Technical Report For Integrating Field Data Collection Concepts and Data management for commercial poultry farmers in Uganda

Prepared by

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Abstract

1.1 Abstract

The main objective of the study was to evaluate the current recording system and information flow among commercial poultry farmers, and how ICT has been used as a tool to bridge the gap of information deficit. The research made reveals that the current recording system is poor and there is a gap in the flow of information among the stakeholders of commercial poultry farming. This gap has significantly contributed to the deterioration of access to extension services(Extension services are an important way to help livestock farmers to improve their lives and production methods, which in turn leads to an increased and improved poultry and poultry products) to poultry farmers. Along with other factors, this gap is also attributed to the researchers, who publish their research findings through various online journals. The gap signifies that it has been hard for extension officers to fulfil their roles due to a large number of farmers they serve and the challenge of traveling long distances to deliver such services to farmers. Based on the results of this analysis, the paper concludes with a set of identified approaches on how ICT can play a part in minimizing the gap that has been found for increasing the efficiency of the extension services in reaching poultry farmers.

Introduction

2 Introduction

Information and communication Technologies (ICT) are considered to bring economic and social development, with the benefits of reaching even those who do not themselves have first-hand access to them[1].ICT can enhance knowledge sharing and improve access to information [2]. While in agriculture, extension officers are responsible in conveying knowledge and scientific findings to rural areas for the purpose of improving the lives of poultry keepers [3]. In other term are refered as intermediate channel between commercial farmers and their contract farmers. Apart from that, they also involve in animal husbandry, help farmers to create working groups and cope with other challenges such as marketing [4]. In delivering extension services (animal husbandry), extension officers also need information from farmers, such as animal profile information to give informed advice, hence farmers' recording keeping is crucial aspect in delivering extension services. Record keeping for livestock is a task of collecting, maintaining, and utilizing collected records [5]. Collected data from farmers is used as a management tool to undertake extension services, performance evaluation, keep proper health records, accurately measure production and reproduction, and perform other important management functions required to run an effective and efficient farm enterprise [6].In capturing data there are number of steps including recording on the form or computability devices, scanning the written document. And data to be stored can be in written form, image, videos or audio [7]. But in keeping records it is very important to consider how data will be extracted later on. Computer is among the tool which facilitate easily storage and retrieve of information compare to paper based.

Since last few years the growth of the telecom industry had increased sharply. The mobile services are becoming cheaper and so are the mobile handsets/tablets. A simple android mobile handset contains all the features like a camera, GPS, internet access, Wi-Fi, typing options, sufficient memory and processing power. These mobile sets are cheap and easy to procure. No specialized training has to be provided to the user to operate them. The current practice for projects like collecting information from the contract poultry farmers is that it is paper-based and takes a lot of additional resources like camera, GPS and stationary. Also trained manpower is required to collect and process the data. There are various software tools which can help in collection, processing and management of data using a mobile device. Some examples are FrontlineSMS, RapidSMS, GeoChat, EpiSurveyor, SMS Tool Kit, MobileResearcher, Populi.net, Nokia Data Gathering. This paper reviews the Open Data Kit (ODK) for mobile data collection and using a private server as the centralised database which stores the collected data.

2.1 User Challenge

Survey design: Sometimes the excitement about a new technology leads to an increased focus on the technical aspects of a survey, at the expense of designing the survey itself conceptually. Often, such a shift in focus means that creating a complex form logic is perceived as the key to a good survey while other important elements, such as defining the goals of the survey or questioning the ethics of questions are neglected.

Survey coding: Unlike paper surveys, MDC surveys require that someone implements the desired skip logics and other restrictions on data entry, usually through some visual form builder or template that will provide the smartphone application with the instructions as to how the survey should behave. There is a learning curve associated with the acquisition of these skill and some level of competence is required to be able to reap the full MDC potential with regards to data quality.

Hardware failure: Applications can bug, mobile devices can break, run out of battery and their batteries are particularly sensitive to high or low temperatures. Replacement devices, paper forms as backup, car chargers and battery packs can mitigate these issues, but in many cases, a severe hardware failure will mean that an enumerator cannot continue her/his work until she/he has returned to the office. In some cases, the data stored on the device might be lost as well.

Lack of connectivity: Most MDC solutions, in this case ODK collect; require an active internet connection to synchronise data, which can add issues to the deployment of MDC. Given that this report is primarily intended for collecting data from poultry farms in real time, internet connection will be required.

Familiarity with the technology: While smartphone literacy is increasing steadily, this is not the case across all demographic groups and geographic zones. Smartphone literacy can be an issue especially in surveys where, for example, enumerators should be older because the survey is aimed at the farmers who might be elderly or illetrates.

2.2 Project Goals

ODK (Open Data Kit) an open-source suite of tools; has been used in this project and with its help data can be collected and sent to a centralized server using internet connected android devices in real time. The project provides information about the ODK toolkit, its features and its advantages to commercial poultry farmers. It Describes the development, implementation, and evaluation of a mobile device-based system to support Extension services. In the best case, making decisions based on limited, outdated, incorrect or no information at all means that time and money is lost. The projects opens up on how Mobile Data Collection (MDC) can help improve the

quality of data, information, analysis and decision making. By using ODK, organizations can collect data faster and with fewer errors than on paper.
Real time geo-coded evidence based data in the form of images, GPS point and text which will help in faster decisions, transparency and monitoring of various development projects in cheap and fast manner is expected.

2.3 Definitions, Acronyms and Abbreviations

Acronym	Definition
MDC	Mobile Data Collection
GPS	Global positioning System
ODK	Open Data Kit

Project Results

3 Project Results

3.1 Product Design

Server Side:
ODK Aggregate (web server, aggregate application and MySQL database) installed on a server with a fixed IP address.(10.1.3.101) fig 4
Client Side:
ODK Collect application installed on the Android based mobile/
tablet having Camera, GPS and GPRS connection.

The methodology of data collection work is as follows:

i. Decide the data to be collected and create a form by logging in at “http://build.opendatakit.org”. Final form in the form of a XML file can be downloaded in the (/odk/forms folder) mobile device or uploaded on the Aggregate server. Fig 1

ii. Download the ODK collect in your Android mobile device. In the settings option set the server address to the aggregate application on the server. Also, download the form from the server if already not

downloaded. Now use the fill blank form option to fill all the details in the form and if finalized can send the finalized form to the server or save it on the mobile itself. There are options to edit and delete the saved forms.refer to fig 2

iii. Install the ODK aggregate locally on a Tomcat server backed with a MySQL or PostgreSQL database server. The step by step help will guide to install and configure the database to receive the data sent from a mobile. There is a main window on which the data sent by the mobile can be seen (Fig. 4). There is option available to convert that data in CSV or KML format so that it can be viewed in Google earth if location is available. There are options to set various user permissions and view that data in the form of graphs also. The mobile user will send the filled finalized form through the mobile device(with GPRS connectivity) which will be received in real time by the ODK aggregate server application running on the a server with a fixed IP address. The communication process is as shown in the Figure 5. The data will be stored in the MySQL or PostgreSQL database. If in case there is no GPRS connectivity the forms can be filled and stored on the mobile can be sent when there is connectivity or ODK Briefcase application can be used to transfer data from Collect to Aggregate.

3.2 Product Functionality and Screenshots

The various modules of ODK are:

- ***ODK Build***: It is a form designer with drag and drop interface.

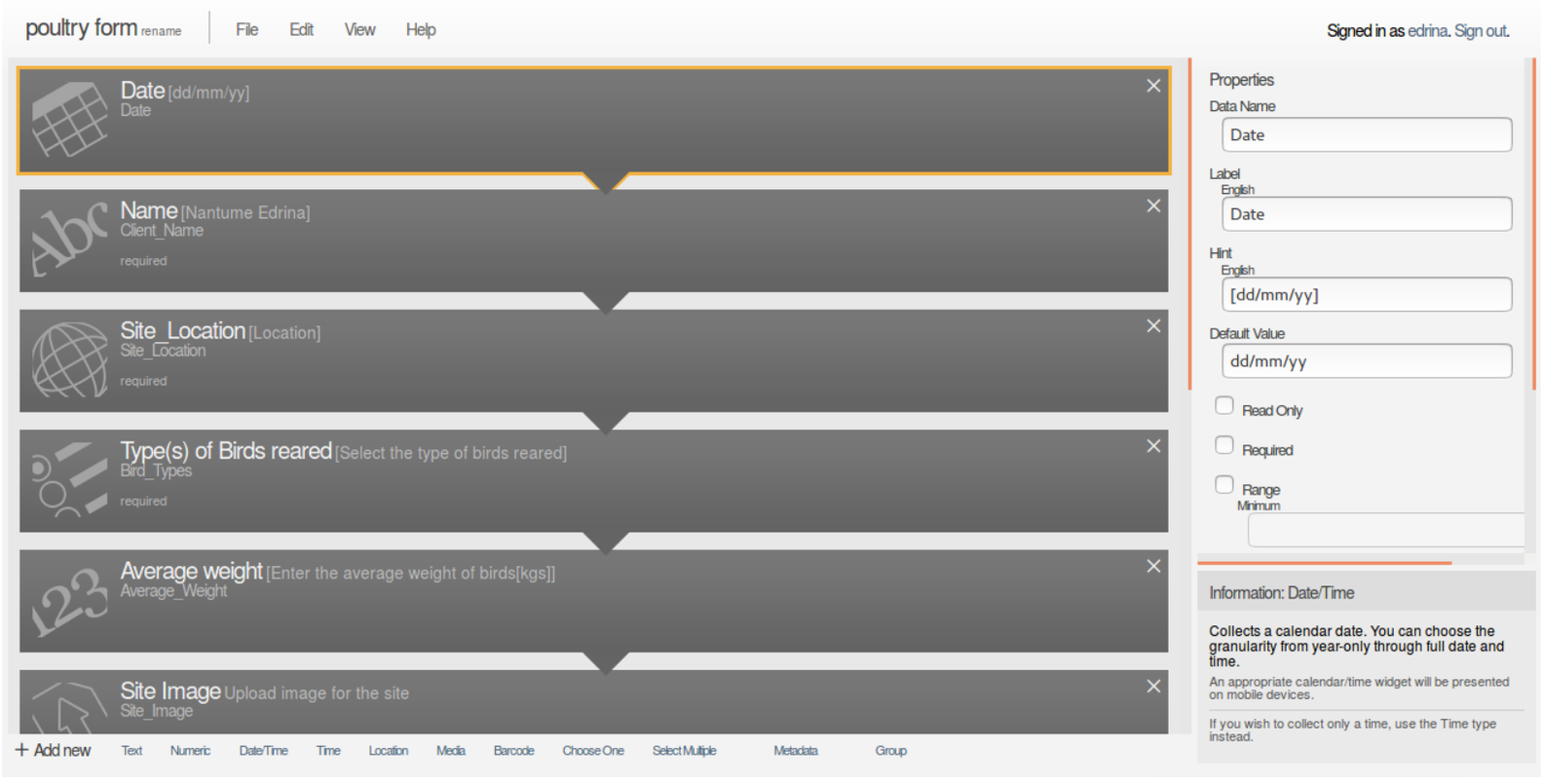


Fig 1

- ***ODK Collect***: It is an app that is installed on the Android mobile. The form created in ODK Build is loaded in it. It has options to accept text, image, video, barcodes, location, options etc through the form. It connects to the centralized server to store that collected data.

Main Menu

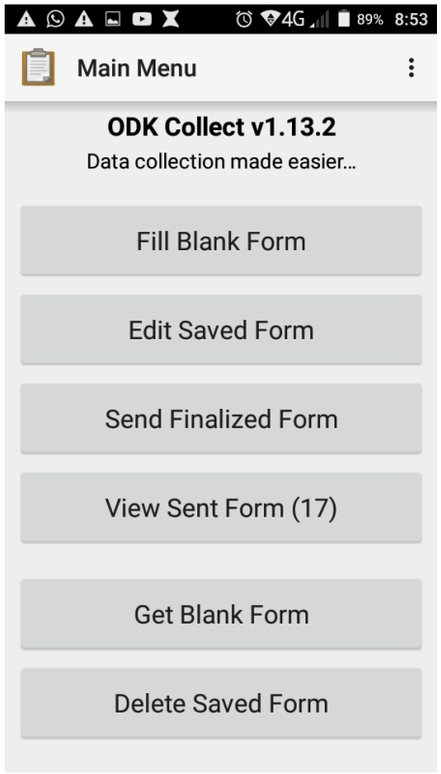


Fig 2

Finalized form: This is sent to the aggregate server which is later passed on to the local server.

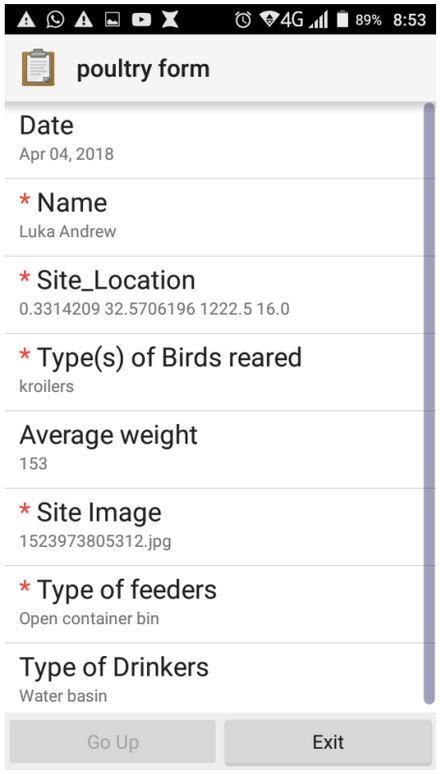


Fig 3

• ***ODK Aggregate***: It provides a ready-to-deploy server and data repository to provide blank forms to ODK collect, accept finalized forms and store the data in the database, visualize the data in maps and charts and export data into various formats. ODK Aggregate can be deployed on Google's App Engine or on the local users server.

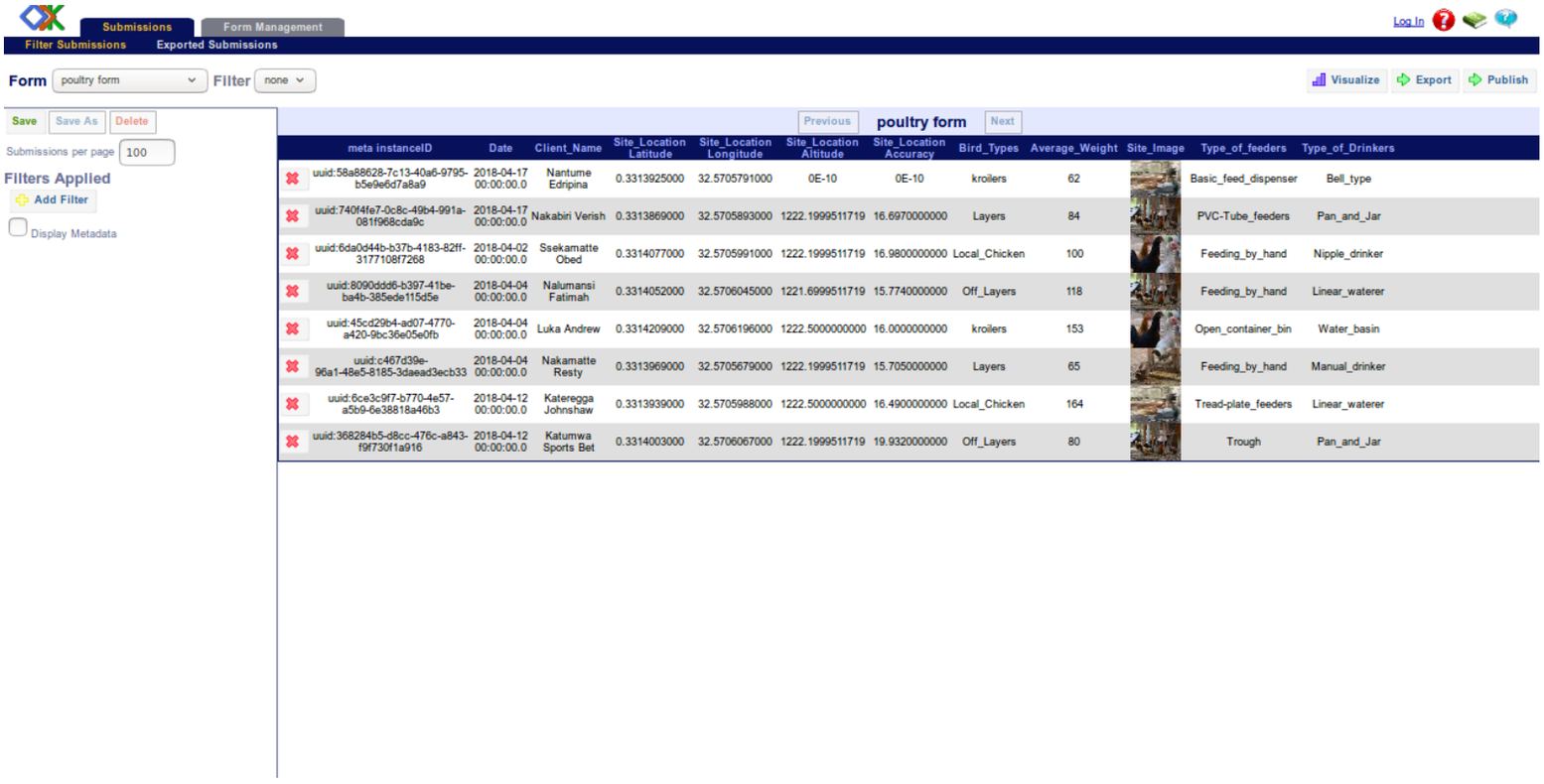
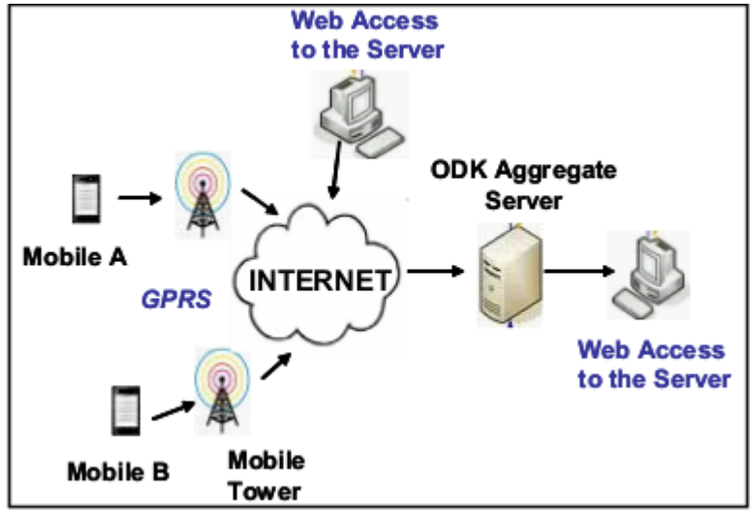


Fig 4

• ***Centralized server***: It is synchronised with the ODK aggregate to receive data that has been collected by the mobile devices in real time.

Fig 5



- ***Apache Tomcat:*** Is an open source web server and servlet container developed by the Apache SoftwareFoundation. Basically, it implements the Java Servlet and the JavaServer Pages (JSP) specifications from Sun Microsystem, and provides a "pure Java" HTTP web server environment for Java code to run in. This will help us host our aggregate server ie the .war file created after running the ODK aggregate setup so as to be accessed on the web.

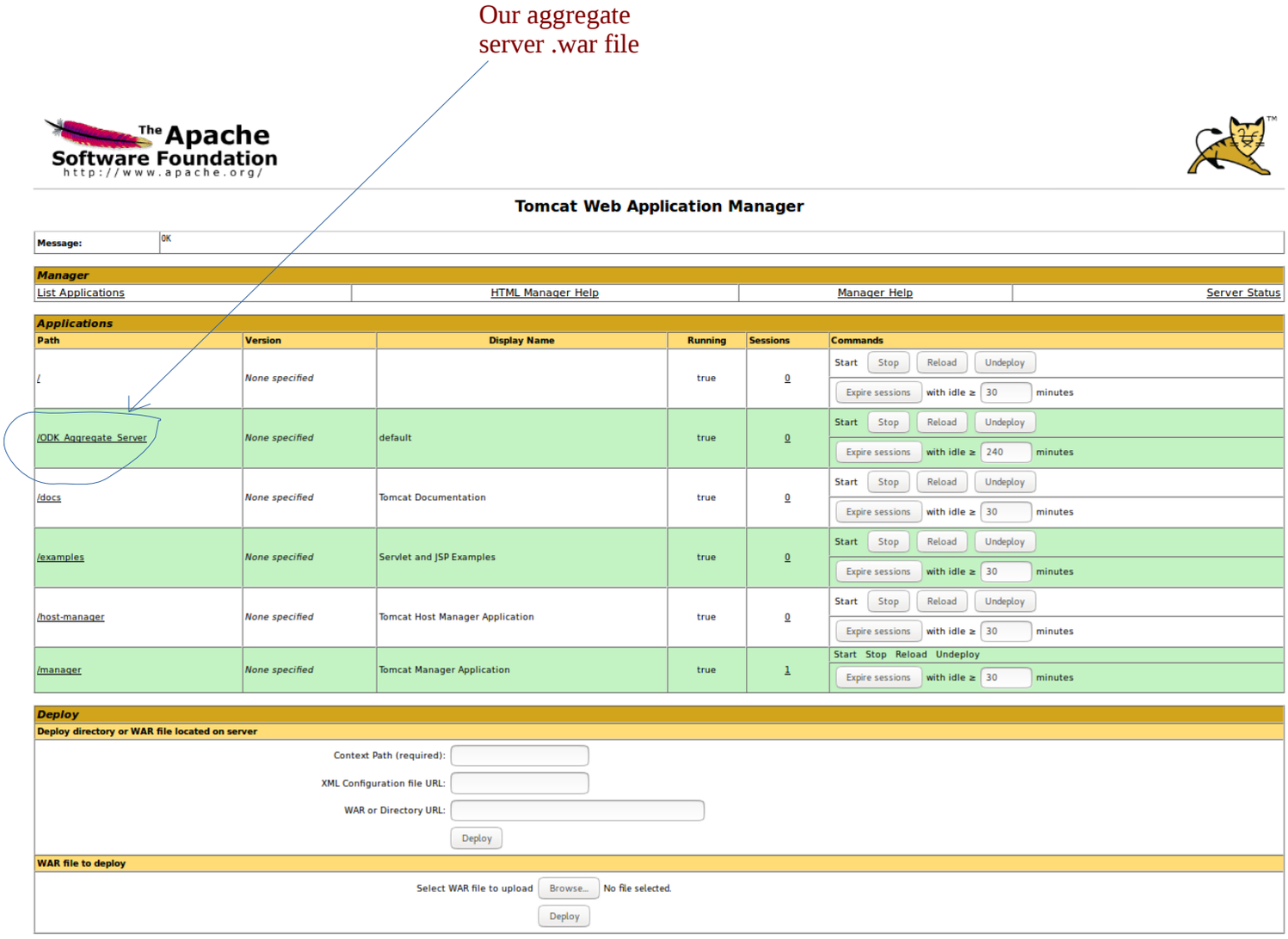
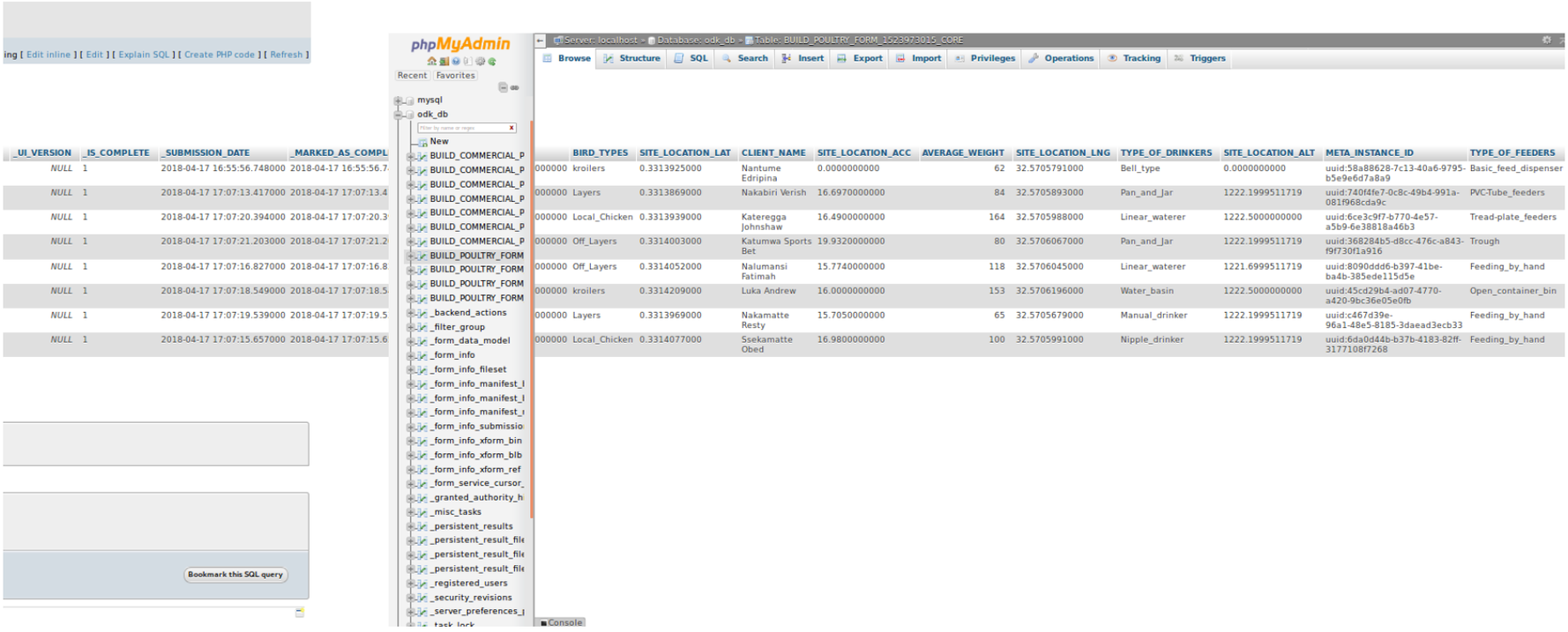


Fig 6

- ***Phpmyadmin:*** phpMyAdmin is a free and open source administration tool for MySQL and MariaDB. As a portable web application written primarily in PHP, it has become one of the most popular

MySQL administration tools, especially for web hosting services. This will help us get access to the mysql database on our server where the data from the ODK aggregate is exported.



_UI_VERSION	_IS_COMPLETE	_SUBMISSION_DATE	_MARKED_AS_COMPL	BIRD_TYPES	SITE_LOCATION_LAT	CLIENT_NAME	SITE_LOCATION_ACC	AVERAGE_WEIGHT	SITE_LOCATION_LNG	TYPE_OF_DRINKERS	SITE_LOCATION_ALT	META_INSTANCE_ID	TYPE_OF_FEEDERS
NULL	1	2018-04-17 16:55:56.748000	2018-04-17 16:55:56.7	kroilers	0.3313925000	Nantume Edripina	0.0000000000	62	32.5705791000	Bell_type	0.0000000000	uuid:58a88628-7c13-40a6-9795-b5e9e6d7a8a9	Basic_feed_dispenser
NULL	1	2018-04-17 17:07:13.417000	2018-04-17 17:07:13.4	Layers	0.3313869000	Nakabiri Verish	16.6970000000	84	32.5705893000	Pan_and_Jar	1222.1999511719	uuid:740f4fe7-0c8c-49b4-991a-081f968cda9c	PVC-Tube_feeders
NULL	1	2018-04-17 17:07:20.394000	2018-04-17 17:07:20.3	Local_Chicken	0.3313939000	Katerega Johnshaw	16.4900000000	164	32.5705988000	Linear_waterer	1222.5000000000	uuid:6ce3c9f7-b770-4e57-a5b9-6e38818a46b3	Tread-plate_feeders
NULL	1	2018-04-17 17:07:21.203000	2018-04-17 17:07:21.2	Off_Layers	0.3314003000	Katumwa Sports Bet	19.9320000000	80	32.5706067000	Pan_and_Jar	1222.1999511719	uuid:368284b5-d8cc-476c-a843-f9f730f1a916	Trough
NULL	1	2018-04-17 17:07:16.827000	2018-04-17 17:07:16.8	Off_Layers	0.3314052000	Nalumansi Fatimah	15.7740000000	118	32.5706045000	Linear_waterer	1221.6999511719	uuid:8090ddd6-b397-41be-ba4b-385ede115d5e	Feeding_by_hand
NULL	1	2018-04-17 17:07:18.549000	2018-04-17 17:07:18.5	kroilers	0.3314209000	Luka Andrew	16.0000000000	153	32.5706196000	Water_basin	1222.5000000000	uuid:45cd29b4-ad07-4770-a420-9bc36e05e0fb	Open_container_bin
NULL	1	2018-04-17 17:07:19.539000	2018-04-17 17:07:19.5	Layers	0.3313969000	Nakamatte Resty	15.7050000000	65	32.5705679000	Manual_drinker	1222.1999511719	uuid:c467d39e-96a1-48e5-8185-3daead3ecb33	Feeding_by_hand
NULL	1	2018-04-17 17:07:15.657000	2018-04-17 17:07:15.6	Local_Chicken	0.3314077000	Ssekamatte Obed	16.9800000000	100	32.5705991000	Nipple_drinker	1222.1999511719	uuid:6da0d44b-b37b-4183-82ff-3177108f7268	Feeding_by_hand

Fig 7

3.3 Next Steps

- Fully implementing the system and put all its dependencies in place
- Making the project global through advertisements so as to be accessed widely by different commercial farmers all over Uganda

Contribution

4 Contribution

No.	Team Member	Contribution
1.	NANTUME EDRINA	System implementation Documentation
2.	SSEMUGABI HASSAN	System implementation Documentation
3	SEKASI DOUGLAS	System implementation Documentation
4	KAKOOZA ALLAN KLAUS	System implementation Documentation

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