Dynamic frontline knowledge mobilization for community-based primary animal health workers

Subtitle: Smartphone app usage for farmer training

“I saved money on commercial chicken feed after learning from the app that I could use natural mixes instead of commercial feed”
Mr Kamphieng, Paksapkao village

*By: Sonia Fèvre, Margot Camoin, Bounlerth Sivilai, Kent Hecker, Fabienne Uehlinger, Victoria Cansino, Craig Stephen, Erin Fraser, Daovy Kongmanila

Final technical report to the International Development Research Centre

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Abstract

This project tested the effectiveness of smartphone-based knowledge mobilisation technology for building capacity of primary animal health workers (PAHWs) in animal farming practices. Significant inputs of time and expertise were required to develop the initial smartphone application (app) which is at the core of this research. After consultations with PAHWs and project members the focus of the app was agreed to be poultry production. The multi-partner project team derived appropriate content and developed the text and storyboard. Lifelearn developed the programming, and the prototype app is now available in English and Lao. A website was built to provide a communications and app sharing platform. The language and the navigation panel used in the app were simplified after local consultations. Results show that PAHWs responded positively to the app, seeing it as a convenient, relatively user-friendly tool for learning and reference. They reported using it to solve questions on poultry raising and sharing it with other farmers. Unexpected results included PAHWs’ wider interest in phone-based technology such as in using pictures. Further research to build on this pilot project should include the development of an app on cattle production, and the use of internet and picture sharing technology.

*Keywords: Smartphone, animal health worker, application, poultry production, training*
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The research problem

Livestock production is essential to the livelihoods of millions of vulnerable people around the globe. Poor animal health and productivity is, therefore, a primary driver of poverty. Limited animal health services in remote and underserviced areas is a well-documented challenge to improving food security and livelihoods that are so heavily reliant on livestock, and also impedes preparedness against emerging infectious diseases. Providing extension services through the training and monitoring of community animal health workers is a well-recognised and validated approach to addressing livestock morbidity and mortality amongst rural communities in low-resource environments where limited government support structures are available. VWB has been implementing such a project in Xaythany District, Lao PDR since January 2010, and this approach will hereby be referred to as a ‘primary animal health care (PAHC) model’. This knowledge mobilization (KM) project aims to contribute to the existing research efforts underway in Lao PDR by VWB and the National University of Laos (NUOL) to evaluate effective methods of training primary animal health workers (PAHWs) with the aim of improving animal health and food security.

Access to relevant and timely information is a major challenge for PAHWs and organizations working with them to improve livestock health and productivity outcomes. This mobile-based knowledge mobilization exploratory project was therefore responding to the constraints in time, capacity, resources and expertise for addressing PAHW capacity needs. By introducing another medium for information sharing and training, this project aimed to evaluate how well adapted smartphones are to responding to these capacity needs.

Due to resource constraints, the focus of this research was on the use of a training app for field-based PAHWs. However, there are various potential expansions that could grow from this initial research including the development of further apps, the use of centralised messaging systems within the network, photo sharing, and the use of the smartphones as a portal for surveillance, market information updates etc. Based on the results of this research, such potential developments will be explored.
Objectives

The overall project goal was to understand if a dynamic mobile knowledge mobilization and exchange system can adapt to capacity development needs for improving food security through livestock health and production in central Laos.

Specific objectives:

Capacity and collaboration:
- To build the capacity of National University of Laos staff to conceptualise, develop and manage new media technologies for training and communication purposes in a local development context
- To engage project facilitators and local farmers (Primary Animal Health Workers, PAHWs) in using smartphone-based technology for sharing information and strengthening the PAHW network
- To build and strengthen Canadian institutions' capacity in knowledge mobilization and education evaluation in a developing country setting
- To build and strengthen relationships between southern partners and Canadian institutions

Research:
To critically evaluate the utility, effectiveness and adaptability of a pilot smartphone-based knowledge mobilization system to meet the needs of community-based primary animal health workers. This will be achieved by answering the following questions:

1. How well does this technology work in a farm-based primary animal health care (PAHC) context?
2. To what extent and in what ways do target users use the technology for learning and information sharing?
3. What is the perceived utility of this technology by project facilitators and PAHWs for learning and information sharing?

Methodology

Initial activities included consultations with PAHWs on key topics of interest for an app, and general discussions about their familiarity with mobile technology. Following the decision to focus on poultry management and health, the project team researched the topic and provided Lifelearn with text, visuals and video for the app. Lifelearn developed the storyboard and app mock-ups and designed the presentation structure and format of the app.

The Galaxy Cooper smartphones were purchased in Laos at the Lao mobile group centre in Vientiane; 2 were purchased in May 2012 and a further 45 phones were purchased in July 2012 (each phone cost approximately CAD 275).

In August 2012 an initial pilot testing of the draft app was undertaken. To set the stage for the testing of the pilot app, a half day training on how to use the smartphone (turn on/off, take photo, calling/receiving, messaging, watch the app) was held on 17 August 2012 with ten PAHWs. At this stage the full Lao version of the app was not available to download due to technical difficulties with wireless capacity and the download setup. The PAHWs were able to view the English app as a 'preview' and asked to provide feedback.

The full beta version of the app was developed in February 2013 and tested on 8 PAHWs. The PAHWs were provided with basic training on using the phones and app, and one week later a debriefing was conducted using a written survey and group discussion, at which time the PAHWs also returned the phones.
Following this evaluation, minor changes were made to the app content and to the technical usability of the app to make it more user-friendly.

The final version of the app was produced in June 2013. The app was uploaded onto the phones by the project team using a USB cable, as uploading them through local internet connection proved too difficult. The smartphones with the app uploaded were distributed to 22 PAHWs representing 10 different villages in the project. The smartphones were given with a special sim card that only allowed the PAHWs to send SMS and not to call or use internet; this was to ensure the PAHWs did not incur phone or internet charges unexpectedly. All sim cards contained an initial credit of 10,000 kip and in the course of the evaluation activities, some PAHWs had the opportunity to win more credit through quizzes.

The evaluation process was combined with training of the PAHWs in using the phones and app. Two half-day training workshops were organised with 22 PAHWs, and FoA, VWB and Lifelearn team members in June 2013, at which time each PAHW currently active in VWB/FoA’s projects were invited. PAHWS were given one smartphone each and agreed to terms and conditions, which included taking good care of the phone.

Initial presentations were made to show how the phones and app work, and practical sessions were provided to allow PAHWS to practise each of the steps. The smartphone was connected to the computer and projected using Droid@Screen, a downloadable software specifically designed to project an android phone to a computer monitor or LCD projector for training or demonstration purposes.

The two days of training (20-21 June) included:

- Smartphone presentation on:
  - General introduction of project by Sonia
  - App presentation by Vicky
  - Terms and conditions by Margot
  - PAHWs hands on smartphone by Bounlerth and Vicky
- Basic technical quizzes of the PAHWs’ ability to use app, undertaken through verbal question and answer, with a competition to answer quickly
- Solution finding: problem situation described, and PAHWs asked to find information on the app to resolve the issue
- Group discussion by PAHWs of information missing from app
- Written questionnaire-based survey completed by PAHWS on usage and satisfaction with app
- Smartphone questionnaire filled out by the PAHWs

A review of technical smartphone issues was undertaken with the PAHWs and technical mentoring provided.

After the training the PAHWs were encouraged to use the phones as often as possible, and to ask team members if they had concerns during that time.

At the end of July (after one month of use), the project coordinator called the PAHWs and asked them the number of times and reasons why they have been using the smartphone in the last three weeks

A final evaluation and training was then held on 16th August 2013, which used the same tools as in the introductory June training, as well as reviewing PAHWS’ self-reported use of the app over that time.
### Project Schedule (updated)

<table>
<thead>
<tr>
<th>Activity</th>
<th>2011</th>
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<th>2013</th>
<th>Responsibility</th>
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<td>Pre-project activities</td>
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<tr>
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<td>Aug-Sept</td>
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<tr>
<td>Development of pilot mobile KM application</td>
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<td>LifeLearn, VWB, NUOL</td>
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<tr>
<td>Project planning and implementation</td>
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<tr>
<td>Training of PAHWs on KM tool</td>
<td></td>
<td>Q1 Mar-May</td>
<td>Q2 Jun-Aug</td>
<td>VWB, NUOL, and LifeLearn</td>
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<tr>
<td>Field-testing of KM tool</td>
<td></td>
<td>Q3 Sept-Nov</td>
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<td>VWB and NUOL</td>
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<td>Stakeholder workshop at conclusion of field-testing</td>
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<td>Q4 Dec-Feb</td>
<td>VWB and NUOL</td>
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<td>Monitoring activities and action learning adaptations</td>
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<td>Q1 Mar-May</td>
<td>Q2 Jun-Aug</td>
<td>All</td>
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<td>Data analysis</td>
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<td>Q3 Sept-Nov</td>
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<td>Evaluation and report writing</td>
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<td>Q3 Sept-Nov</td>
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### Project outputs and dissemination

Throughout the timeframe of this project, outputs have included:
- Research into information needs of PAHWs
- Development of training materials and sourcing of information (text, images, pictures, video)
- Production of the app on poultry raising
- 22 smartphones distributed to PAHWs and 11 to project team members
- Dissemination of knowledge mobilization and skills among the PAHWs in their community
- Information sharing and connectivity in several activities between the project team members in FOA and PAHWs in the village

### Research findings

During the evaluation period, various PAHWs asked team members for advice on using the phones, retrieving the app, adding the app to the home screen, accessing Lao script, using sms, saving the name and phone number of contact persons and finding them again, and using and sending pictures.

During the pilot testing of the draft app in August 2012, the PAHWs provided the following feedback:
- The phone is easy to use
- They want to have more pictures on the app
- They are intrigued by the idea of the app and are interested in many subjects for the future
Narration/oral voice over is more useful than written text (to be evaluated once the Lao app is available)

Of the eight PAHWs who participated in the beta Application testing in February 2013, all agreed that the phone was technically easy to use. They also unanimously agreed that the training video was beneficial and useful and the skills learned will be applicable to their practice. Five out of the eight stated that they watched the training video 5 or more times before they could remember how to use the phone and application properly. However, they also unanimously agreed that the text was too small to read, and that they would prefer a live training group to work through how to use the smartphone and App.

Over the course of the project various PAHWS did not take part in training or assessment due to competing work requirements. Given these issues, accurate pre-post assessment is difficult to perform. Therefore, descriptive accounts of the resulting information to show general trends within the data are provided. The tools used to collect the data were self-reports of usage, attitudinal questionnaires and performance data on simulated tasks.

One month after getting the smartphones, in July 2013, the PAHWs’ self-reported usage of the App varied between 2-3 times per day to 1-2 times per week for seeking information on poultry raising; however at this time, the PAHWs reported rarely sharing this information with farmers (5/19 PAHWs).

Nineteen out of the 22 PAHWs who attended the June training participated in the final face to face smartphone evaluation (August 16th 2013).

By this time, after 2 months of use, 14 out of 22 PAHWs reported that they used the App more than 4 times or more per week for their personal knowledge and 19 out of 22 said that they used it to share information with farmers. In those cases where it was shared, the PAHWs reported that data was for feed and feeding information (5/22 PAHWs). Of the PAHWS who reported using the SMS function, 18/22 reported using it to contact team members with the greatest frequency being 6 times over a week. Nineteen of the 22 PAHWs used it to contact other PAHWS, three of which indicating that they used it 10 or more times/week to contact fellow PAHWS.

For the overall evaluation questions, all nineteen completed each task; however, there were 3 questions out of 8 where between 1 to 5 individuals could not complete the task within the maximum authorised time of 5 minutes. It was observed that while trying to complete the tasks, those who did not succeed were unable to navigate the App successfully.

The final evaluation questionnaire (22 respondents; the three who did not attend the final evaluation were given the questionnaire later on) revealed that all respondents reported that they have used the information from the app in their daily activities. Nineteen of the 22 PAHWS reported that they used the App to solve the last poultry problem they encountered. This problem was typically a feeding/housing/egg production issue. The participants felt that the text and voice function were clear and easy to understand, yet 13 out of 22 stated that they needed to refer to the same information 5 or more times before they remembered it. This question did not specify the type or complexity of the information. The type of information that they most preferred were images followed by videos and texts. The most preferred communication method was first by phone call and then by text. Given the phone functionality (inability to call) as reported in the information above, there seems to be some difficulties in communicating given their preferred method. In terms of their preferred methods of learning about animal health, they preferred project manuals followed by discussing with a project vet followed by training/workshops.

There were some reported problems. While the PAHWS were asked about problems encountered while using the App, the most often reported problem was of not being able to use the call function. Since a lot of PAHWS
complained that they had to have two phones with them at all times, so the project team decided to allow them to use their own sim card in the smart phones. They also had problems sending photos, thus more explanations on how to take and send pictures was requested by PAHWs in the final evaluation training in August and a special training group on this topic was set up. The camera functionality of the phone was still often used, since some of the PAHWs took pictures of sick animals and showed them to mentors at later trainings to check if their diagnosis and treatment used was correct. In stories they wrote to explain when, between the first training and the final evaluation, they successfully used the App to solve a problem, one of them reported: “I also took a picture of a pig that might have had classical swine fever and of goats that had wounds in their mouth” (see appendix).

In the debriefing session on the information the PAHWs would have liked to find in the App and which was not there, three main consistent themes that arose from five different groups was to expand the application to other animals – especially cattle (4/6 groups), to cover farming practices, especially diseases and their treatment (3/5) and to include reproduction management (2/5). Those themes were also mentioned in the “comment” part of the questionnaire asked during the final evaluation in August: out of 22 PAHWs, 6 spontaneously asked for more information on cattle, 3 on diseases and 2 on reproduction management. Mr Vanththong from Thachampa wrote “I would like to have some images of symptoms for cattle, buffalo, pig and goat’s diseases and also images of artificial insemination”. PAHWs are interested in learning about the causes and symptoms of disease, but even more in learning practical procedures: choice of drugs, injection techniques and castration. Those topics are included in the trainings delivered to them, but it seems they would like to have an easily accessible reminder of all this information when they are working in the field, and a smartphone is easier to use than a manual for example.

Overall, the PAHWs reported that they learned about feed mixing and poultry housing from the application: some could remember the correct ratio to mix leaf powder and other ingredients in poultry feed without checking the App. In the “stories”, 10 out of 18 said they used it to improve housing and 9 out of 18 used it to improve feeding. The “selection and reproduction” part of the App was apparently less used by PAHWs in their day-to-day work with farmers; this could be due to the fact that selection is an issue that appears on the longer term and cannot be solved straight away in a farm, so more difficult to apply for PAHWs. Even if poultry diseases and vaccination were not explained in detail in the App (focused on farming management), 4 out of 18 still advised farmers about disease prevention; one of them reported “I have told farmers how to take care, feed and vaccinate chickens, based on the knowledge that I found in the app”. This can mean that a single line in the App on the vaccination of newly hatched chicks has been remembered by some of the PAHWs, or that they managed to complete the content of the App with their own knowledge that they got from other types of training.

Participants unanimously agreed (22/22) that the app has been a good tool for communication with farmers, mainly because the information in the App is of easy access to farmers thanks to the pictures, videos and voice. The mean rating on the effectiveness of the app was 4/5 (SD 1.36) suggesting that PAHWs felt that, despite some of the technical challenges, they gained valuable information which positively impacted their perception of the effectiveness of the tool.

Technical challenges
Difficulty in downloading the app via internet was a major challenge. The downloading process was thus altered to accommodate the issues experienced. Due to limited/slow internet connections in Laos, and the frequent failed connections, the app is now downloadable on the computer and can be transferred manually to the phones through a USB connection. The download is 33.8 MB. It includes two elements; the .apk file (1.8 MB) and the asset folder (31.9 MB). The app itself is only 1.8 MB.

An optimal internet connection would be a modestly fast DSL or cable connection that offers approximately 2mbps. This would typically allow the download to take approximately 6 minutes.
Another challenge faced locally was that not all the SIM cards purchased were functional, and these needed to be replaced. Luckily sim cards are inexpensive (approx. CAD 1.20 per card) although the environmental ethics around wasted sim cards are an issue.

The Lao script was not available on all phones purchased. It was necessary to download the font in order for the dynamic text in the app to be recognized to allow for improved usability for the PAHWs. The native keyboard on the majority of the phones was Thai, and was therefore not user-friendly for the majority of the PAHWs. Downloading the appropriate font allowed for the PAHWs to communicate with each other through SMS easily, although not all the phones had this function. These are being checked with the supplier.

**Project implementation and management**

*Technical issues*

Some of the technical challenges of the project have included developing appropriate measurement tools for the PAHWs’ use and interest in the app and smartphones. Although it was fairly easy to train them to use the phones and the app, and to see that they are very interested in using them, it has been difficult to create an easy tool to accurately assess which aspects are most useful. This is partly because there is a cultural bias towards giving positive over negative feedback. A solution to this challenge would be for all the phones to be connected to the internet (eg. on 3G) to be able to track PAHWs’ use automatically.

Following from that, the project structure included data analysis by partners removed from the project, which allowed for gaps in understanding. Should this model be replicated, more effort would need to be made to ensure the data analysts have a clearer familiarity with PAHWs’ work and village life.

One challenge in the project has been the socio-economic issue of providing high-value phones to project participants, the risks of creating jealousy by other types of project beneficiaries and partners, and the opportunity costs of using funds for such activities over other more direct income-generating interventions. It could be argued that a lower-value phone should have been sourced, and/or that the project could have tried to work with developing tools that people could use with their existing phones.

Finally, despite transparent explanations about the scope of the project, PAHWs are obviously enthusiastic about further development of the app and use of the phones. Ideally the project would like raise further funds for this, although at the current time is not aware of possible funding sources.

**Partnerships**

LifeLearn, VWB, NUOL and the University of Calgary have worked in partnership to develop a pilot application and explore whether smartphones are a well-adapted medium for providing training and capacity building in the context of a primary animal health care model. VWB also had discussions with Telecoms Sans Frontieres about possible applications of the research results in future.

Internet.org has expressed an interest in the story of how farmers use smartphones and the internet; this is currently being researched.

Two team members also attended Epihack, a training/hacking event in Phnom Penh, Cambodia, on the 6th - 8th of August 2013, run by the Skoll Global Threats Fund, and have been invited to present the results of the App evaluation at a future Epihack event in Laos. The event provided participants with an understanding of how to use several digital tools (regular phones, smartphones, mapping software) for diseases surveillance in Southeast Asia. Human and animal health specialists and developers worked together on how to use, improve or adapt already existing tools to the local context. The project team members worked on two different
projects: Verboice, a hotline tool which can be used on regular cellphones to deliver but also collect information from respondents; and ILI surveillance, a web-based reporting system for Influenza-like Illness in Thailand in order to detect trends of flu outbreaks. This workshop was a good opportunity for the team to identify potential ways to maximize the utility of mobile phone devices for community-based information sharing.

**Expenditure**

The financial report is available separately. The major costs in this project have been: purchase of the smartphones, and human resource for developing the app, and doing research, training and evaluation with users. LifeLearn donated over 1000 hours into the development of the app. The time invested was put towards research and development, design, programming, content writing and creation, and trouble shooting. LifeLearn would require an additional 350 hours to develop the phone-based survey and an enhanced SMS-based communication setup (approximation only).

**Capacity building**

The project has increased basic skills amongst NUOL and VWB staff in using smartphone technology. This is complimented by a keen interested amongst NUOL staff and PAHWs to become more familiar with, and have access to smartphone technology and mobile internet access. The project has also built the capacity of LifeLearn to develop technology adapted to a rural, developing country context, which is an important skill-set if mobile and internet technology is to expand to these markets.

The core team from NUOL and from LifeLearn include a female coordinator, project manager and female veterinarian. Although this was not explicitly intended, it is providing a model for much needed capacity building and transferable skills for women in developing countries and building ICT leadership skills amongst local NUOL staff.

**Impact**

It has been well documented that limited animal health services in remote, underserviced areas poses a significant challenge to improving food security and the livelihoods of those reliant on livestock. This knowledge mobilization project was born out of the need for new tools to support and train primary animal health workers (PAHWs) and the institutions supporting them. Skilled and knowledgeable PAHWs can help provide effective animal health information in areas where veterinary infrastructure and resources are deficient. However, access to relevant and timely information is a major challenge for PAHWs and organizations working with them. The results show that PAHWs are willing to learn how to use new technologies, curious about the potential of smartphones, and positive about the usefulness of the App as a tool for learning and reference about poultry. There is still much potential for developing the scope of mobile-based technologies for community-based learning and communications.

**Recommendations**

Given the positive results of the App so far, the project partners and participants (PAHWs) are interested in further developing the results of this project. Recommendations for future developments include:

- Develop Apps for other animals (especially cattle) and measure its effectiveness
- Determining the impact of internet use to the phones: with the assistance of a consultant/ICT specialist, spend time with the team to determine appropriate ways to use internet with the phones, and to maximize the use of photo sharing and other relevant functionalities to improve animal health
• Explore functionalities such as note-taking for PAHW roles, eg. whether recording farms visits via smartphones would be more effective than notebook-based recording (currently used)
• Extend use of app to other poultry training related activities
• Improve use of app during project training and pahws’ extension work
• Determine effectiveness of an sms-based communications systems for PAHW information exchange, eg. with an SMS template for PAHWs to fill out on cases (symptoms, pictures, history of animals...)
• Develop a system for using and sharing photos – eg of animal health cases
• Develop survey tools for use on phones for animal health recording by PAHWs and project team

Bibliography of project outputs

App: Dynamic Mobile Training for Community-Based Animal Health Workers

Knowledge mobilization website: training.vetswithoutborders.ca

Online articles


Blog entries

• http://blog.vetswithoutborders.ca/2012/05/02/mobile-technology-research-sheds-light-to-efficient-poultry-feeding
• http://www.lifelearn.com/2012/10/mobile-apps-serving-mhealth
• http://blog.vetswithoutborders.ca/2013/03/11/smart-pahws-with-smartphones
• http://blog.vetswithoutborders.ca/2013/07/03/an-app-etite-for-innovation/

Presentations

Lifelearn and VWB delivered a presentation at the Global Development Conference; May 2012, Guelph ON Canada (http://www.ovc150.ca/en/celebrate/Global_Dev_Sym_2012.asp) (see appendix)

Printed materials

• Lifelearn represented the project and presented a poster at the Tech4Dev International Conference; May 2012, Lausanne, Switzerland (http://cooperation.epfl.ch/2012Tech4Dev )

• Epihack : Information leaflet for networking event
Appendix I: PAHWs’ smartphone stories

Self-reported stories written by PAHWs about their use of the app, August 2013

1. After I got a Smartphone, I have seen an example about chicken production, and then I gave some advices to farmers. E.g. how to do good feed and feeding for them and how to clean the animal house.

2. I took the app. in the Smartphone to show other farmers such as my neighbourhood and others, to they see how to mix the feed and making housing. I also take a picture of classical swine fever and goats that hurt their mouth. However, I don’t know how to save as video; therefore I cannot show to the project team.

3. I have found the animal house is not be standard and the feed is not enough, then I give advice to farmers how to making house and correct/good feeding.

4. In the app., it can help me to know about chicken housing better than before. I found some farmers don’t do a good care and based on natural mainly. I have told farmers how to take care, feeding and vaccination for chickens, based on knowledge that found in app.

5. I found the many small chicks died at the same time and all eggs cannot be hatched. Based on the app. I have given advice about making chickens houses.

6. I found some problems in the village and in the house during raining season, the duck and chickens have diseases, diarrhoea, unhappy and have white faeces , theses could be because the animal house and floor is too wet. The place of animal house used to be a disease occurred previously. For solution, I advise farmers to separate sick animals from healthy animals, and use lime to spray in the animal house area, they should change the place for building the new animal house and should do cleaning.

7. I took the information from Smartphone to tell farmers about housing, feeding and vaccination.

8. I took the Smartphone and show the information for farmers to see how the chickens growing well and without diseases; If we have good pens, it will prevent the animals from diseases; also we should give more feed for chicken to growing more.

9. Smartphone is very useful , e.g. during 2 months, I found the problems in other farms about hatching and taking care small chicks, then I help them by explanation and open the app. for farmers. However, there is a weak point in the Smartphone that can send only SMS that sometime is not as quick as I need.

10. As the recommend in app., I know about chickens raising methodologies such feeding, housing, nest, how to mix the feed to make chickens growing well. I also give advice for farmers when I see their chickens are thin that they should make a good feed for them.

11. During past 2 months I used a Smartphone many times. I used the app. around 5 times per day to see many methodologies; I recommended to farmers and showed video about how to mix the feed for chickens around 10 times.

12. Normally, the chickens systems of farmers are based on natural: no pens and let the chickens sleep on the trees, and feed with only rice and paddy. Therefore, I used information from app. and tell farmers about how to feeding, housing, take care small chicks and if we would like the chickens have a lot of eggs and have big size, we should give them a good feed.

13. I recommended my friends about feeding, mixed feed and diseases prevention base on information in app.

14. I have seen the chickens that are belong to my neighborhood have not enough feed, which make their chickens died. So, I recommended them to do as the information in app.
15. I found the chickens systems of farmers are based on natural, the feeding is not correct, lack of breeding selection and don’t take care their chickens.
16. When I went to visit farmers’ farms to do vaccination and castration for pigs, I found the house of chickens is not standard: have dirty water during rainy season. So, I gave some advice for them about housing that based on information from app. that they should make the pens in higher area, good air condition and take the rice hush to floor.
17. I didn’t see any problems.
18. I found that some chickens have diarrhea around 2 days and then died, I don’t know how to solve that problems. I also found the 3 weeks chickens died when farmers took them for scavenging.