



Horizon Sopyrwa

Final Consulting Report

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I. About the Organization

Organization

Horizon Sopyrwa is a pyrethrum extracting and refining company located in Musanze, Rwanda. Pyrethrum is a flowering herb which possesses a natural substance called “pyrethrins”. It is important in different formulations of natural insecticides used in crop, animal protection and human health. The pyrethrum world demand is far higher than the supply. Due to increase awareness on the side effect of synthetic insecticides, more consumers are switching to organic products.

Horizon Sopyrwa gets the supply of pyrethrum from more than 30,000 farmers growing pyrethrum on about 3,000 ha in rotation with other crops. Farmers are organized in 23 cooperatives to grow, to harvest and to dry pyrethrum.

Currently, Horizon Sopyrwa has 78 permanent employees and 140 temporary employees. The last annual revenue of Horizon Sopyrwa is 4.3 million US dollars. The target customers are 15 companies which are formulators of pyrethrum based insecticides and suppliers of refined extract to other formulators of natural insecticides.

The market share of Horizon Sopyrwa is 20%. Its key competitors are Pyrethrum Board of Kenya (PBK), Botanical Resources of Australia (BRA), Pyrethrum Company of Tanzania (PTC), HongHE Senju Biological Company of China. All these companies are producers of pyrethrum and have more land than Horizon Sopyrwa, thus can produce high volume of raw material and refined product. They may influence the price of pyrethrum on international market.

The mission of Horizon Sopyrwa is:

To create value to our stakeholders through supply of high quality pyrethrum products to the local and international markets

Horizon Sopyrwa has a good IT foundation compared with other companies in Rwanda. Every office here has at least one computer. And Sopyrwa has its own server and Local Area Network. In information management aspect, they have already started to use SAP Business One to integrate their business processes. But they still have problems in internal communication, data management and business processes automation. Our mission is to help them better use the IT infrastructures and solve the current problems by the use of IT.

Facilities

The area that Horizon Sopyrwa operates on consists of two parts: Administration Area and Factory Area. Administration Area has all the offices of supporting departments of the company, including General Manager Office, Finance Department and Crop Production Department. Every officer there has a computer. The office of IT department is where the server and network infrastructures are placed.

Factory Area has 6 separate units: grinding, boiling, extraction, refinery, maintenance and laboratory. Each unit has its own building. Managers and supervisors have computers and all

computers can get access to the Internet. Besides those buildings, there are two green houses for pyrethrum growth testing on the yard between administration area and factory area.

Since the power supply in Rwanda is not stable, power outages happen sometimes. It may suspend production. But, UPS (Uninterruptible Power Supply) connected to computers and servers ensures that data loss does not happen.

Units

Horizon Sopyrwa has 5 units in its product line. The main responsibility of the grinding unit is to grind dry flowers. Extraction unit then extracts the powders from grinding and get intermediate product with the pyrethrin content of 30%. Refinery unit refines the intermediate product from extracting unit and get the final product with the pyrethrin content of about 70%. To make sure all products have the same pyrethrin content, refinery unit with mix the 70% product with ISOPAR M and make the pyrethrin content to 50%. Boiling unit provides steam to both extracting and refinery processes. Laboratory unit tests samples from each process in the product line to control the quality.

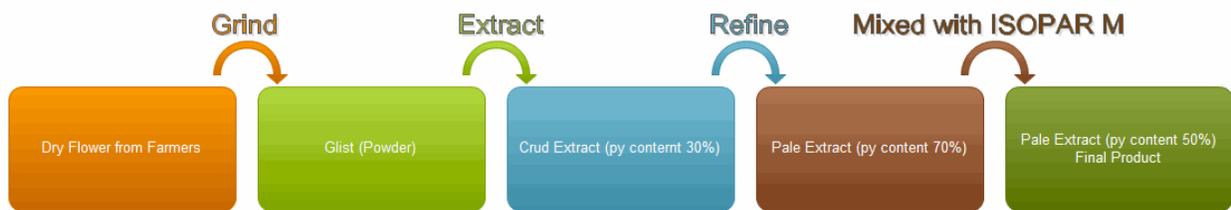


Figure 1 Production Process

All information in the product line is manually recorded. Only important information from them will be input into Excel sheets and SAP Business One (mostly finance related data in product line) daily. Sales and Marketing Officer receives orders from clients before season. When the product is produced, the production department will inform Sales and Marketing officer and Finance Department. Then, shipping and payment will be arranged. Most information in Sales & Marketing and Finance is recorded in SAP.

Staff

In Horizon Sopyrwa, there are 4 main departments: General Manager Office, Finance Department, Factory Production Department and Crop Production Department. General manager is responsible for all the operations in Horizon Sopyrwa.

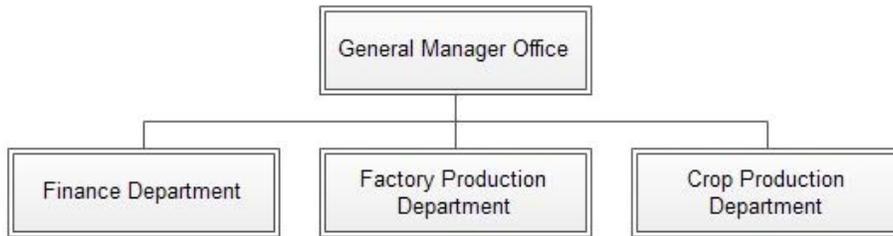


Figure 2 Company Hierarchy

In General Manager’s Office, the hierarchy is as follows:



Figure 3 General Manager Office Hierarchy

Most officers in this office use Microsoft Word and Excel to work. The General Manager and Sales & Marketing Officer will have access to SAP Business One to deal with clients’ orders and finance related activities. The IT Technician is the only IT officer in the company. He deals with all the IT related issues and manages the server and LAN.

The hierarchy of Finance Department is as follows:

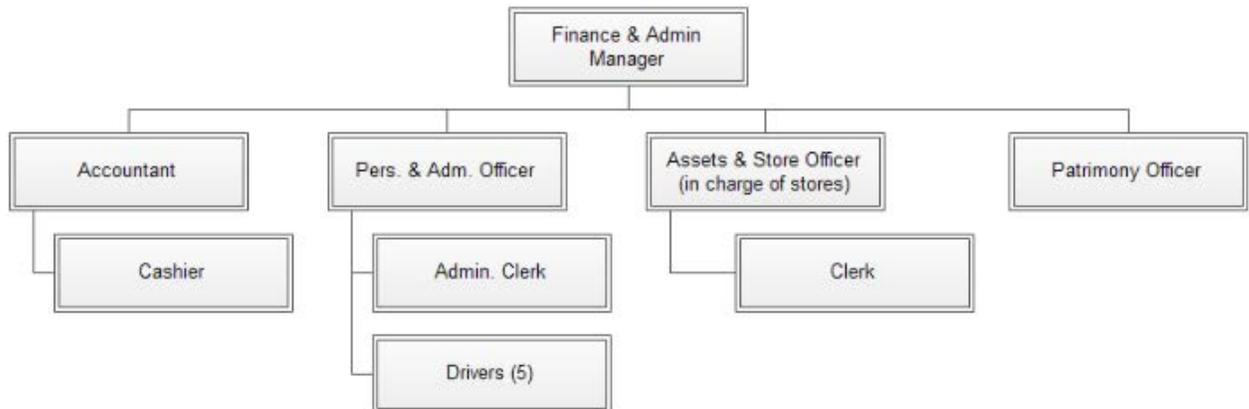


Figure 4 Finance Department Hierarchy

In Finance Department, every officer uses SAP Business One and Microsoft Excel to do their work. The hierarchy of Factory Production Department is as follows:

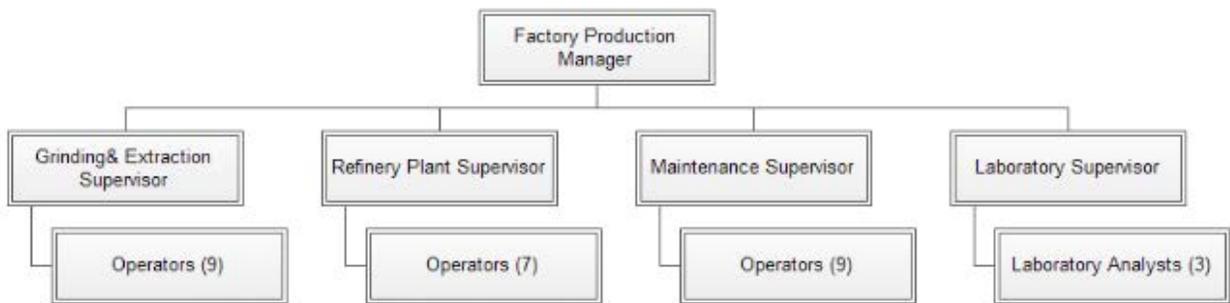


Figure 5 Factory Production Department Hierarchy

Factory Production Manager is responsible for all operations in the factory. Manager, all supervisors and laboratory analysts can get access to computers. They mainly use Microsoft Word, Microsoft Excel and SAP Business One to work. Now, they need a 2D or 3D design software like Solid Works for parts maintenance. All operators do not use computer.

The hierarchy of Crop Production Department is as follows:

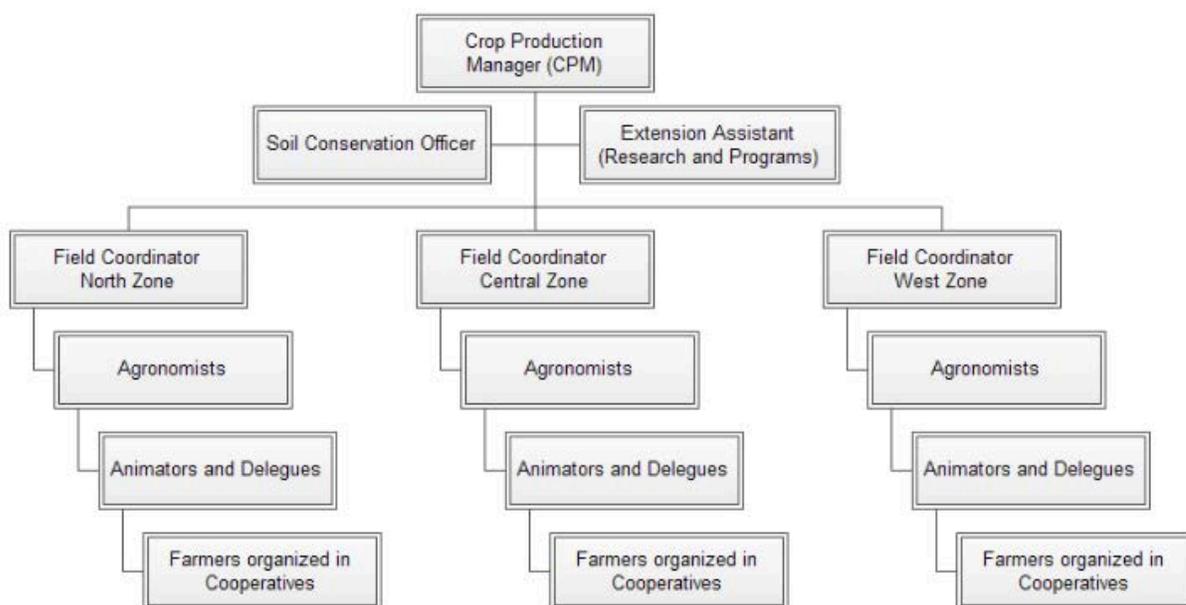


Figure 6 Crop Production Department Hierarchy

Crop Production Department is responsible for planning and developing the pyrethrum agriculture and conduct farmers’ growing activities. Raw information is collected by delegates from farmers. Delegates process information and provide a report to animators. Animators process the information and report to agronomists. And then, agronomists report to field coordinators. Field coordinators report to Crop Production Manager. In this department, manager, assistant and field coordinators can get access to computers. They mainly use Microsoft Word and Microsoft Excel.

There is no regular IT training in the company. ABC Rwanda is responsible for all SAP training in Horizon Sopyrwa.

Table 1 Officers' Responsibilities and IT use

Related Department or Officer	Responsibilities:	Software Used
General Manager	<ul style="list-style-type: none"> • Manage all the activities • Make strategies • Monitor operations • Communicate with clients 	<ul style="list-style-type: none"> • Excel • Word
IT Technician	<ul style="list-style-type: none"> • PC support • Network support • Data backup • Software installation and update • Make IT plans 	<ul style="list-style-type: none"> • Excel • Word • Microsoft Server 2008 • SAP Business One • Any other needed software
Finance Department	<ul style="list-style-type: none"> • Auditing and Tax 	<ul style="list-style-type: none"> • Excel

	<ul style="list-style-type: none"> • Payment • Payroll • Payment collection 	<ul style="list-style-type: none"> • Word • SAP Business One
Crop Production Department	<ul style="list-style-type: none"> • Organize farmers to grow pyrethrum • Collect information of farmers • Collect farmers' activity information • Do growth trials and soil tests • Provide agricultural support to farmers 	<ul style="list-style-type: none"> • Excel • Word
Factory Production Department	<ul style="list-style-type: none"> • Grind, extract and refine pyrethrum • Organize and manage all production activities • Machinery maintenance 	<ul style="list-style-type: none"> • Word • Excel • SAP Business One
Laboratory	<ul style="list-style-type: none"> • Analyze py content and moisture content of the products from each process • Quality control 	<ul style="list-style-type: none"> • Word • Excel • Chemostation
Sales & Marketing Officer	<ul style="list-style-type: none"> • Contact clients • Manage orders • Plan marketing • Study competitors 	<ul style="list-style-type: none"> • Word • Excel • SAP Business One

Technology Infrastructure

Horizon Sopyrwa has one server and 28 PCs. The Operation Systems Sopyrwa is using include Windows Server 2008 R2, Windows XP, Windows Vista, Windows 7 and Ubuntu Linux 10.04 for some certain instances. In their laboratory, they use Chemostation with the HPLC computer. Microsoft SQL Server 2008 is used as Database Management System. Website (www.sopyrwa.com) is hosted off-site. Email is managed by Google apps.

Horizon Sopyrwa has a newly created wired (in administration area) and wireless (in factory area) Local Area Network. They have two switches, 3 access points and a router (DHCP enabled) connected with WiMax station. In terms of Internet, they use MTN (Internet Service Provider) to provide Internet with the bandwidth of 385Kbps Download/128 Kbps Upload.

From November 2011, Horizon Sopyrwa started to use SAP Business One. Now, SAP Business One is used in Finance (mainly), Factory Production, Sales & Marketing.

The bandwidth is a big problem in Sopyrwa. All the officers in Horizon Sopyrwa are sharing the limited bandwidth, so the Internet connection is quite slow. But Internet service is very expensive in Rwanda (Sopyrwa spends about 500 US dollars per month for the limited bandwidth). Horizon Sopyrwa does not have enough budgets to improve it. The bandwidth limitation makes many ICT improvement plans not possible.

Office Name	Number of PCs	Number of Printers	Number of	Access Point
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				Servers	
General Manager	6	3	1	Switch 1	
Finance	4	1	0	Switch 1	
Cashier	1	0	0	Switch 2	
Personnel & Administration	1	1	0	Switch 2	
Crop Production	7	2	0	Switch 2	
Laboratory	5	1	0	Wireless Access Point	
Factory Production	3	0	0	Wireless Access Point	
Store Officer	1	0	0	Wireless Access Point	

Table 2 Office IT Infrastructures Information

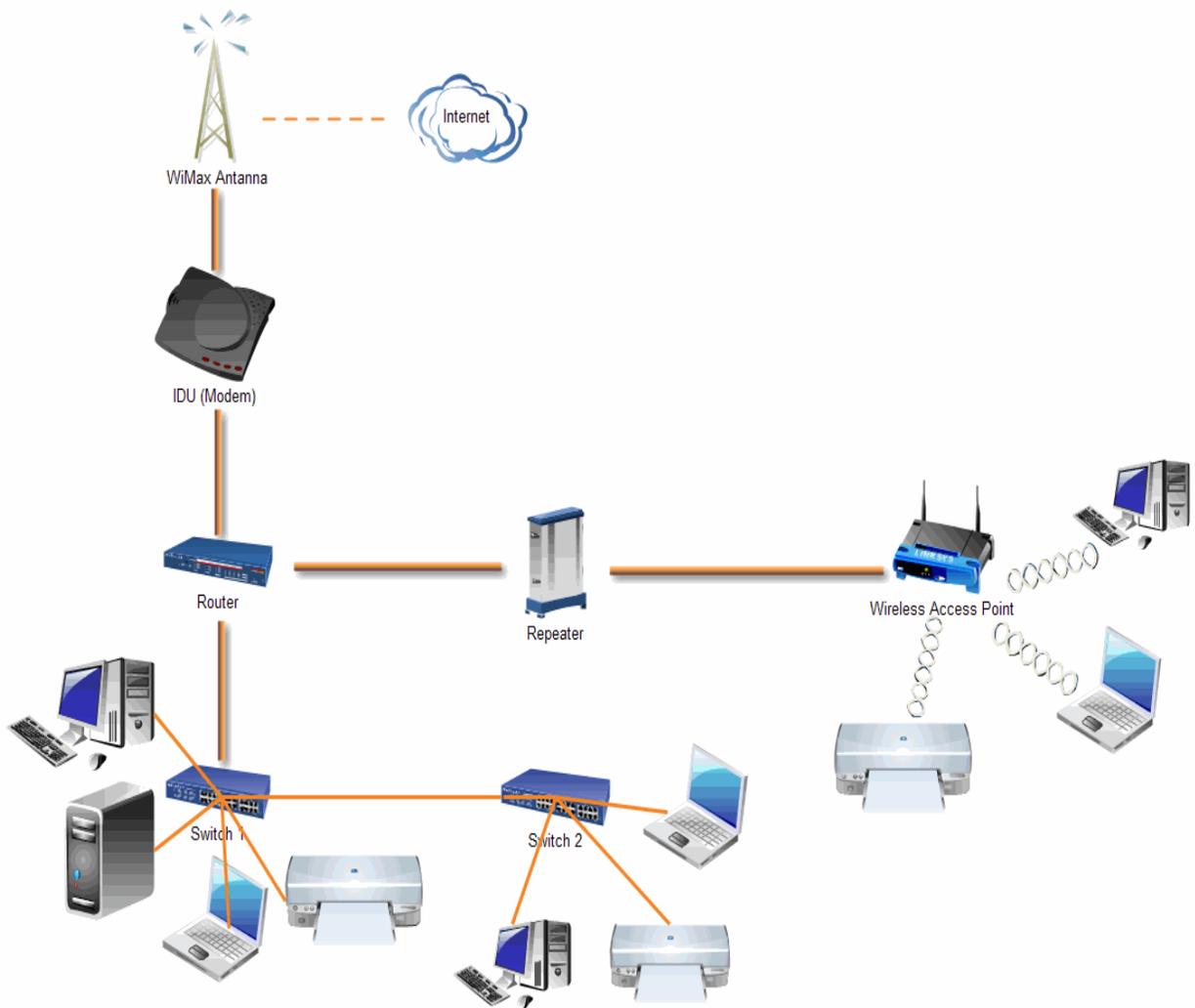


Figure 7 Network Diagram

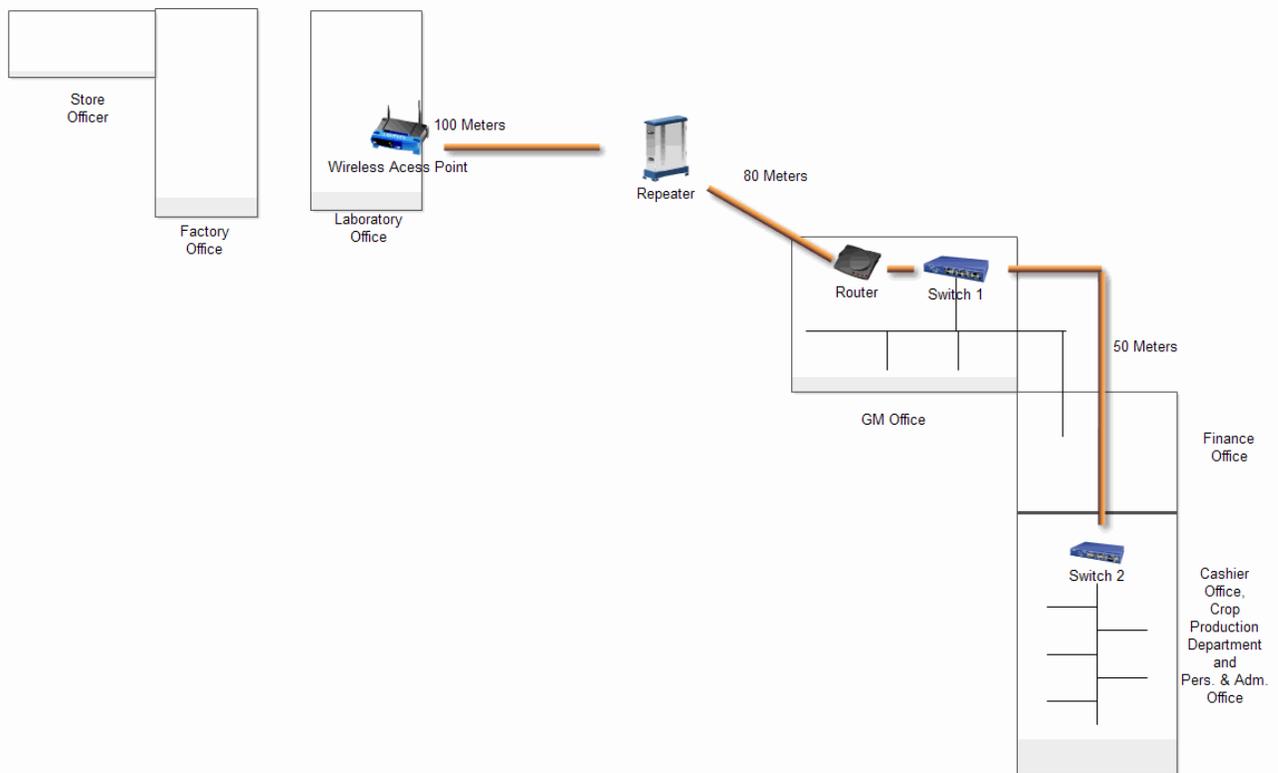


Figure 6 Network Physical Layout

Technology Management

In Horizon Sopyrwa, technology is managed by the IT technician. He is the only IT related officer in Sopyrwa and he is responsible for problem solving, reporting problems, fixing problems, administrating LAN, implementing IT plans, maintenance of equipment etc. There are no IT support teams in Horizon Sopyrwa. But IT team of Horizon Group in Kigali can provide support when needed and ABC Rwanda can provide support for all SAP related issues.

Installing and updating software are done by the IT technician when it is needed. Anti-virus is updated automatically when the computers are connected to Internet. All data back up is by using external hard drives. Data in SAP is backed up daily and other data is backed up weekly.

Technology Planning

In Horizon Sopyrwa, technology planning is done by the IT officer. After he finishes the planning, he will discuss the plan with the IT team of Horizon Group and make the final plan. The budgeting is done by IT officer and related departments. Every three months, the IT officer will check the implementation of the plan and start to make new plan for next season. The current plan has been in place for 5 months.

Before November 2011, there are no IT infrastructures in Horizon Sopyrwa. The current IT infrastructures are built mainly for implementing SAP Business One. IT is not planned comprehensively.

Internal Communication

Internal communication is done in 3 ways in Horizon Sopyrwa: Email, SAP and paper.

SAP Business One is used for the communication among Sales& Marketing Officer, Finance Department and Factory Production Department. All other communications between departments are done via Email (Google Apps). In each department, they use paper to transfer information. Though there is a Local Area Network in Horizon Sopyrwa, they never use it to do internal communications except SAP Business One. There is no file sharing or internal data transfer.

They contact outside clients via Email and Phone. Since officers use email to transfer files, it is difficult to organize the transferred files very well. Sopyrwa communicates with Horizon Group via Email, Phone or traveling for face-to-face communication. The main limitation is the bandwidth. The 384kbps bandwidth cannot support voice conference or video conference effectively.

Information Management

There are six types of information critical to Horizon Sopyrwa: client information, orders, farmer information, pyrethrum growth information, production information and invoices. Most information is managed electronically via Excel sheets. Information in Finance Department and Sales& Marketing Department and part information in Factory Production Department are managed electronically via SAP Business One.

The only information system now is the SAP Business One. It has been implemented by ABC Rwanda since November 2011. It helps a lot, but staff is still trying to get used to it. Some modules have not been developed completely. In Factory Production Department, officers still need to enter information repeatedly into both Excel and SAP Business One. Officers in Finance Department are very satisfied with SAP Business One. It helps there manage data efficiently and generate reports conveniently. Currently, all Microsoft SQL Server databases are only connected to SAP Business One. No other databases are used now.

Business Systems

Currently, the business systems of Horizon Sopyrwa are managed by SAP Business One. They use SAP Business One in Finance Department, Factory Production Department and Sales& Marketing Officer to manage their processes about invoices, inventory, orders, client information and production information. Since HR module of SAP Business One has not been implemented yet, payroll cannot be processed by SAP Business One.

Currently, SAP Business One manages business processes accurately and effectively. Offices are satisfied with it.

II. Internal Communication and Collaborative Work

Motivation

Currently, except SAP Business One, Email and phone calls are the only ways to do internal communication. All reports and files are sent by Email (Google Apps). Since Sopyrwa is using Google Apps to manage email, all messages have to travel out to Google servers, and then back from them. However, the bandwidth of Sopyrwa is only 384kbps download/128kbps upload and it costs about 500 US dollars per month. So, when officers in Sopyrwa communicate internally using the current way, all the bandwidth is used up and the loading speed is very slow.

Mobile phone call is the other way of internal communication. Except file transfers and announcements, all internal communications are done by phone calls. This brings the problems of information accuracy. Some important information cannot be recorded in time and sometimes gets forgotten or lost. Besides, phone calls cost Sopyrwa a significant amount of money.

In conclusion, the current way of communication is not very efficient and can be improved. Since Sopyrwa has a good LAN, we can find better solutions by using LAN.

Outcomes

In this task, a LAN instant messenger software Squiggle was implemented. Squiggle is an open source LAN instant messenger tool that is totally free. Squiggle has the features of instant message, group chat, file transfer, broadcast and voice chat. All features are based on LAN. Squiggle does not take any Internet bandwidth.

Before implementation, we tested Squiggle on 3 testing machines. The results show that Squiggle is very easy and reliable to use. All instant messaging (including peer-to-peer chat, group chat and broadcast) is fast and accurate. The file transfer speed is very fast (up to 2Mbps). Voice chat testing is not finished because of the lack of microphones, but the function works. Based on the result of testing, we can conclude that Squiggle is a great and reliable LAN messenger and it is very suitable for Horizon Sopyrwa.

I created instructions of installation and the IT officer in Sopyrwa installed Squiggle for every computer in Sopyrwa by following the instructions of installation. All officers in Sopyrwa are divided into four groups: GM Office, Finance Department, Crop Production Department and Factory Production Department. While installing Squiggle, We initialized user name and group that the user belongs to, set up Squiggle automatically start, set up Squiggle automatically login, set up file transfer destination (a newly created folder on desktop) and enable Squiggle History. All the configurations make Squiggle very easy to use.

Based on our testing data and current situation of Horizon Sopyrwa, we believe with use of Squiggle, up to 80% Internet bandwidth can be saved (equivalent to 400 US Dollars got saved per month). Internal communication efficiency will improve by 90% (file transfer time from more than 5 minutes to less than 30 seconds). Most phone calls costs can be saved. Information can be accurately recorded and chat history can be easily tracked.

Squiggle is easy to sustain and is extensible. Squiggle team is keeping modifying and updating it. All features will be added continuously. Maintenance in Sopyrwa is very easy. The IT officer

only needs to fix unexpected problems and update Squiggle when new version is available. Since Squiggle has a feature called Bridge, which can link to sub-LAN together, the Squiggle in Sopyrwa can be integrated with Horizon Group in Kigali in the future.

There are several small problems and limitations of Squiggle for Sopyrwa. The first one is that the installation of Squiggle requires Microsoft .Net Framework, which take about 500MB of hard disk space. The second one is that since Squiggle is a server-less peer-to-peer messenger, it is not possible to create accounts for officers.

Whole company training has not been done, so officers have not started to use Squiggle for work.

Recommendations

Sopyrwa should conduct a Squiggle training for all officers in Horizon Sopyrwa so that officers can start to use the new tool as soon as possible. As soon as officers start to use Squiggle to do internal communication, bandwidth can be saved then Internet connection speed can be significantly improved.

In the future, if Squiggle works well, I recommend IT officer in Sopyrwa start to search for enterprise solutions. Since Squiggle is a server-less messenger, it is not possible to create accounts for officers and manage them. As Sopyrwa growing, information security will more and more important. Long-term use of Squiggle may bring potential security risks to Sopyrwa.

III. Data Backup and Management

Motivation

Currently, besides SAP Business One (backed up daily), data in Sopyrwa is backed up weekly. Backup is done by the IT officer using an external hard drive to copy data office by office. This way of backup is very fragile. Once the hard drive has problems, all data of Sopyrwa will be in high risks. If data gets lost or broken, it is a disaster to Sopyrwa and the loss is uncountable.

Besides, there is no centralized data management. All data is on a single machine. Relevant officers or managers do not have access to certain files. All files should be transferred via email. What is more, if this machine is broken, data gets lost.

Email transferred data is difficult to manage. Users have to download them from Gmail to local folders. This process brings inconvenience to users without file management skills. Moreover, if a file needs to be sent back and get modified, multi-version problems will occur. Users have to store multiple versions to the same file. It is confusing and may waste hard disk space.

In conclusion, the current way of data management has potential risks and is difficult for less skilled users. It is necessary to find new ways to do data management so that data can be safer and easier to manage.

Outcomes

In this task, firstly we got two solutions to solve the problem. The first is to use a center server to manage all data and share to every user. The second is to use a synchronize tool to synchronize folders in a local computer to server. However, both solutions have serious problems. The first one can solve data management and backup problem, but all files are only kept on the server (still single machine storage). And if multiple users access the same shared folder of the server and modify it, confliction may happen. The second one is better. Data gets stored on two machines but it is difficult to use, especially for users not quite familiar with using computer applications.

Finally, we got a solution that can solve the problem perfectly: use Dropbox. Dropbox is a cloud storage and file sharing tool, which can synchronize local folder to cloud and the users who you are sharing with. By using Dropbox, we can create shared folders based on the following diagram.

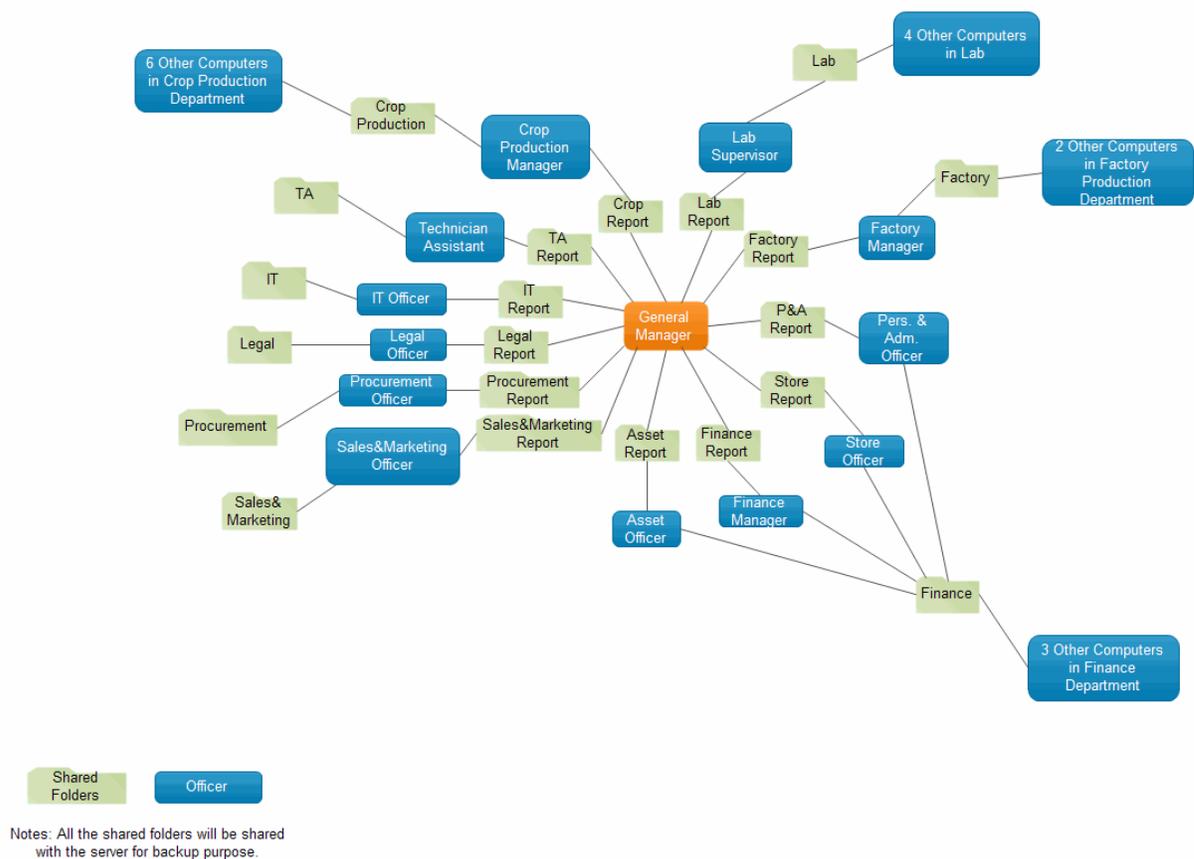


Figure 9 File Sharing Structure

12 report folders will be created and shared between General Manager and every officer that needs to report to him weekly. Additional 9 folders will be created within each department or office just for backup purpose and department internal data management.

In this way, every report will be in at least 3 locations: General Manager’s computer, reporting officer’s computer and Dropbox cloud. All other documents will also be in multiple locations with

the existence of department folders. So all important data in Sopyrwa will be stored in multiple local machines and cloud. Data will be very safe.

Besides, the benefits above, Dropbox has two unique features, which are especially suitable for Horizon Sopyrwa. The first unique feature is that Dropbox can automatically detect LAN and use LAN transfer as priority. So all internal transfer will be very fast (in testing, the speed is 2Mbps). The other unique feature is that Dropbox allows user to set up bandwidth limit for it. Based on the current situation of the bandwidth in Sopyrwa, fully cloud service will bring great pressure to the current limited bandwidth. So most other cloud storage service is not suitable for Sopyrwa. But with the bandwidth setting feature, we can set bandwidth limit to 1 Kbps download/1Kbps upload. So, Dropbox is more like an internal file sharing and back up tool.

The Dropbox solution can also bring great flexibility and extensibility to Sopyrwa. For example, we can flexibly set up bandwidth limit based on level. General Manager and Department Manager may travel sometimes and have the needs of remote work. So giving them more bandwidth limit can allow them back up files to cloud faster and access faster. Sopyrwa can also use Dropbox to share files to Horizon Group and clients (General Manager and the CEO of Horizon Group have such needs now). In the future, when the bandwidth of Sopyrwa gets increased, we can turn the current partial cloud service to fully cloud service by setting unlimited bandwidth limit, so that remote work and mobile work will become possible.

In conclusion, Dropbox is a perfect solution for data backup and management and it is very suitable for Sopyrwa. With Dropbox, all important files can be backed up on multiple machines and cloud so that data will be very safe. Shared folders can also be a good surplus of internal communication and in this way, files can be well managed in the designed folders and multi-version problems can also be solved. Besides, the solution is very flexible and future extensible. It will be a good foundation of fully cloud service and remote work in the future.

All Dropbox accounts have been created by IT officer, but Dropbox training and fully implementation are pending.

Recommendations

Sopyrwa should conduct a Dropbox training for all officers in Horizon Sopyrwa so that officers can start to use the new tool as soon as possible. As soon as officers start to use Dropbox, data in Sopyrwa will be backed up safely and managed very well.

IT officer should use the Dropbox bonus policy to help users to increase their free space. This free space increase can be achieved by introducing new users, uploading photos etc. IT officer can follow this policy and increase free space up to 21GB for every user. With this amount of free space, the benefits of this solution can be got without limitation.

IT officer can set up high bandwidth limit for General Manager and work together with IT manager in Horizon Group to create shared folders between General Manager and the CEO of Horizon Group. They have daily communication and file transfers. The need is urgent.

IV. Information Management in Crop Production Department

Motivation

In Pyrethrum industry, demand is way higher than supply, so the production of dry flowers is the key point to improve revenue. In Sopyrwa, Crop Production Department is responsible for conducting and improving the production of dry flowers. How to help Crop Production Department to improve production is the most important thing in Horizon Sopyrwa.

Currently, the yearly operations of Crop Production Department are shown in the following diagram.



Figure 10 Yearly Operations of Crop Production Department

Crop Production Department records all information of these operations. But information is gathered based on the hierarchy below.

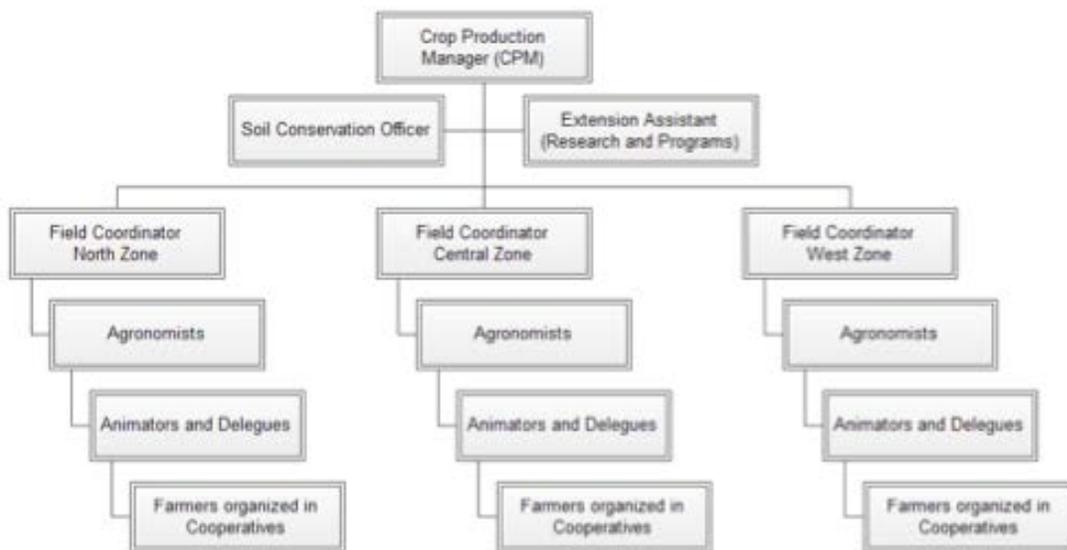


Figure 11 Crop Production Department Hierarchy

Delegates get information from farmers and report a brief summary to Animators. Animators make a summary and report to Agronomists. So on so forth. So, when Crop Production Manager

gets the report, he only know the summaries of three zones but not detailed information of farmers. All raw information is manually recorded by Delegates and Delegates are keeping them.

To improve production, analysis is necessary. But without detailed information and analyzing tools, analysis cannot be done. Search farmer or activity information is also very important for Crop Production Department. But it is impossible currently.

Based on the importance of Crop Production Department and the current situation. It is urgent to find a good solution so that electronically record, search and analysis can be done.

Outcomes

A good option is to find an existing software to help Crop Production Department to electronically record, search and analyze information. However, since the operations of Crop Production Department are very unique, it is difficult to find a good software to use without redevelopment. Microsoft Access seems like a good tool, but it is still difficult for officers in Sopyrwa to use.

The only solution that can solve the problems very well is to develop a customized software for Crop Production Department. I spent 5 weeks gathering requirements, designing the software, developing it and testing and debugging it.

The software is developed as webpages plus database. The software and database are installed on the server. Officers use webpages in their offices to access the software and do adding, editing, deleting, searching and reporting.

In the Farmer page, users can add, edit or delete farmer information. Farmer information includes farmer's ID, farmer's first name, farmer's last name, farmer's gender, farmer's date of birth and farmer's family ID (which family the farmer belongs to). Users can search farmer's information by inputting any combination of the conditions (date of birth can be input as a range).

In the Family page, users can add, edit or delete farmers' family information. Family information includes family's ID, family's address (cell, sector, district), family's phone number, how many children of the family are in primary school, how many children of the family are in secondary school, how many children of the family are in university, the size of land the family has, chief farmer's ID and Cooperative ID (which cooperative the family belongs to). Users can search family's information by inputting any combination of the conditions (number of children in school, number of children in primary school, number of children in secondary school, number of children in university and size of area can be input as a range).

In the Cooperative page, users can add, edit or delete cooperative information. Cooperative information includes cooperative's ID, cooperative's name and cooperative's address (cell, sector, district). Users can search cooperative information by inputting any combination of the conditions.

In the activity pages (Seed, Cultivation, Fertilizer, Pesticide, 1st Weed, 2nd Weed, Violation, Production), users can add, edit or delete different activities' information. Activity information includes Farmer's ID, Activity date and quantity (kg/hectare). Users can search activity information by inputting any combination of the conditions (date and quantity can be input as a range). User can also report activity information by date range and report unit (farmer, family, cooperative, cell, sector, district or whole company).

Crop Production Manager will have an admin account and can create/delete account for users. Users will be assigned an account to log into the system. Users can change their password.

Technically, it is a J2EE development. The whole software consists of 50 JSPs and 49 JAVA classes. The total number of lines of code is 23687. It is based on an MVC design pattern. All requests are sent to Controllers from JSPs. Controllers process the requests and send responses to JSPs. The Database Management System used is Microsoft SQL Server (Sopyrwa uses it for SAP Business One as well). The framework used is Hibernate Framework. The IDE used is Netbeans IDE 7.2. The web server used is GlassFish Server 3+.

The server has been successfully configured and the software has gone live for Crop Production Department to use. With the use of the software, Crop Production Department is able to record information electronically, search all needed information easily and flexibly and generate reports automatically. It enables Crop Production Department better manage their operation and increase pyrethrum production and further increase the revenue of Horizon Sopyrwa.

Recommendations

For sustainability, the IT manager (he has many years of JAVA development experience) of Horizon Group should make time to maintain the software periodically. Or Sopyrwa can hire someone who knows J2EE or outsource to IT companies in Rwanda to maintain the software. Maintenance is very important to the software. Without continuous maintenance, the project will go failure at end.

Database backup tool should be used to guarantee the data is safe. I recommend IT officer search for some good backup tools for Microsoft SQL SERVER like SQL Backup Pro or some free open source tools which can backup the Database automatically.

In the future, the software can be integrated with some more advanced data analysis tools such as Ariacom Business Report to enable more detailed analysis. I also recommend Sopyrwa integrate the software with the GIS which is under implementation. With the integration with GIS, more analysis based on locations is enabled and both the software and GIS can bring more functions to Sopyrwa.

Another recommendation is that in the future, if bandwidth is increased, Sopyrwa can move the software from local server to web server so that the software can be accessed anywhere. So delegates or animators can input data on the fields.

V. Additional Recommendations

Upgrade Internet Bandwidth

Current Internet bandwidth is 384 Kbps download/128 Kbps upload. It is very limited and it is even shared by more than 20 users. The Internet connection is very slow in Sopyrwa and it is the biggest limitation for using more IT.

Sopyrwa is using the 384 Kbps service from MTN and the monthly cost is 224,200 Rwanda Franc. I suggest Sopyrwa switch to 1Mbps fibre optical service from BSC. The monthly cost is 270,000 Rwanda Franc. The cost is slightly increased, but the bandwidth is almost tripled.

With the new 1Mbps bandwidth, Sopyrwa can start to use some SaaS (Software as a Service). And video conference can be done between Sopyrwa and Horizon Group.

Incoming Documents Management

Currently, incoming documents (like letters) are manually managed. Sometimes, documents get lost. Since the amount of incoming documents are large. I suggest the secretary scan all incoming documents into computers then use Excel to record title, incoming date and keywords.

All scanned documents can be managed by file tagging tools like Tagged Frog. It is very light and easy to use. And it can solve the current problems very quickly and easily.

In a long term, I suggest to use a basic CRM to manage all incoming documents and clients' information.

About the Consultant

Yikai Zhu is a Master of Information Systems student at Carnegie Mellon University. He took part in the Technology Consulting in the Global Community internship over the summer and returned in the fall to start the second year study at Carnegie Mellon University.

Appendix A: Squiggle Screenshots



Figure 12 Squiggle Login

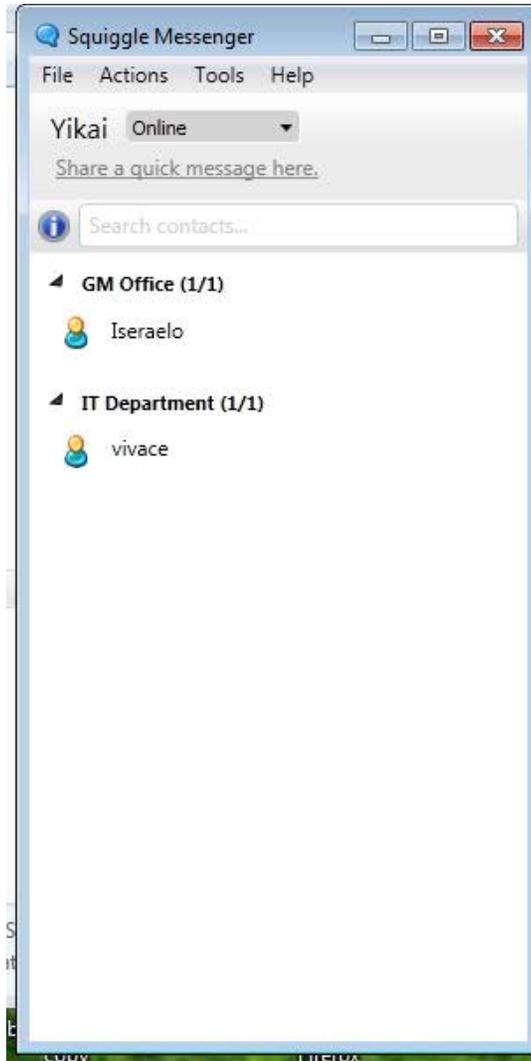


Figure 13 Squiggle main interface

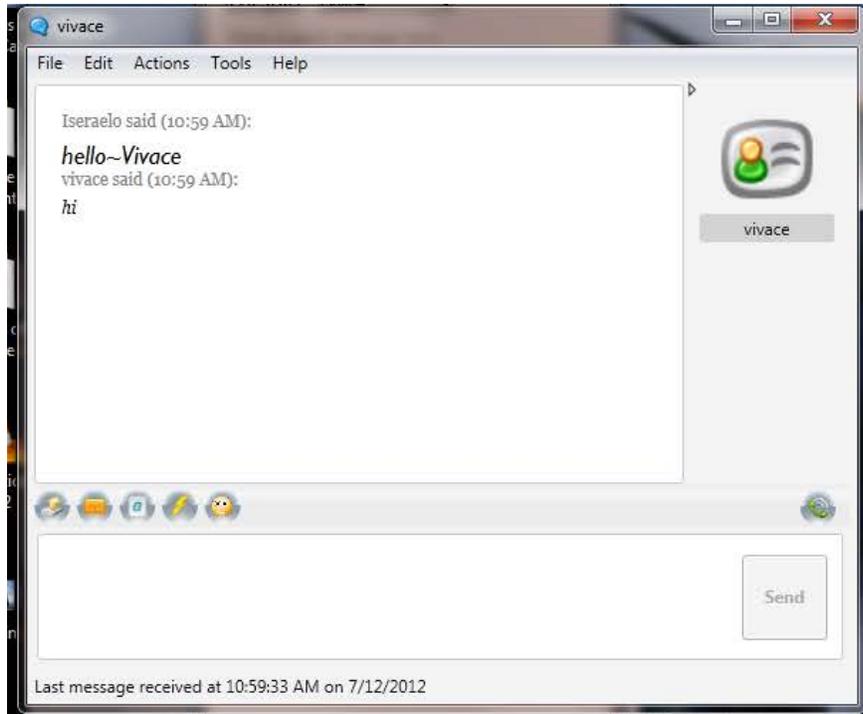


Figure 14 Squiggle Peer-to-Peer Chat

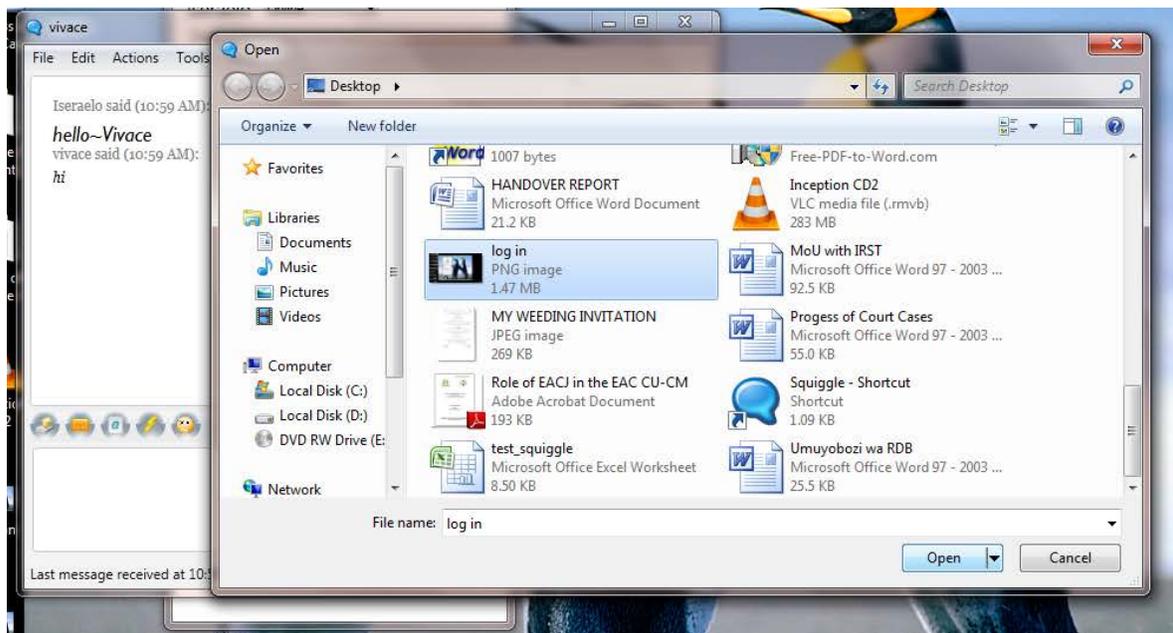


Figure 15 Squiggle File Transfer

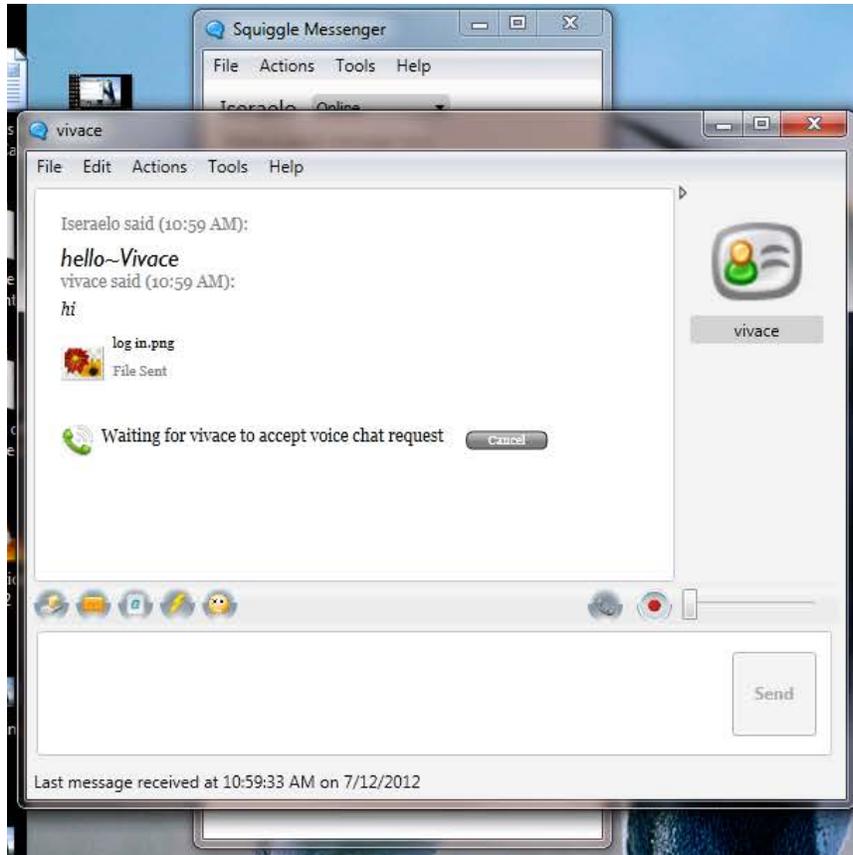


Figure 16 Squiggle voice Chat

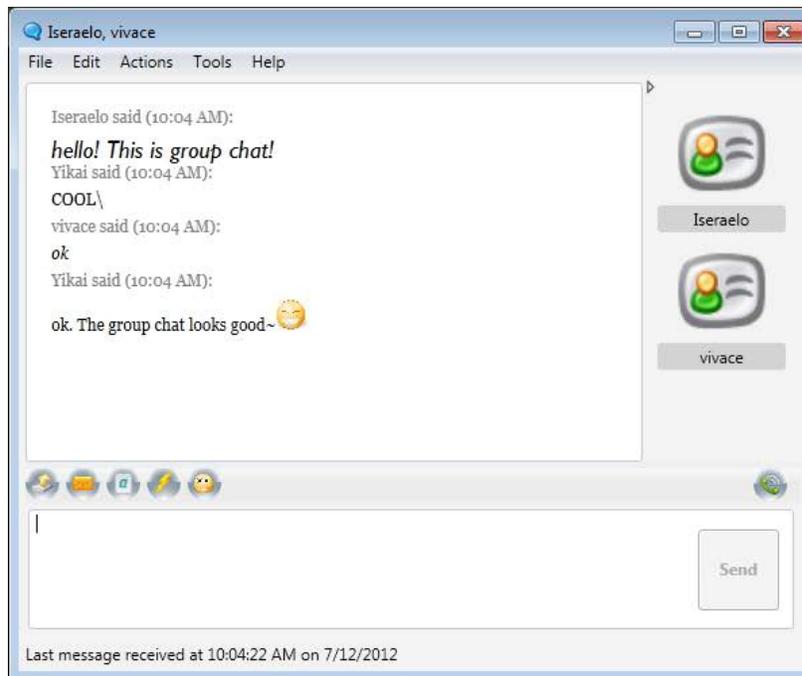


Figure 17 Squiggle Group Chat

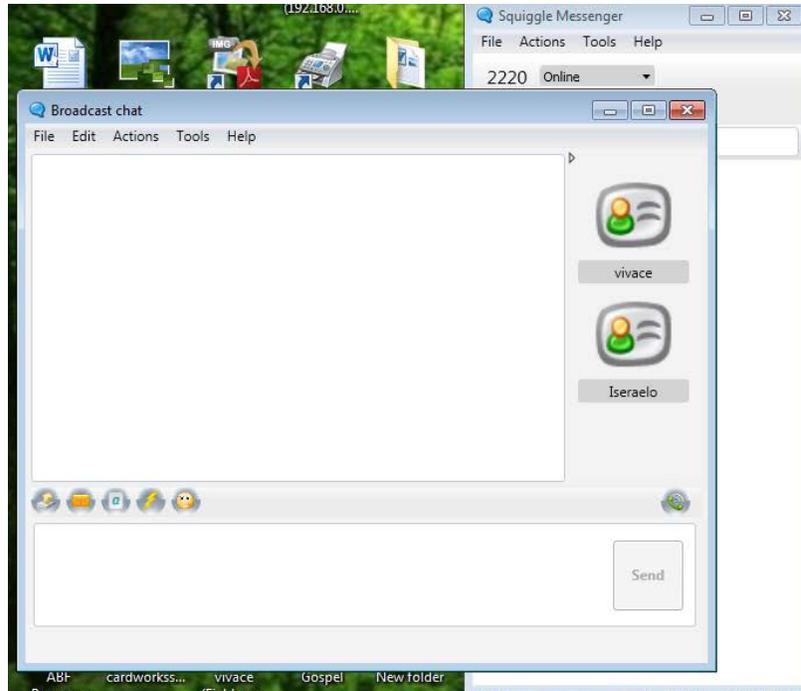


Figure 16 Squiggle Broadcast

Appendix B: Squiggle Installation Instruction

Squiggle Installation Instruction:

1. Confirm if the OS is Windows 7
2. Install .Net Framework 4 (dotNetFx40_Full_x86_x64.exe)
3. Restart Windows 7
4. Put the Squiggle Folder (Squiggle-3.1 Client) on C:/Program Files
5. Create a Squiggle shortcut on the desktop and another Squiggle shortcut on Start – All Programs – Startup
6. Open squiggle and set the Display name and Group name. There will be 4 groups: GM Office, Finance Department, Crop Production Department, Factory Production Department. The user name will be “Position-Name”, for example, IT-Vivace or TA-Boniface.
7. Select “Remember me” and “Sign me in automatically”
8. Create a folder called “Squiggle transferred files”
9. Go to Squiggle – Tools – Settings – General, and change the Downloads folder to the “Squiggle transferred files” on the desktop
10. Go to Tools – Settings – Chat and select “Enable History”
11. Do training about sending message, transfer files, group chat, broadcast message.

Appendix C: Crop Production Department Info Management Software Screenshots

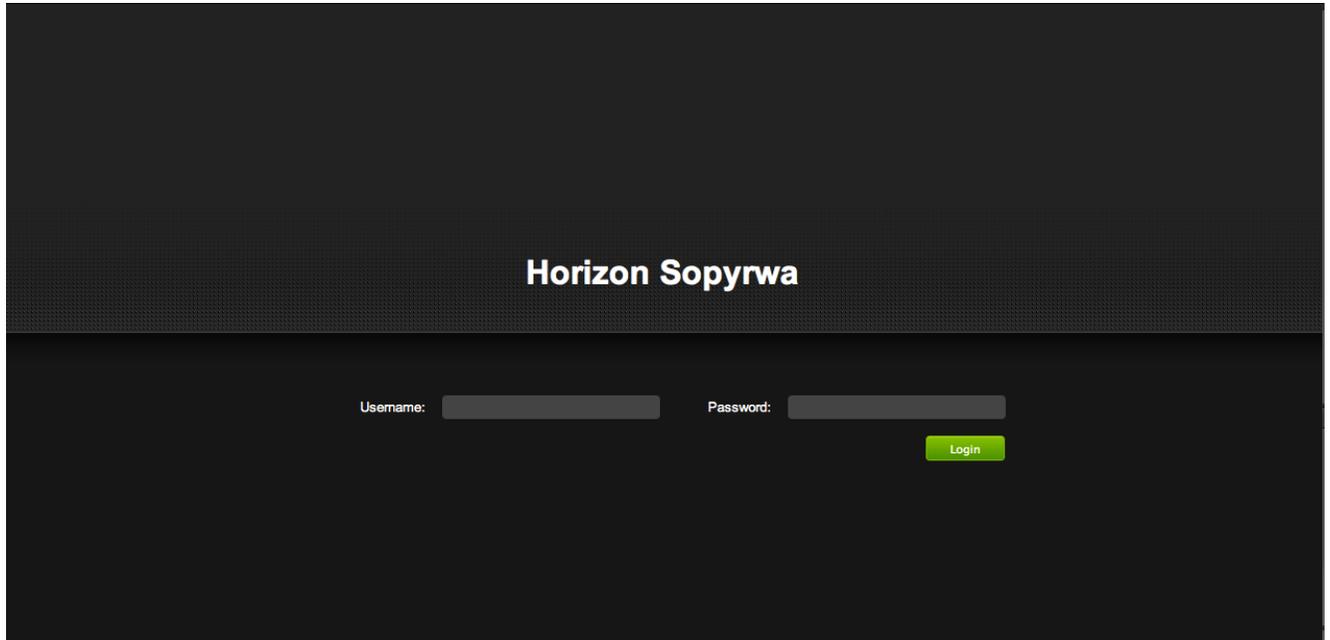


Figure 19 CPD Log In

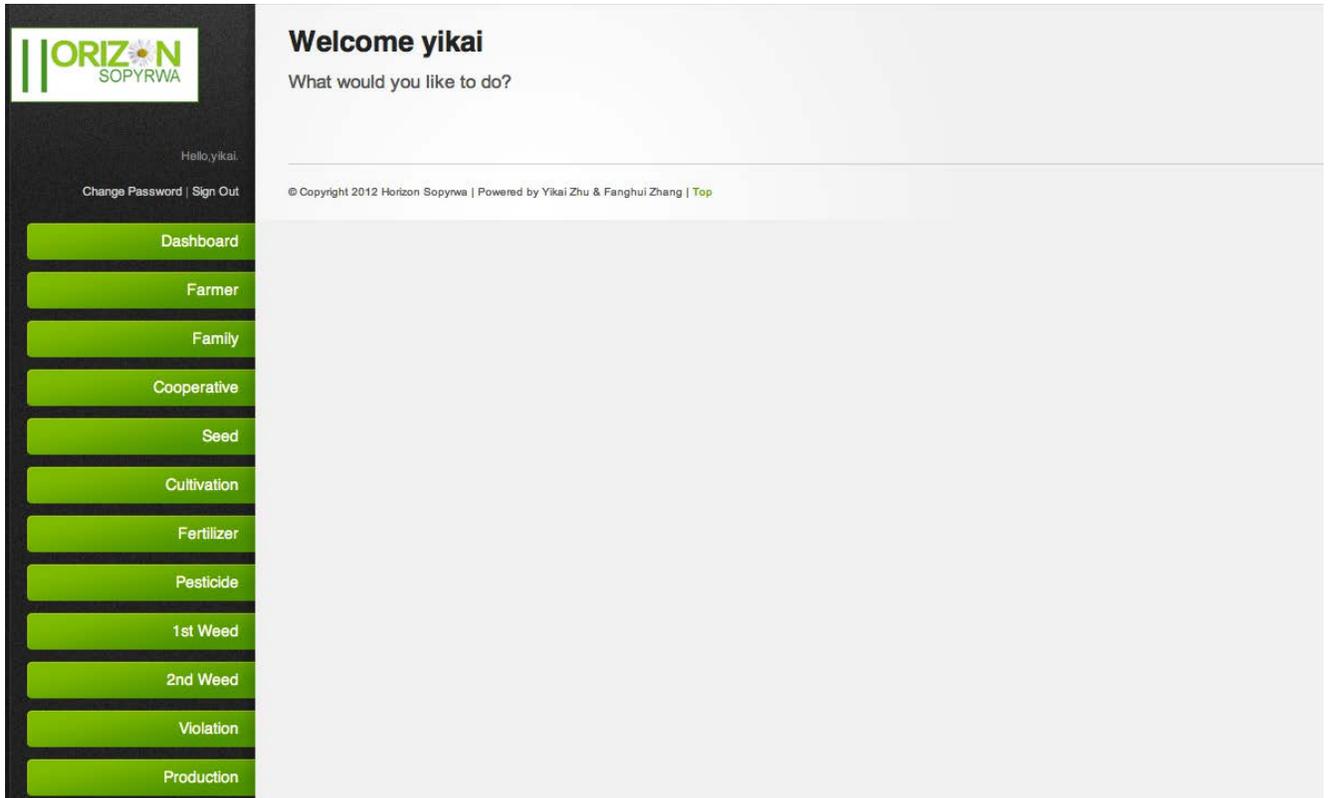


Figure 20 CFD Index

ORIZON SOPYRWA

Hello, yikai.

Dashboard

Farmer

Add

Search&Edit

Family

Cooperative

Seed

Cultivation

Fertilizer

Pesticide

1st Weed

2nd Weed

Violation

Production

Welcome yikai

What would you like to do?

Add Farmer

Farmer ID:

First Name:

Last Name:

Gender: Male Female

Date of Birth: 2012 9 17

Family ID:

Submit

Figure 21 CPD Add Farmer

SOPYRWA

Hello, yikai.

Dashboard

Farmer

Add

Search&Edit

Family

Cooperative

Seed

Cultivation

Fertilizer

Pesticide

1st Weed

2nd Weed

Violation

Production

What would you like to do?

Search Farmer

Farmer ID:

First Name:

Last Name:

Gender: Male Female

Date of Birth: From 2012 9 17 to 2012 9 17

Family ID:

Submit

Figure 22 CPD Search Farmer



Hello, yikai.

- Dashboard
- Farmer
- Family
- Cooperative
- Seed
- Cultivation
- Fertilizer
- Pesticide
- 1st Weed
- 2nd Weed
- Violation

Welcome yikai
What would you like to do?

Display Farmer Table

Farmer ID	First Name	Last Name	Gender	Birth	Family ID		
1	two	two	female	2012-6-1	1	Edit	Delete
101	h	s	male	2012-8-8	1	Edit	Delete
118	d	d	male	2009-8-1	23	Edit	Delete
123	a	q	female	2010-8-1	1	Edit	Delete
212	sd	dsfs	female	2011-8-1	1	Edit	Delete
3	d	d5	male	2012-8-7	3	Edit	Delete
31	3	dsf	male	2012-8-9	10	Edit	Delete
323			male	2012-8-7	1	Edit	Delete
33	sdf	dsf	male	2012-5-1	1	Edit	Delete
3ed				2012-8-5	1se	Edit	Delete
423			male	2012-8-3	2	Edit	Delete
45	d	d	male	2012-8-6	5	Edit	Delete
51386	first	last	female	2012-8-8	1	Edit	Delete

Figure 23 CPD Search Farmer Results



Hello, yikai.

- Dashboard
- Farmer
- Family
- Cooperative
- Seed
- Cultivation
- Fertilizer
- Pesticide
- 1st Weed
- 2nd Weed
- Violation
- Production

Welcome yikai
What would you like to do?

Production Information Report Forms

Date

from 2012 9 17

to 2012 9 17

By:

Farmer Family

Cell

Sector

District

Cooperative

All

Submit

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Figure 24 CPD Production Report

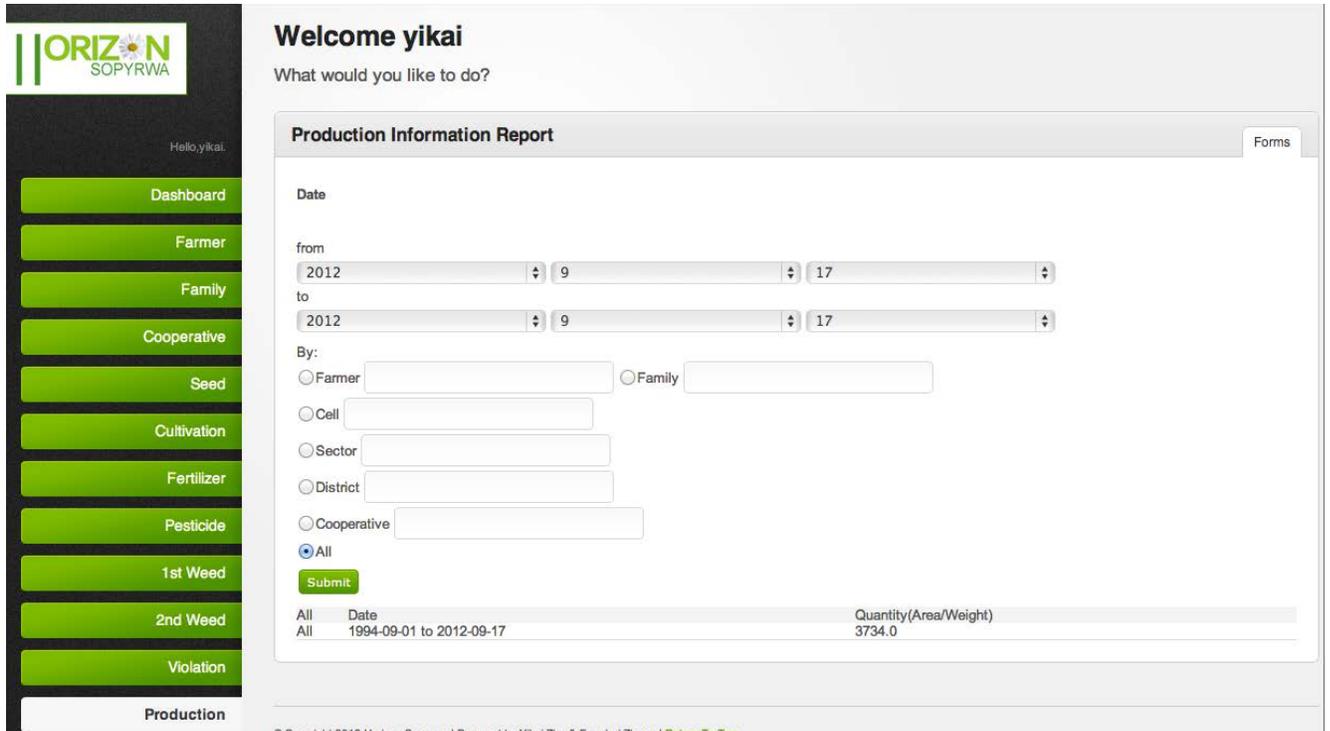


Figure 25 CPD Production Report Result

Appendix D: Crop Production Department Info Management E-R Diagram

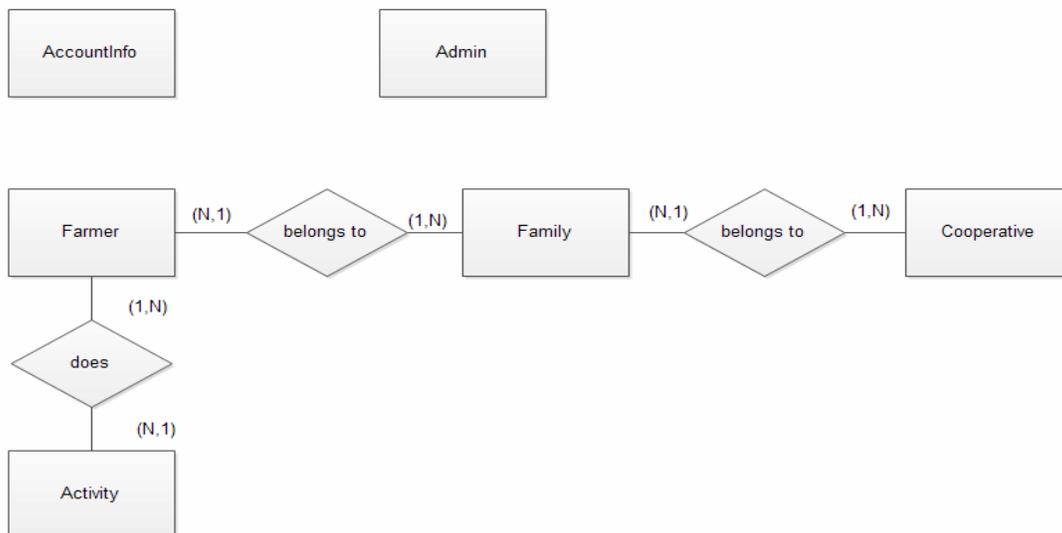


Figure 26 CPD E-R Diagram

Appendix E: Crop Production Department Info Management Schema

Farmer (**farmerID**, fistName, lastName, gender, birth, familyID@)

Family (**familyID**, cell, sector, district, phoneNumber, kids_in_primary, kids_in_secondary, kids_in_university, kids_in_school, area, farmerID@, cooperativeID@)

Cooperative (**cooperativeID**, cooperativeName, cell, sector, district)

Activity (**recordID**, farmerID@, activityDate, activityID, quantity)

AccountInfo (**userName**, password)

Admin (**adminName**, password)