otherwise VVWs may not start to vaccinate chicken since it will likely imply that they will systematically loose money during the first vaccination campaigns). In return VVWs could commit to vaccinate their own chicken. As a result this would set a chicken demonstration sample group in each village.

Experience from Saysathan indicates that control groups can be effective in inducing increased demand for veterinary services. The set up of animal control groups could prove more efficient than demonstration farms to promote preventive parasite control.

## References

1) Evaluation of social aspects of village managed social safety net Pilot through livestock banks; Saysathan district, November 2011, Steeve Daviau

2) Evaluation of the village veterinary network, Saysathan district, January 2012, Stuart Ling and Viphone Thammavong

3) Veterinary surveys in goat farms, Saysathan district, May 2011, Dr. Bertrand Bouchard DVM, MS & Dr. Anne Drew, DVM

# IV. Website links to CARE Laos awareness and training aid materials

For awareness raising among communities: one video segmented in three videos: 1) Awareness on vaccination of cattle and chicken- CARE Laos:

http://www.youtube.com/watch?v=Q23yK4nRwOs

2) Awareness on vaccination of pigs - CARE Laos:

http://www.youtube.com/watch?v=GlDe6mo17wA

3) Awareness on livestock deworming & coccidiosis - CARE Laos:

http://www.youtube.com/watch?v=WsrSjSY9vHc

For the training of village veterinary workers: one video segmented in two videos that include a simplified version of the training curriculum taught to VVWs :

1) Training on vaccination for village veterinary workers - CARE Laos:

http://www.youtube.com/watch?v=CbRgt-jeA-U

2) Training on antibiotics, deworming, Coccidiosis for village veterinary workers: http://www.youtube.com/watch?v=D6Iwdh1FXzE

For the training of village veterinary workers, one manual written by Dr Bertrand Bouchard