Promotion of Regional Integration in the SADC Livestock Sector
(PRINT Livestock Project)
9 ACP SAD 002

Report on LIMS Adoption Mission to Botswana

PRINT Report N° BB-PB-LIMS-BW-04-2009
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Dates: 21st to 24th April 2009

Acknowledgments

We would like to thank all the colleagues who contributed to the success of this mission in one way or another, particularly Dr. Moetapele Letshwenyo DPS, Dr. T.K Phillemon Motsu DVS, Mr L. H. Paya DAP and Dr Neo Mapitse PVO (Epidemiology), for the warm welcome accorded to us and their patience during our fruitful discussions. Their commitment is highly appreciated.

BACK TO OFFICE MISSION REPORT

Summary

Country   : Botswana

Mission team : Dr Bedane Information specialist PRINT, Dr. Pascal Bonnet CTA PRINT,

Dates   : 21st to 24th April 2009

Venue   : National Veterinary Laboratory and Botswana College of Agriculture (SACCAR building) Sebele, Ministry of Agriculture, Botswana

Introduction: mission rationale and objective
The Livestock Sector Unit (LSU) in the Food, Agriculture and Natural Resources (FANR) Directorate of the SADC Secretariat is entrusted to promote regional integration and sustainable livestock development. The PRINT Livestock Project in FANR became operational in July 2005. The project's specific objective is to establish a livestock information management system (LIMS) in Animal Production and Health, Marketing and Trade. The generation of up-to-date and reliable information will assist the coordinating role of FANR as well as the development of harmonized policies and strategies in the SADC livestock sector.

The mission team comprised two SADC staff, namely, Dr. Pascal Bonnet (Animal Health & Livestock Economist, CTA Chief Technical Adviser PRINT – CIRAD), Dr Bedane Information specialist PRINT.

Summary of SADC PRINT mission:

The mission was the launching of the SADC LIMS system and comprised three components:
- the organisation of a AIMS-LIMS Stakeholders workshop, with potential contributors to LIMS and potential users of the system
- a 3 days Training of trainers on the LIMS application and
- the drafting of the first elements for establishing Standards Operating Procedures of LIMS in Botswana.

Detailed ToR's and timetable of the mission are provided in full in the annexures.

Funding of mission:
PRINT CIRAD operational budget for the period April 2009 to October 2009, Addendum 3 of the SADC CIRAD service contract (reimbursable costs).

1. INTRODUCTION, OBJECTIVES of the MISSION

The lack of reliable livestock information in the SADC region has hampered identification of the potential and constraints of the livestock sub-sector and consequently the formulation of large scale intervention projects. To alleviate this problem, the PRINT livestock project was mandated with the establishment of livestock information system which integrates technical and socio-economic data for SADC Secretariat and its Member States (MS). In order to establish the Livestock Information Management System (LIMS), the Project gathered the necessary information (situation analysis, information needs assessment) and prepared conditions (developing templates, purchasing hardware and software, training national experts and contracting software developers) for the set-up of the system. The development phase of the database was completed by the end of July 2008 and became ready for introducing to SADC MS.

Once the application was ready for roll-out, the PRINT Livestock Project has organised missions to MS to undertake the installation of the LIMS application and training of national experts. It was agreed that these missions, intended to cover all MS, start in August 2008. The first mission started on 1st August 2008 in Botswana with the following objectives.

1) To launch officially the SADC Agricultural Information Management System (AIMS) and its livestock component LIMS in the country. This one-day meeting is used to create awareness on LIMS among livestock data sources and information users and map the network of stakeholders.
2) To train trainers on LIMS data collection templates and the operation and use of the application. This component of the mission targets the training of six to ten national experts on the management of the templates and the application with the objective of primarily enabling them to use the system but also to prepare them to train their colleagues in the Regions or Provinces. The intensive training usually runs for three days.
3) To collect data on livestock from different sources in the country.

The seminar intended to launching AIMS and LIMS and create awareness among different stakeholders took place on 1st August 2008 at the Central Veterinary Laboratory meeting hall in Sebele. The number of participants to the meeting was far below expectation and the two directors of the Veterinary Services and the Animal Production Department were absent. Hence, although the meeting continued for the whole day, it was decided to organise another mission at a later date.

In line with that decision, a second LIMS implementation mission was organised and launched between 21 and 24 April 2009. This mission report focuses on the activities and results achieved in April 2009. The mission was undertaken by Drs. Pascal Bonnet, Chief Technical Assistant of PRINT Livestock Project and Berhanu Bedane, the LIMS Technical Assistant.

The **LIMS system** is made of 1/ the **LIMS software** and **harmonized reporting templates** (in Excel) which some staff were sensitized and trained on, 2/ **procedures** for information **exchange** (**SoP**) and for using **LIMS** applied through 3/ a **network of stakeholders** (forming the national **LIMS network**) working in collaboration. All these aspects were discussed with the participants.

2. PERSONS MET and INSTITUTIONS INVOLVED

During the planning phase of this mission, the two reporting officers from PRINT meet and discussed with:

1. Dr. Moetapele Letshwenyo, Deputy Permanent Secretary of the Ministry of Agriculture, Botswana
2. Dr. Kgosietsile Phillemon-Motsu, Director of the Department of Veterinary Services
3. Mr. Lesitamang Paya, Director of the Department of Animal Production

   Later Dr. Neo Joel Mapitse, Principal Veterinary Officer of the Department of Veterinary Services was assigned to organise the meeting and the training, with whom the reporting officers communicated for smooth plan and execution of the mission.

The details of the persons who attended the seminar and the training are provided in the annexure.

3. PREPARATORY PHASE

A meeting on the planning of the mission took place on the 2nd of April 2009 at the office of the Deputy Permanent Secretary, Dr. Letshwenyo. The two reporting officers and the two directors of livestock departments were present at the preparatory meeting chaired by the Deputy Permanent Secretary. The main focus was how to achieve better preparation and better results than the 1st mission. The reporting officers listed the requirements for the seminar and the training. These included the stakeholders to be invited at the LIMS launching seminar including livestock service representatives from the regions, the venue and related logistics as well as the nomination of the participants to the training of trainers' course on the operation and use of LIMS. At the meeting it was made clear that PRINT Livestock Project cannot meet anymore costs for hiring venues or cover expenses for lunch and coffee breaks as PE 4 was concluded on 31 March 2009. It was agreed that Dr. Kgosietsile Phillemon-Motsu, the Director of the Department of Veterinary Services spearhead the preparations. PRINT assisted the preparation by providing some materials such as the draft list of participants from different institutions, draft agenda of the meeting, etc. on 3rd April 2009. As mentioned earlier, Dr. Neo Joel Mapitse, Principal Veterinary Officer, took over the Director the preparation and the coordination of the LIMS implementation mission at a later stage.

4. LIMS STAKEHOLDERS MEETING

The stakeholders meeting where AIMS and LIMS were officially launched in Botswana took place on 21st April 2009 at the meeting hall of the Central Veterinary Laboratory. The meeting was attended by 19 participants, mainly from the Ministry of Agriculture. Except for some poultry and dairy farmers, all participants were from either the Department of Animal Production or the Department of Veterinary Services.

According to the original plan, the Deputy Permanent Secretary of the Ministry of Agriculture was expected to officially launch AIMS and LIMS in Botswana. However, due to other urgent matters he was unable to grace the event and his representative Mr. Paya, the Director of Animal Production opened the meeting. Likewise, the Director of the Veterinary Services was unable to attend the meeting but represented by his deputy, Dr. Letlhogile Modisa. The mission of senior management outside of Gaborone and the parallel meeting organised to discuss a regulation on meat industry highly affected the turnout. Both the number of participants and the composition were below expectation. The detailed list of participants is attached as annex 1.

In his opening speech, the representative of the deputy permanent secretary Mr. Paya reminded the participants the attempts made to have LIMS launched as early as August 2008. He mentioned the opportunity he had in several occasions to learn about LIMS and how it contributes to better understanding of the livestock sub-sector as a whole for better decision making and congratulated PRINT for the achievement. He further emphasised the need to go out and meet farmers and work with them to gather quality data and avoid sending aggregate figures mostly based on estimation. According to him the major effort is expected from staff members of the Animal Production Department. Earlier the Chief Technical Assistant of the PRINT Livestock Project, Dr. Pascal Bonnet explained the objective of the mission and in particular what is expected from the seminar.

The presentations were mainly made by the reporting officers. The background of Agricultural Information and Management System (AIMS) was kindly covered by Mr. Krishan Bheenick, the TA for communication and training of the ICART Project of FANR, SADC. Mr Krishan Bheenick presented in particular the various tools available within the current AIMS portal and to explain the philosophy of the portal which is overarching all information systems of FANR.

The detailed agenda of the stakeholders meeting is presented as annex 2.

Figure 1, Participants of the 1st LIMS stakeholders meeting on 1st August 2008

Contents presented:

The objective of such stakeholder workshop is to present the entire AIMS initiative in order for participants to "locate" the LIMS system as a component under the AIMS system. It is therefore a follow up of former meetings dedicated to regional agriculture information systems, but this time focussing on the Livestock sector.

During the stakeholders meeting the following presentations were made and discussions took place.
- Objectives of the AIMS/LIMS launching seminar
- Background of AIMS
- Introduction to LIMS
- Demonstration of the LIMS templates
- Demonstration of LIMS database
- Demonstration of LIMS Portal
- Data sources and networking with stakeholders

The two AIMS workshops held in 2007 and 2008 have also been opportunities to sensitize the MS on the expected achievement of AIMS :
- formation of **AIMS networks**,
- compilation of numerical data and key information at regional level by sub sector and given stakes – topics (data contributors perspective),
- Improvement of systems **interconnectivity** so that information is available from browsing in a portal (users perspective).
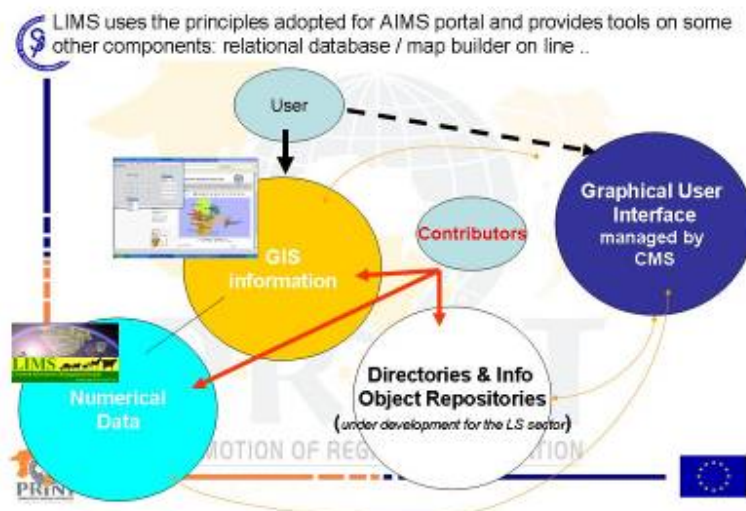
The expected components of AIMS and the place of LIMS elements were presented (i.e. the Excel Templates, database in MS Access application to facilitate data compilation and exchange, and LIMS web-based mapping portal to display indicators computed from the database).
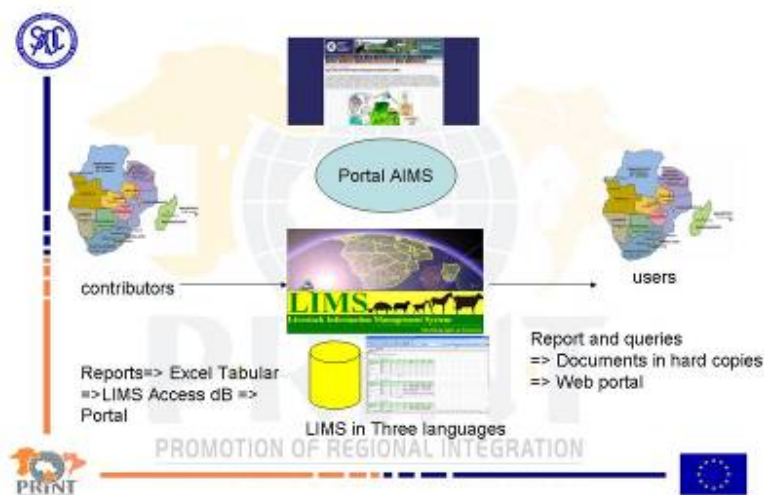
LIMS is a system not only a database: it has **contributors** (from the LIMS national network) and **users** (any one using the portal), and it has a toolkit made of Excel Templates, database in a MS Access application and **procedures** for data compilation and exchange.
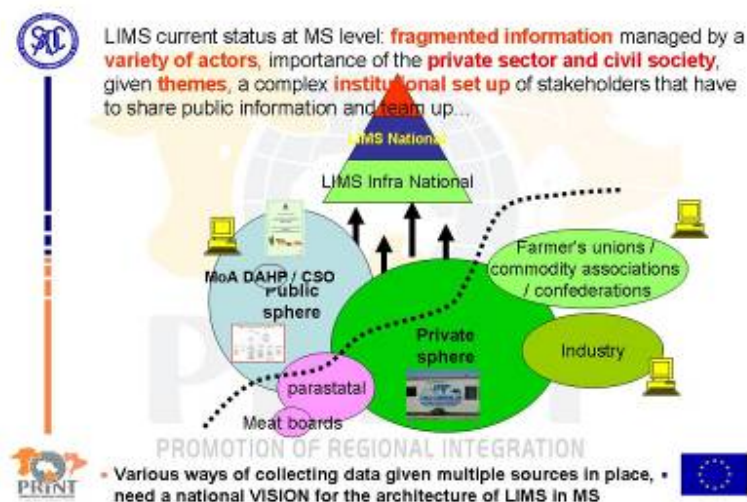
Contributors to LIMS are expected to originate from **multiple sources** and will have to work in collaboration thanks to the formation of LIMS national network. Therefore, LIMS provides for capturing data from various stakeholders and institutions, given their expertise and interest in the system, at various scales and can therefore be decentralized and it is a therefore a modular system.

Nevertheless a **central coordination and management unit** is required (coordinated by the network) as there will be a national LIMS database centralized in the country.

Networking of institutions

PRINT has already worked out the networking aspect of the information system (IS) by supporting the **horizontal integration** of actors, thanks to the support to the 4 subject matter **SADC sub committees of LTC**, composing four task forces aiming at managing part of the LIMS and therefore being its **custodian at regional level**. Horizontal integration means the integration of networks of stakeholders on a subject matter or specific areas of interest for the LS sector

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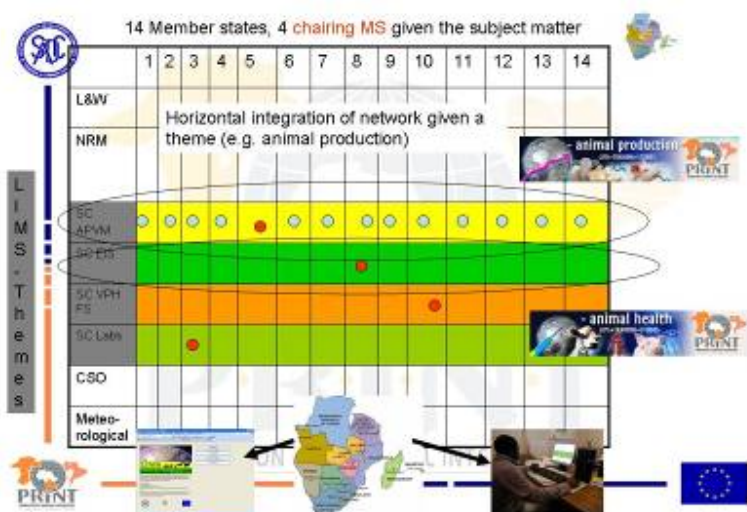
The AIMS initiative and the LIMS launching missions are opportunities to complement the process initiated in 2007 by boosting the **vertical integration** of national networks "at the periphery" of the core Livestock sector represented by the four representatives to the sub committees of SADC, this topic being central at this occasion. Vertical integration means an aggregation and integration of new players (e.g. specialist of meteorology, of early warning systems), i.e. new professionals to the core group, and to the network of pure Livestock specialists.
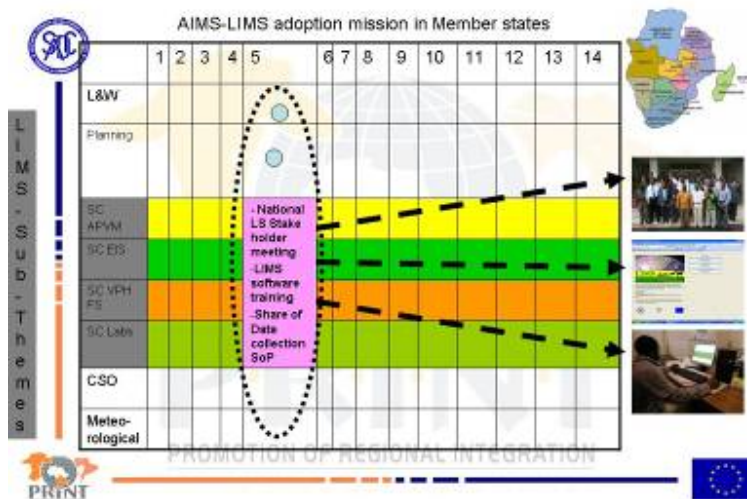
LIMS into AIMS: List of Participants invited to the AIMS meeting Pretoria 2008 – From Ministry of Agriculture and other institutions
From the original group of attendees at the **AIMS workshop** in Pretoria, none were present at our seminar. We particularly regret the absence of the Central Statistics Office which is a key actor regarding agricultural statistics.

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The slides summarizing the AIMS networking rationale as established by the Batswana AIMS team in Pretoria: an example of **vertical integration** towards the formation of an AIMS network in a country of SADC was already delineated.

The presentation made by the Botswana group in Pretoria were encouraging concerning the creation of an AIMS and therefore LIMS network (slides as follow) in Botswana, in order to foster the activities that should be launched towards a better collaboration between the various sources of data and information in the agricultural sector. Despite the effort again no members of this very first group was attending the LIMS seminar, though a clear indicative list of institutions concerned was already provided.

Presentation of Botswana at the AIMS Pretoria meeting in 2008

These slides are summarizing the AIMS networking rationale as established by the Batswana AIMS team in Pretoria: it is an example of **vertical integration** towards the formation of an AIMS network in a country of SADC

How to make it happen?

- Should be institutionalised
- Meet the needs of the stakeholders
- Awareness training of stakeholders
- Avail resources

5 Steps to be taken first (Strategies)

- Identify the key driver (Ministry of Agriculture – Food Security & Early Warning Section)
- Mobilise the relevant stakeholders (information users/providers)
- Identify/select the relevant information
- Establish the network structure
- Networking

Figure 2, Participants of the 2nd LIMS stakeholders meeting on 21st April 2009 at NVLB

5. TRAINING OF TRAINERS ON LIMS TEMPLATES, APPLICATION and SoP's

The same as LIMS training of trainers conducted in other SADC MS, the main objective here was to enable national experts operate and use the application and at a later stage conduct similar training for livestock information officers at regional and district level within Botswana. The training of regional and district experts is an essential part of establishing LIMS in the country. To enable trainees concentrate only on the training and not disrupted by routine activities during the three days, a venue away from office premises was selected. The Strengthening capacities for risk management of Transboundary Animal Diseases in the SADC Region (SADC TADs Project, SACCAR building BCA) kindly provided training venue at their premises in Sebele. A total of eleven trainees were nominated by different departments for the training of trainers. The following is the list of participants.

Table 2, List of participants of the LIMS training

No.	Name	Gender	Designation
1	Mr. Lebani Nthoyiwa	Male	Principal Scientific Officer
2	Mr. Hezlet Gerald Mphinyane	Male	Principal Scientific Officer II
3	Dr. Tshepo Yvonne Sereetsi	Female	Veterinary Officer, Gaborone field office
4	Ms. Cecilia Tlamelo Opelokgale	Female	Principal Veterinary Technician
5	Mr. Lengsen Buzwani Habana	Male	Principal Technical Officer
6	Dr. Jaone Jayson Mazebe Sebina	Male	Senior Veterinary Officer, Francistown
7	Ms. Kefilwe Ntesang	Female	Scientific Officer
8	Ms. Kebonye Phorego	Female	Scientific Officer
9	Dr. Kabo Thema	Male	Veterinary Officer, Lobatse
10	Mr. Ratsatsi Witness Mokotedi	Male	Principal Scientific Officer, Mochudi
11	Dr. Benjamin Ditsele	Male	Principal Veterinary Officer

A more detailed list of participants to the LIMS training of trainers' course is presented in annex 3. Some snapshots of the training are shown hereafter.

Figure 3, LIMS template and application training in Botswana in progress

The training aims at sensitizing the **future trainers** to the rationale of LIMS system. Obviously it is also to train them on the **LIMS application functionalities** and the **templates contents**, so that they become familiar with the entire concepts and system.

The LIMS training had two major components. These are the training on the LIMS template and the training on the operation and use of the LIMS application. The timetable for the training is attached as annex 4.

a) Training on the LIMS templates – Before embarking on data entry to the database, trainees need to know the data collection forms or templates. The knowledge of what type of data is collected, how often and the right columns where these should be entered are crucial for better understanding of the database at a later stage. Hence, among the 11 modules representative LIMS templates were selected and each was described to the trainees. Additional information included as footnotes for the selection of parameters where there are multiple choices to pick from were adequately covered. The trainees were briefed on the Standard Operating Procedure for providing comments and suggestions for further improvement of the templates as well as for daily use when these are introduced to the grass roots from where data is captured on paper copies or MS Excel sheet. The trainees also received both the electronic and hard copy prints of all the templates for the 11 modules of LIMS.

The system is based on the principle: "*if you master one template, you master them all"*, as most screens and templates share a similar tabular presentation.

b) Training on the LIMS application – This component of the training focused on the proper operation and use of the LIMS database. Trainees were taken through the installation and configuration of the application, data entry and modification, query building, report generation, export of data for final analysis and procedures for backing up data and transfer data files between different installation. The complete training timetable is attached as annex 3. Each of the trainees had access to an Asus Mini-laptop on which all the exercises were practiced. One of the trainees used his own laptop throughout the course. During the training of the three days, eight of the 11 modules were fully covered first by demonstration followed by exercise using live and in some cases dummy data. Due to time shortage, three of the modules were briefly mentioned, but not fully covered. However, since the operations involving data entry, modification and query are similar for almost all modules of the LIMS application, trainees would not have difficulties managing the remaining modules.

At the end of the three days training, a general discussion was conducted with the participants. The trainees expressed their satisfaction on the training, which according to them was well organised and conducted. The training for most was informative and LIMS is the best way for managing information. Other comments included:
a) The training was compressed into three days. It would have been better if ample time was devoted for better understanding.
b) The participants were invited at short notice. That did not allow them to bring real data for training.
c) The need for PRINT to continue providing technical support.
d) It was not clear whether general computing skill was taken into account while selecting candidates for the training of trainees.

e) Most trainees fear that upon returning back to their duty station they may not have chance to continue using the LIMS application[*], in which case training them would mean a waste of time, resource and effort.

f) There is lack of computers at district level

g) There is no data for most modules and there is a need to generate these to make the system work. There are a lot of activities being conducted. However, little is recorded. We should start working and working now.

h) For the evaluation of the training and the best way forward, it would have been good to have the senior management. Unfortunately, none of them came to see how the training was being conducted and assess the situation.

The trainees finally agreed to meet on Monday 27 April and produce a common back to office report and request senior management to give them chance to continue using LIMS and chart a way forward for further implementation of the system in the country.

Eleven "eee ASUS" mini laptops computers from PRINT were available, all running OS XP and Access 2003 reducing hence the loss of time due to adjusting LIMS on other systems like Access 2007 and Vista (though LIMS can adapt the other systems and OS). External QWERTY keyboard were available to switch to keyboards English setting. In such a training with the LIMS software , all PC must be set up with regional parameters as **English UK** to properly run LIMS software (decimal is a dot and thousand space is allowed). This will also be a prerequisite when running LIMS in MS (therefore to be put as a warning message in the training material)[1]. Some attendees run their own computers some with Vista.

Some major issues to be looked at when running the LIMS in Botswana are highlighted hereafter in the report.

5-1 Validation of Partitions

The concept of partitions of a country is generally well understood (= Administrative divisions and Cadastral Boundaries on one hand and any Technical division used for the purpose of managing Livestock issues). Nevertheless, the alternative use of **technical partitions** versus **administrative partition** must be discussed in depth during a LIMS adoption mission, as these are key features into LIMS to insure interconnectivity with other information chains and provide room for populating the LIMS with external data originating from other sources than the Ministry of Agriculture (e.g. zoonosis records from MoH will use health zones).

This aspect of the LIMS allows capturing data from various sources by respecting the **observation units** they originally use. It therefore allows to interact and interconnect with other systems by assuring that one can import/export some information / data in compliance with the relevant observation units required (i.e. with logical and geographical compliance and GIS interconnectivity).

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[*] Note that each trainee received a CD containing the application, user manual, training notes, etc. at the end of the training.

[1] Refer to Annexe for more explanation

The LIMS screen that allows to pre-populate and define administrative and technical **partitions** of a country (this must be reflected at SADC level as SADC level will compile data using the same shared partitions).

For SADC purpose, it needs to be populated with at least the **ADMIN2 level** of a country (generally named a "district", it refers to the ISO standard for coding), so that all data are aggregated at such a level and sent to SADC accordingly.

Nevertheless for a national utilisation of LIMS one can think to implement a rather more detailed set of zones (ADMIN3, Crush Pen, or Dip Tank catchments areas etc..) in the future. Such level of information will remain in the **national LIMS database**, only aggregated data at ADMIN2 level will be sent to SADC for **regional compilation** at SADC secretariat in Botswana.

The Generic Partitions, Admin 1.Admin, 2. and some Technical partitions have to be validated in Botswana[2] and we provide the alternatives into the annexe (cf. LIMS Comment sheet) and some elements in the following paragraphs. **Web-mapping** under the AIMS portal cf. http://LIMS.sadc.int requires consistent correspondence between partitions implemented on the portal and in LIMS, therefore the need to monitor any changes into the system.

The trainers mentioned that there is a trend in Botswana to eventually present statistics with the only use of administrative partitions rather than using alternative technical partitions like currently used by veterinary authorities.

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[2] Sources of geographical data were explored during the first situation analysis undertaken in phase one of LIMS cf. the report.
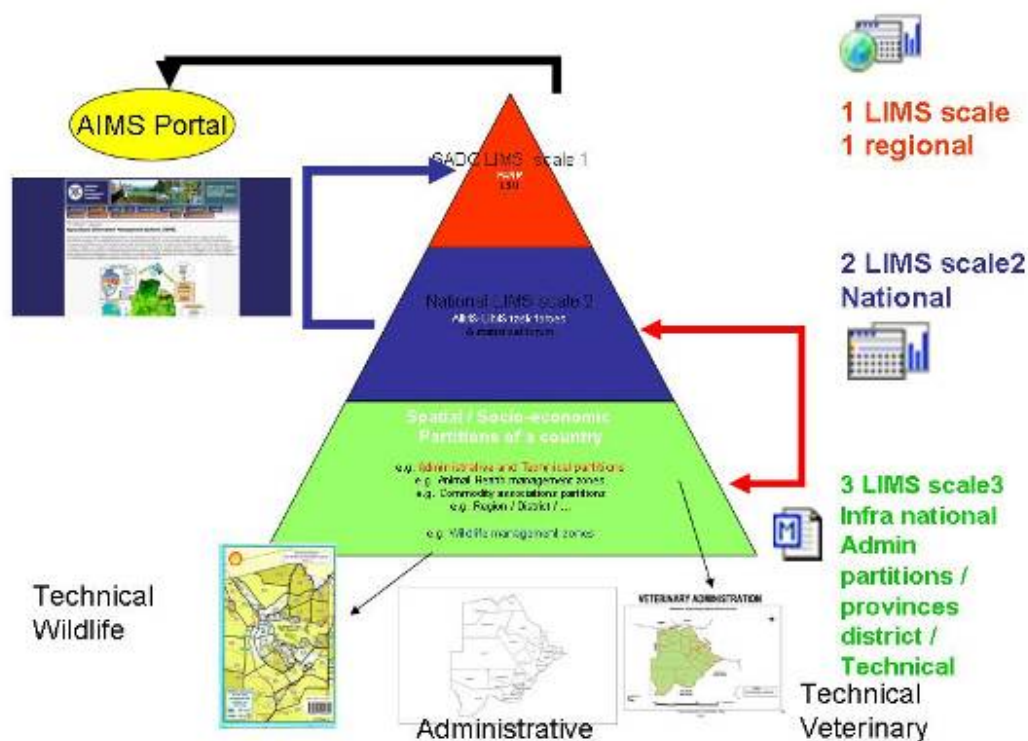
LIMS provides for compiling stats from various origins by allowing indicating various technical or partitions besides the administrative one's. An example in Botswana is provided hereafter, where data from Wildlife department can be inputted into LIMS using wildlife management areas, or veterinary health data can be inputted using veterinary zones.

5-1-1 Administrative partitions

The final list of administrative zones should be provided by the group of trainers as it appears that there are discrepancies in official sources (cf hereafter some mentioned) and moreover there is a reform of the admin structure of Botswana. Eventually all statistics will be provided using administrative partitions, meanwhile the MoA can always enter historical data into LIMS using the relevant technical or administrative partitions that were in use.

Options of partitions in Botswana (from various sources)
According to WHO and the BNA BW atlas (Surveys and Mapping) there were 10 "administrative" regions in Botswana with various topo-names used (attach is a map corresponding).

Country:	Botswana
Representativity:	January 2000
Source of the data:	Department of Surveys and Mapping

Source of the codes:	SALB project, Copyright © United Nations 2003. All rights reserved
Comments:	According to the National Mapping Agency, there was no 2nd administrative level in Botswana in January 2000

1st administrative level names	1st administrative level codes
Central	BWA001
Chobe	BWA002
Ghanzi	BWA003
Kgalagadi	BWA004
Kgatleng	BWA005
Kweneng	BWA006
Ngamiland	BWA007
North-East	BWA008
South-East	BWA009
Southern	BWA010
10 units	

These regions are also called districts some times and serve to map socio-economic data in the last thematic Botswana atlas.

According to other sources (FEWS), the numbers and names differ and there are 6 regions (including Gaborone) and 26 districts under the regions, like shown in the next table (and map displaying the 26 districts). Actually this map and table will not beused.

NAME1_	PCODE	NAME2_Districts
Central Region	BWA001	Letlhakane
Central Region	BWA001	Serowe
Central Region	BWA001	Selebi-Phikwe
Central Region	BWA001	Bobonong
Central Region	BWA001	Mahalapye West
Central Region	BWA001	Palapye
Central Region	BWA001	Mahalapye East
Francistown Region	BWA002	Tutume
Francistown Region	BWA002	Tati
Francistown Region	BWA002	Tonota
Gaborone Region	BWA003	Kweneng North
Gaborone Region	BWA003	Kweneng West
Gaborone Region	BWA003	Kgatleng
Gaborone Region	BWA003	Kweneng South
Gaborone Region	BWA003	Bamalete/Tlokweng
Maun Region	BWA004	Chobe
Maun Region	BWA004	Ngamiland West
Maun Region	BWA004	Ngamiland East
Southern Region	BWA005	Ngwaketse West
Southern Region	BWA005	Ngwaketse North
Southern Region	BWA005	Ngwaketse Centra
Southern Region	BWA005	Ngwaketse South
Southern Region	BWA005	Barolong
Western Region	BWA006	Ghanzi
Western Region	BWA006	Hukuntsi
Western Region	BWA006	Tsabong

According to Wikipedia source, Botswana has 28 "sub-districts" and 9 regions also called « districts". The trainees agreed to take this option as the most representative for the regions in Botswana. Only the number of districts is still controversial and should be clarified by trainees liaising with the survey and mapping and referring to an official and legal document.

1. Central
2. Ghanzi
3. Kgalagadi
4. Kgatleng
5. Kweneng
6. North-East
7. North-West
8. South-East
9. South

Following the source from Maplibrary, Botswana has also 9 regions but 26 sub districts (cf Maps and table)

LBL	ADM1	ADM2
BOT-1	Central	Bobonong
BOT-2	Central	Letlhakane
BOT-3	Central	Mahalapye East
BOT-4	Central	Mahalapye West
BOT-5	Central	Palapye
BOT-6	Central	Selebi-Phikwe
BOT-7	Central	Serowe
BOT-8	Central	Tonota
BOT-9	Central	Tutume
BOT-10	Ghanzi	Ghanzi
BOT-11	Kgalagadi	Hukuntsi
BOT-12	Kgalagadi	Tsabong
BOT-13	Kgatleng	Kgatleng
BOT-14	Kweneng	Kweneng North
BOT-15	Kweneng	Kweneng South
BOT-16	Kweneng	Kweneng West
BOT-17	North-East	Tati
BOT-18	North-West	Chobe
BOT-19	North-West	Ngamiland East
BOT-20	North-West	Ngamiland West
BOT-21	South-East	Bamalete-Tlokweng
BOT-22	Southern	Barolong
BOT-23	Southern	Ngwaketse Centra
BOT-24	Southern	Ngwaketse North
BOT-25	Southern	Ngwaketse South
BOT-26	Southern	Ngwaketse West

Some administrative partitions were implemented into LIMS before the training in Botswana, based on the previous situation analysis. They were discussed and are subject to change (into LIMS one can edit such a list before entering data)

ADMIN Partition list as implemented into LIMS (yellow = ADMIN1)

CountryCode	PartitionLevel	PartitionType	PartitionName	ParentPartitionName
BW	1	Administrative	Southern	
BW	1	Administrative	Francistown	
BW	1	Administrative	Western	
BW	1	Administrative	Central	
BW	1	Administrative	Maun	
BW	1	Administrative	Gaborone	

BW	2	Administrative	Ngwaketse South	Southern
BW	2	Administrative	Tutume	Francistown
BW	2	Administrative	Tsabong	Western
BW	2	Administrative	Tonota	Francistown
BW	2	Administrative	Tati	Francistown
BW	2	Administrative	Serowe	Central
BW	2	Administrative	Selebi-Phikwe	Central
BW	2	Administrative	Ngwaketse West	Southern
BW	2	Administrative	Ngwaketse North	Southern
BW	2	Administrative	Ngwaketse Centra	Southern
BW	2	Administrative	Ngamiland West	Maun
BW	2	Administrative	Ngamiland East	Maun
BW	2	Administrative	Chobe	Maun
BW	2	Administrative	Palapye	Central
BW	2	Administrative	Mahalapye West	Central
BW	2	Administrative	Bamalete/Tlokweng	Gaborone
BW	2	Administrative	Bobonong	Central
BW	2	Administrative	Ghanzi	Western
BW	2	Administrative	Hukuntsi	Western
BW	2	Administrative	Kgatleng	Gaborone
BW	2	Administrative	Kweneng North	Gaborone
BW	2	Administrative	Kweneng South	Gaborone
BW	2	Administrative	Kweneng West	Gaborone
BW	2	Administrative	Letlhakane	Central

BW		2	Administrative	Mahalapye East	Central
BW		2	Administrative	Barolong	Southern

5-1-2 Technical partitions

Similarly some technical partitions were implemented into LIMS before the training in Botswana, based on the previous situation analysis and census data collected by DVS (Vet regions districts and sub districts). There are 6 veterinary regions and 16 "veterinary districts" in Botswana (cf following map), though 19 are shown in some instances by splitting some (cf Table (Maun + Shakawe+Nata) / (Tsabong + Hukuntsi)) and when dealing with some sources of census data (DVS cf following tables).

Non official stats on number of animals (source DAHP)

ANIMAL STOCK CENSUS 2006 SUMMARY
FOR DEPARTMENT USE ONLY

DISTRICT	BULLS LOCAL	BULLS IMPROVED	COW	HEIFER	OXEN	TOLLIES	CALVES BULL	CALVES HEIFERS	NOT BROUGHT	TOTAL CATTLE	SHEEP	GOATS	PIGS	HORSES	DONKEYS	DOGS	CATS
FTOWN	507	1414	45586	13434	6723	10024	10247	11296	1800?	106442	6244	36390	13	237	5265	6779	881
LETLHAKANE	540	1717	60014	16284	10482	12842	13868	19687	5491	195360	7251	51141	254	4672	8994	6897	867
NATA	373	627	23759	6779	4450	5858	4441	6429	6693	58400	3196	15928		2197	2676	1719	230
MAUN	731	1503	60566	18862	11690	13173	11938	12852	21227	152357	13096	70850		6718	12930	10429	679
KASANE	405	46	6890	2003	1410	1252	1528	1877	109	15328	976	3673	33	58	142	1955	180
SHAKAWE	182	254	11978	3798	4073	1686	2719	2739	2677	29404	56	27352	9	634	3810	3306	353
GHANZI	62	2198	56000	17545	3194	14094	14169	10422	21076	138367	5752	16835	0	3068	2593	3923	161
HHUKUNTSI	143	401	20722	5458	1916	4817	5809	6176	0	45572	2870	17572	0	1734	2143	2322	59
TSABONG	1411	3294	32938	14126	9411	14106	8470	10352	4650	98797	25328	61522	0	5128	8798	2795	90
KANYE	727	2032	53794	21136	9251	19679	11585	11694	10182	139979	12631	43254	0	5171	17849	5358	2406
JWANENG	86	1316	32020	13083	4551	8573	5845	7164	7062	80700	7324	23389	0	3285	5867	2375	685
LOBATSE	113	904	22216	11342	2083	8714	4587	5306	1873	57160	6903	17763	0	279	7143	2397	878
MOLEPOLOLE	798	2390	79194	25972	8503	21458	58025	84667	9200	253337	12045	60555	0	2855	13805	8998	2539
GABORONE	51	311	7531	3630	1450	2587	1525	2056	418	19492	2174	12262	0	139	2365	1328	511
MOCHUDI	140	833	24895	8380	2360	7472	6864	6631	4096	62636	3957	17861	1147	869	3901	2719	1285
SEROWE	296	2431	68612	26135	6013	20675	17279	17100	15267	175168	6622	34440	0	1054	8447	4904	1440
MAHALAPYE	694	2952	91431	26021	11367	21159	21982	23303	20278	221217	10381	45323	0	1049	11410	10037	1822
PALAPYE	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	138672	8214	42123	0	308	12225	7943	821
SIPHKWE	422	1071	337120	54227	3753	18941	4442	5038	12292	95806	20048	52276	0	217	14888	6111	2134
TOTALS	7641	21882	1044212	291278	102713	197351	198197	240295	162339	2036137	152077	652518	5456	34928	144888	89747	17923

Trends in census from DAHP

MINISTRY OF AGRICULTURE; BOTSWANA

DEPARTMENT OF ANIMAL HEALTH AND PRODUCTION

CATTLE CENSUS FOR THE LAST NINE YEARS

STATION	2005	2004	2003	2002	2001	2000	1999	1998	1997
Francistown	165,782	115,224	162 181	198 390	229 695	220 636	220,112	201 751	179 203
Letlhakane	133,778	132,190	169 852	169852	144 635	122 543	138 253	140 321	102 398
Nata	40,846	45,591	49 508	51 645	STILL	UNDER	FRANCIS	TOWN	DISTRICT
Serowe	147,475	119,600	174 948	174 948	171 468	161 645	161 645	162 066	151 892
Selibe Phikwe	78,238	67,262	52 691	154 699	154 598	125 000	109 284	109 631	106 460
Palapye	137,352	98,553	114 086	163 035	148 621	122 926	124 017	145 440	133 811
Mahalapye	220,976	166,348	172600	185 718	179 375	222.029	218 600	218 666	181 919
Molepolole	217,958	161,684	168,476	167310	178 436	185 500	154 761	117 813	176 902
Mochudi	76,404	42,900	52 076	93 704	82 907	56 131	52 835	77 408	74 216
Gaborone	20,784	14,148	15,493	15459	20 310	32 867	54 351	48 396	42 194
Kanye	146,926	126,609	136,002	130130	126 489	160 309	212 257	216 139	146 531
Lobatse	57,391	54,077	49,719	54 211	53 364	Still under	Kanye	District	Station
Jwaneng	85,023	65 510	67,751	66 320	73 243	65 694	67 739	52 648	51 993
Gantsi	212,786	164,190	186,133	143026	155 798	153.882	208 000	200.109	143 131
Tsabong	110,783	54,615	112,593	131730	159 089	134 032	157 622	140 000	101 189
Hukuntsi	58,598	39,512	51,336	49 360	WAS	STILL	UNDER	TSABONG	DISTRICT
Maun	166,479	161,829	144,990	131 069	103 400	122.216	96 197	73 328	Eradicated
Kasane	16,466	16,084	14012	15 053	14 289	14 474	14 995	13 586	Station
Shakawe	29,862	28,489	20 137	24 145	17 034	17 244	Still under	Maun	Station
TOTAL	2,117,907	1,674 415	1 797 325	2 099 731	2 012 751	1 917 133	2 040 674	1 917 136	1 530 839

Census figures represent number of cattle covered during Anthrax/QE annual vaccination campaigns which is estimated at 80%.

These partitions are used when dealing with LS issues by DVS (at the time DAHP).


16 Vet districts

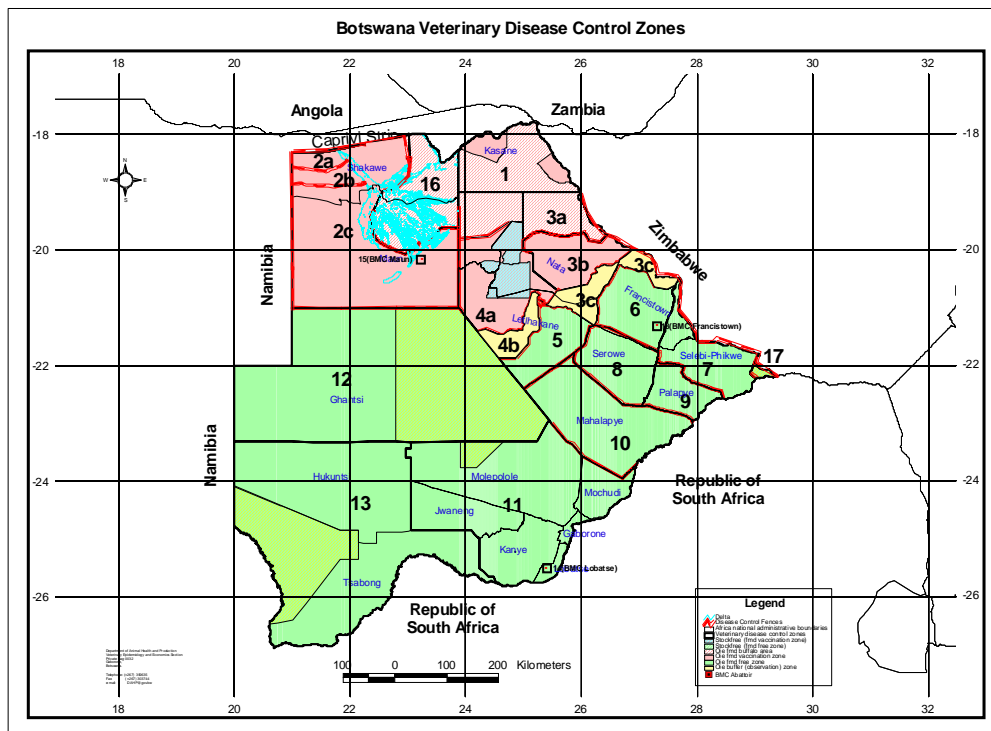Technical Partitions implemented under LIMS (table shows 6 regions, and 19 vet districts)

CountryCode	PartitionLevel	PartitionType	PartitionName	ParentPartitionName
BW	1	Technical	North East	
BW	1	Technical	North West	
BW	1	Technical	South	
BW	1	Technical	South East	
BW	1	Technical	South West	
BW	1	Technical	Central	
BW	2	Technical	Tsabong	South
BW	2	Technical	Mochudi	South East
BW	2	Technical	Molepolole	South East
BW	2	Technical	Nata	North West
BW	2	Technical	Palapye	Central
BW	2	Technical	Selibe Phikwe	Central

BW		2	Technical	Maun	North West
BW		2	Technical	Shakawe	North West
BW		2	Technical	Letlhakane	North East
BW		2	Technical	Serowe	Central
BW		2	Technical	Lobatse	South West
BW		2	Technical	Kasane	North West
BW		2	Technical	Kanye	South West
BW		2	Technical	Jwaneng	South West
BW		2	Technical	Hukuntsi	South
BW		2	Technical	Gantsi	South
BW		2	Technical	Gaborone	South East
BW		2	Technical	Francistown	North East
BW		2	Technical	Mahalapye	Central

There is also a partition dealing with OIE status of land and reflecting control measure (vaccination, disease free..) (cf following maps) i.e. a partition appropriate *vis à vis* export market of meat (cf. Module M5 of LIMS).

Botswana Veterinary Disease Control Zones
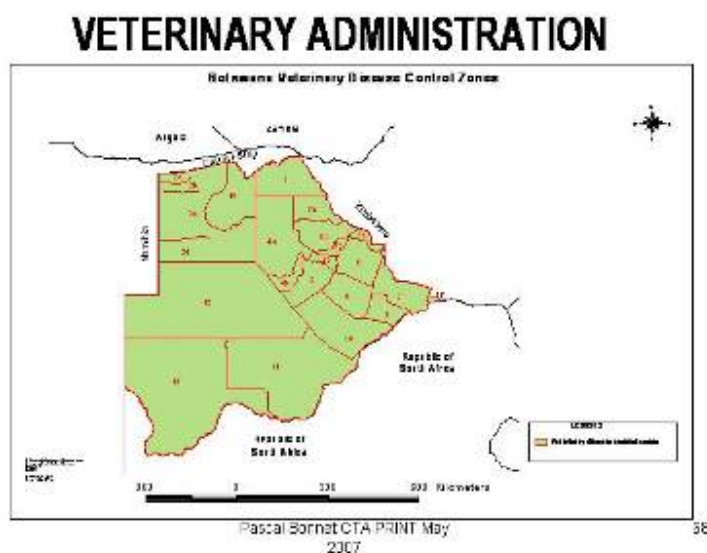
Alternative Technical partitions that could be implemented into LIMS:
Given the importance of wildlife in the country it should be possible to enter data originating from the relevant sources of information.

The Wildlife & Game zoning in the Okavango delta (to the west Ngamiland where several FMD outbreaks occurred): source = Ministry of Environment, it uses **wildlife management areas** as Technical Partitions

Other partitions like VEA and Crush pens could be implemented into LIMS ata national level though SADC will only require a level 2 ADMIN in its regional compilation.
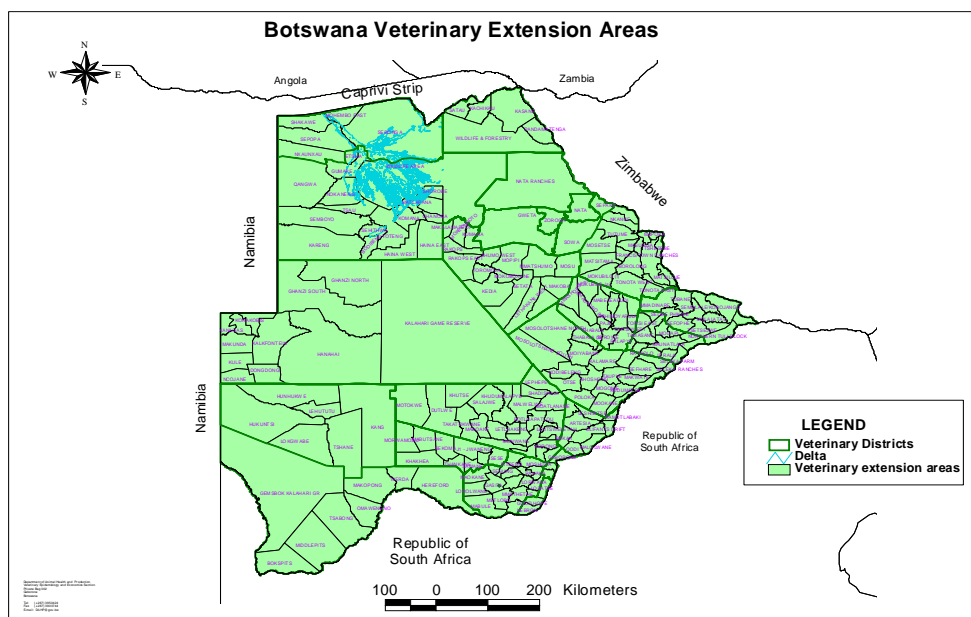
VEA Veterinary Extension areas

If MoA of Botswana get agricultural statistics according to the land tenure regime, it is also possible to capture data using separate technical partitions representing such system as reflected in the following maps.
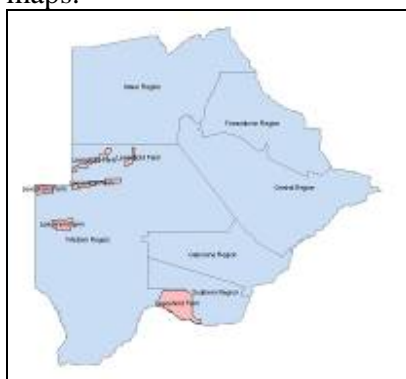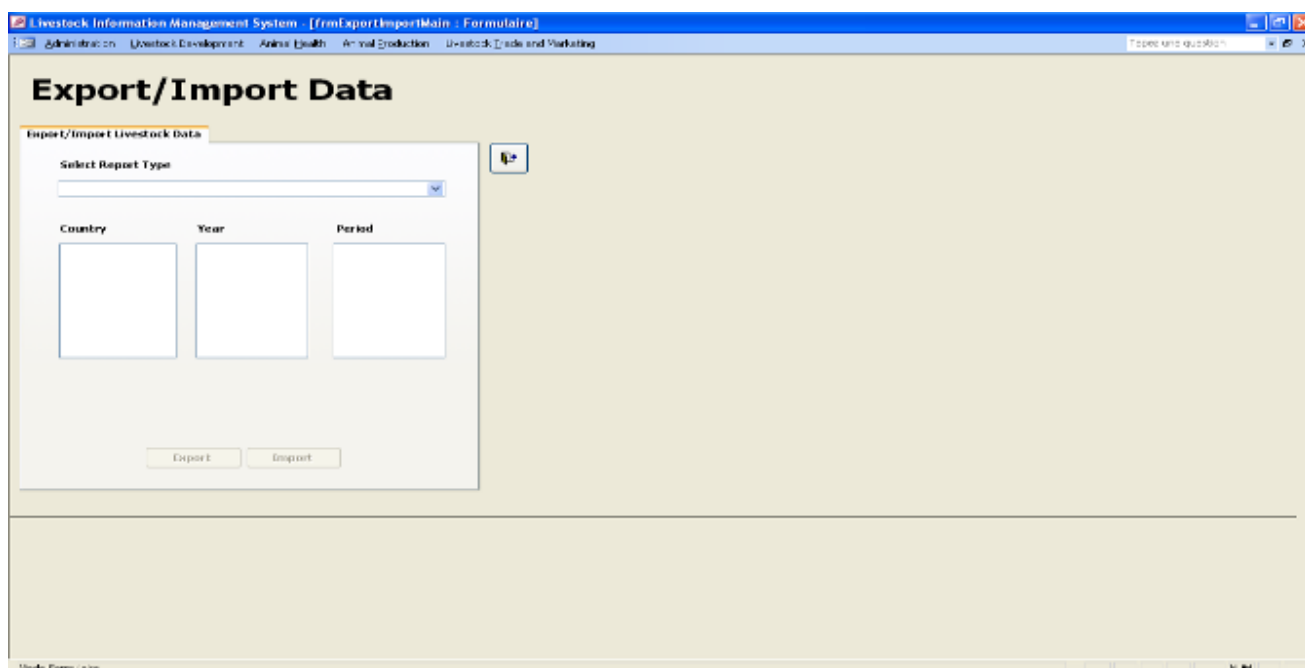

Lease hold

Freehold

TGLP status

One should notice the importance of Compliance of partitions in order to inter operate with other systems.

Interconnectivity between systems: geographical compliance of observation units:
As an example, if data shall be imported into LIMS by Livelihood zones, this set of partitions must be populated into LIMS, thanks to the technical partition facility predefined in such a way. Or if animal census data (Module 1 of LIMS) shall be exported by dip tank or crush pens zones, or by vaccination zones, LIMS can export such information to be inputted in any other system, including a GIS.

The facility that allows export of data or import shall soon allow to select the partitions of preference for data exchange.
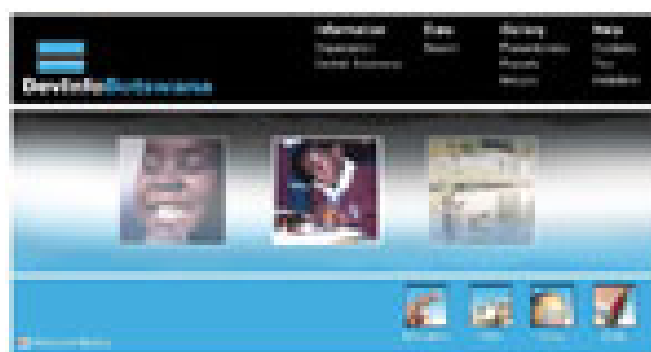

DEVinfo Botswana is an example of external database to be interoperable with LIMS (though we did not investigate the database at CSO, the body responsible for its release)

5-1-3 Villages and towns gazeeter

One can implement a list of Villages, city, towns with their names into LIMS, since some screens use such details (e.g. Module 10 or modules on infrastructures M6). Taken from among the possible sources[3], an official village's gazeeter can therefore be implemented as a set of reference parameters of LIMS.

One of the problem of implementing a **full Gazetteer** into LIMS is that the implementation of a long list into LIMS is not always necessary and will render LIMS a bit "heavy" and slow when it comes to accessing such a listing (by a scroll down feature in the software).
As a mater of facts only a few items (a few names from the list) will be finally used (e.g. use of only towns where Livestock infrastructures do exist). This remark is important to consider before we implement such a listing into LIMS. The current gazetteer in the Botswana Atlas has too many items (towns or cities or village names). PRINT recommends to explore the sources of such lists, validate the available ones and only use one as a "reference list of village" (in LIMS manual and guidelines for Namibia) so that any data capture for a new city or village will be made in compliance with such an official listing and will follow a nomenclature.
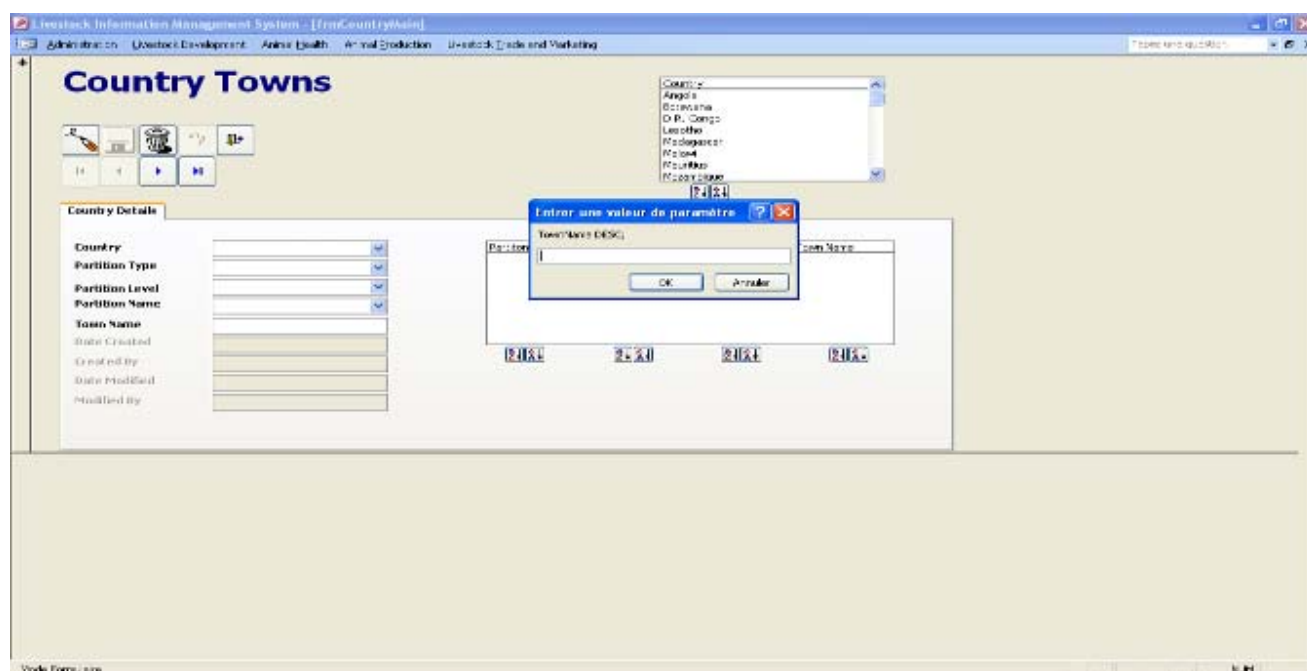
Any city or town' list can be implemented into LIMS thanks to this screen, before becoming available in any screen (by a scroll down menu item) when requiring access to a town name.

Therefore we recommend that a person be in charge of monitoring any change in the national Partitions list (ADMIN1 and 2) and then be updating LIMS with information communicated to SADC

5-2 Components, Modules and Templates looked at during the training

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[3] DEVinfo is not providing any reference for such objects as all DEVinfo indicators are zonal statistics.
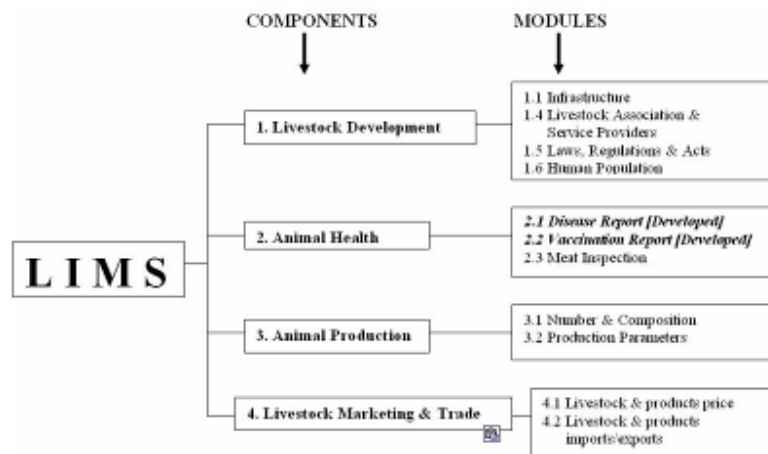
Diagram: the four components of LIMS on which future trainers have been trained (in addition to the administrative module and other functionalities of LIMS).
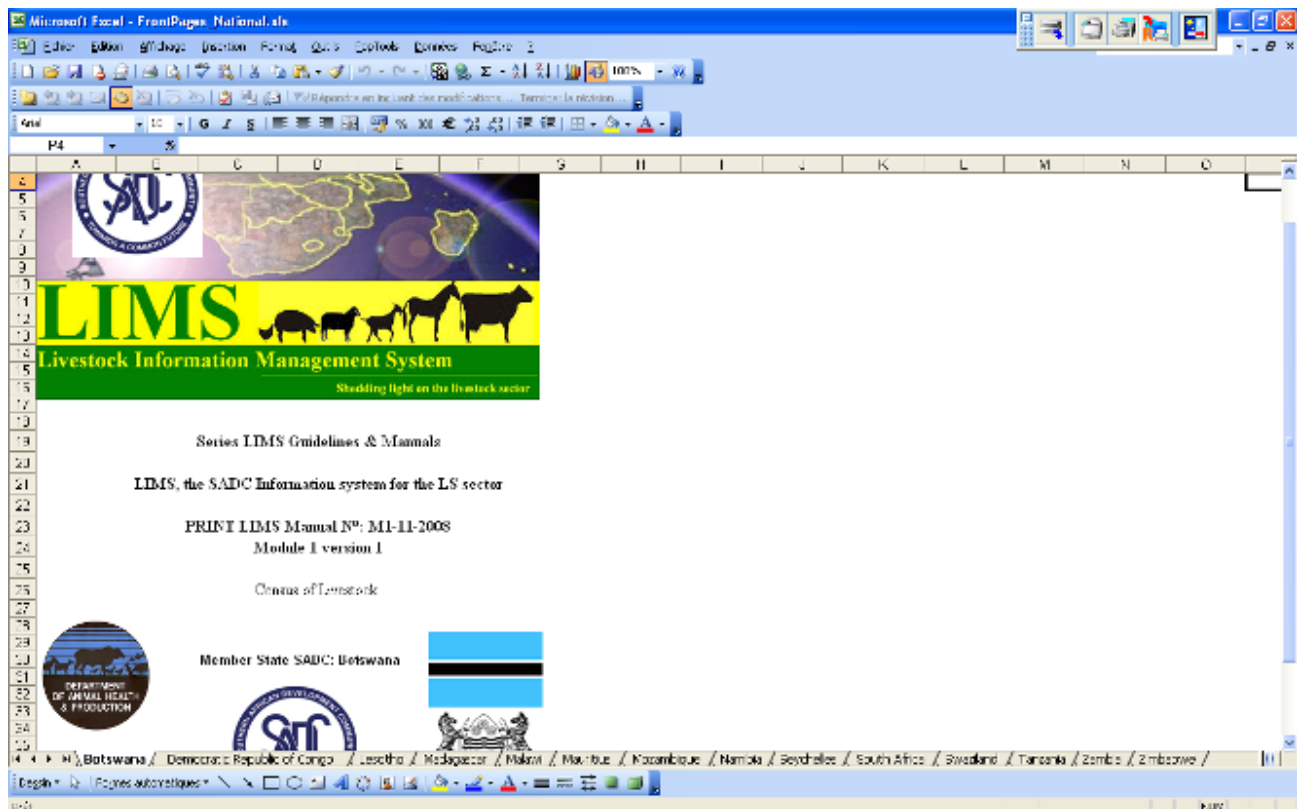
Components have **modules** with reporting **templates** (in Excel all reproduced into the application in MS Access© into screens) which pertain to modules. Therefore there are three levels for categorizing and coding the contents Component Ci Module Mj Template Tk, example C1M1T1.

The templates can be customized to the country logos and institutions. Questionnaires can be derived from the tables to be used in the field at any hierarchical level.

Liste des Modules et écrans (rapports types Excel) correspondants au système LIMS / *Lista dos Modulos e ecrã (relatorios tipo Excel) do LIMS* / **List of Modules and screens (SADC Harmonized templates) of LIMS**

- Front page national / page de guarda nacional / page de garde nationale

  - Headers / Timbre / Entête

- Module 1 *Numbers & Composition of Herds* / Effectivos animais do rebanho nacional / Effectifs nationaux – recensement animal
  - 1. *Nr by species* / effectivos animais por espécies / Nombre par espèce
  - 2. *Nr by economics /* effectivos animais por função economica / Nombre par fonction économique
  - 3. *Nr by breeds* / Effectivos animais por raça / Nombre par race
  - 4. *Nr by herd structure* / Effectivos animais por idade e sexo / Nombre par âge et sexe (démographie)

- Module 2 *Human Households & Population in Livestock farming* / Agregados familiares criadores / Ménage engagés dans l'agriculture et l'élevage
  - 1. *Human Population* / Agregados familiars / Ménages et population humaine

- Module 3 *Production Parameters* / Produção animal / Production animale
  - 1.*Slaughter* / Abate (carne) / Abattages
  - 2.*Milk* / Leite / Lait
  - 3.*Dairy products* / Lacticinios / Produits laitiers
  - 4.*Eggs* / Ovos / Oeufs
  - 5.*Hides, skins* / Curos e Peles / Cuirs et peaux

- Module 4 *Livestock & Products Price* / Preços dos productos animais / Prix des produits d'élevage et animaux vivants
  - 1. *Live animals* / Animal vivo / Animaux vivants
  - 2. *Meat products* / Producto de carne / Produits carnés
  - 3. *Milk products* / Leite e Lacticinios / Produits laitiers
  - 4. *Eggs* / Ovos / Oeufs
  - 5. *Hides & skins /* Curos e Peles / Cuirs et peaux
  - 6. *Fiber & feathers /* Fibras e plumas / Fibres animales et plumes

- Module 5 *Livestock & Products trade: import/export* / Importação e Exportação / Import et Export
  - 1. *Live Animals* / Animal vivo / Animaux vivants
  - 2. *L. stock Products* / Productos animais / Produits d'élevage
  - 3. *L. stock Inputs /* Inputs / Intrants de l'élevage

- Module 6 LS *Infrastructures* / Infra-Estructuras / Infrastructures

  Generic Partitions / Divisões do pais / Divisions du pays
  - 1.Administrative / Administrativa / Administratives
  - 2.Technical / Tecnico / Techniques

  Infrastructures *Agreg*. / Infra-Estructuras Agregados / Infrastructures description agrégées
  - 3.*Dipping* / Tanque banheiros / Bain détiqueur
  - 4.*Pens* / currais / Enclos de vaccination
  - 5. *Vet clinics* / Clinicas vet. / Cliniques vétérinaires
  - 6.*Govt Offices* / Officios do governo / Bureaux de l'état
  - 7. *Mun Abattoirs & slabs* / Matadouros municipais e locais e casas de matança / Abattoirs locaux et tueries

- 8. *Milk Collection* / Recolha de leite / Récolte de lait liquide
- 9. *Livestock Markets* / Mercados de Gado / Marchés
- 10.*Storage Products* / Armazens / Entrepôts et Stocks

Infrastructures Detailed / Infra-Estructuras detalhados / Infrastructures détaillées
- 1.*Vet Diagnostic Labs* / Laboratorios de diagnostico / Laboratoires de diagnostic
- 2.*Vet Vaccine Labs* / Productores de Vacinas / Producteurs de vaccins
- 3. I*ndustrial Abattoirs* / Matadouros industriais / Abattoirs industriels
- 4.*Dairy Processing Plants* / Usina de transformação de leite / Unité de transformation laitière
- 5.*Secondary Markets*, / Mercados segundarios / Marchés secondaires
- 6. *Port of Entry & Exit* / Portos de entrada e saida / Postes d'inspection en frontière PIF

- Module 7 *Meat Inspection / Food safety* / Segurança Sanitaria dos alimentos / Sécurité sanitaire des aliments
  - 1. Ante-mortem / Inspecção ante mortem / Inspection ante mortem en abattoir
  - 2. Post-mortem / Inspecção post mortem / Inspection post mortem en abattoir

- Module 8 *Livestock Associations and Service Providers /* Associações de criadores e fornecedores de servicios / Association d'éleveurs et fournisseurs de services
  - 1.*Umbrella org & assoc* / Associações profissionais / Associations et Confédérations
  - 2.*Private companies* / Sector Privado / Secteur privé
  - 3.*Government* / Sector Publico / Secteur public

- Module 9 *LS related Laws, Regulation and Acts, policy docs* / Legislação e politicas agro pecuaria / Législation et documentsd e politique sur le secteur élevage
  - 1.*National Docs* / Documentos al Nivel nacional / niveau national
  - 2.*International Docs* / Documentos al Nivel internacional e regional (SADC) / Niveau international ou sous régional (SADC)

- Module 10 *Disease Outbreak notification* / Notificação dos surtos de doenças / Information sanitaire notification d'épidémies animales
  - *Outbreaks* / Epidemias focos / Foyers d'Epizooties animales

- Module 11 *Vaccinations* (e.g. TAD's) / Vacinação / Vaccinations
  - 1.*Vaccination* / Vacinações efectuadas / Vaccinations effectuées (prophylactique et de contrôle)

5-3 Related Manuals on templates and the LIMS application

The draft generic manuals prepared by PRINT were released at this stage, since they have been updated with comments made during the previous trainings. The same applies for the Users manual (on how to manage the software). Any new versions will be posted on line (including in a wiki manual) distributed during further meetings and workshop and sent to MS.

5-4 Drafting of first SoP's for LIMS in Botswana

The general principle of LIMS is to share the effort of collecting the data therefore it requires the contribution of various institutions selected from the existing sources belonging to the national AIMS / LIMS networks. Therefore it is essential that such LIMS networks are formed in all MS (cf. next paragraph).

SoP's are aimed at indicating the **roles and functions** of some institutions when **contributing** (and **using**) the LIMS. After listing the relevant institutions that can could contribute to the LIMS, one should select the most relevant ones, and then convene a meeting with them and then agree on to

organize the data flow. Therefore it will support the completion of the entire information chain for the given module or component of LIMS taken care of.
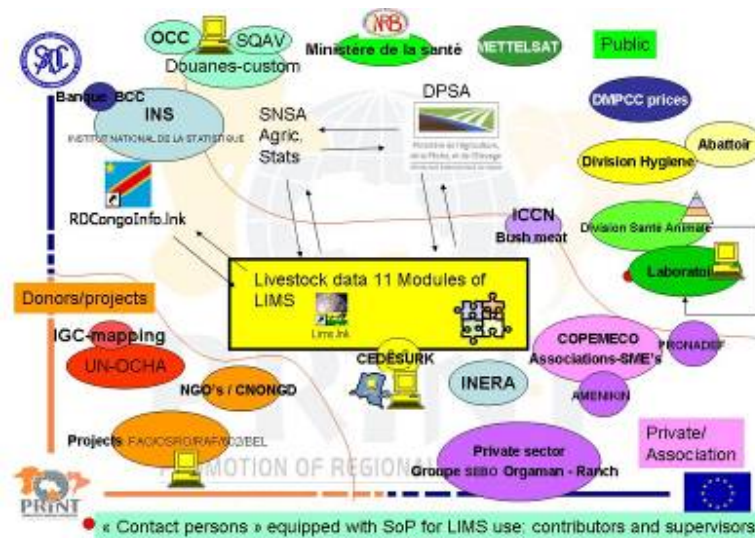
e.g. a comprehensive stakeholder map made in DRC for LIMS information, will now be reduced according to templates and modules and then reorganized in order to produce a set of recognized and accepted diagrams for contribution and use to/of LIMS.

e.g. Example of a diagram to be included into an SoP for the Module 5: in DRC three institutions were identified as potential sources and one 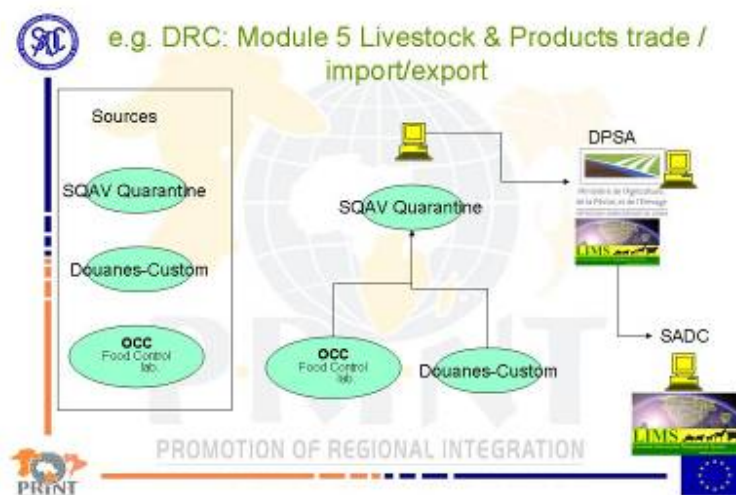was selected to capture the data into LIMS and then transfer dataset to a national database, before it is reported to SADC. An information system using a LAN is highly recommended though the system provides for transferring data in other means (email an attached file, uploading through FTP, physical transfer by flash disk etc..).

The aggregation of individual diagrams can be attempted to present a global picture on how information will flow, therefore providing for the entire rationale of the LIMS network. It would explain how data flows from primary source to secondary and to the central database, using multiples

sources (private and public) and multiple scales, all data being aggregated at a certain stages, therefore respecting the privacy of information provided.
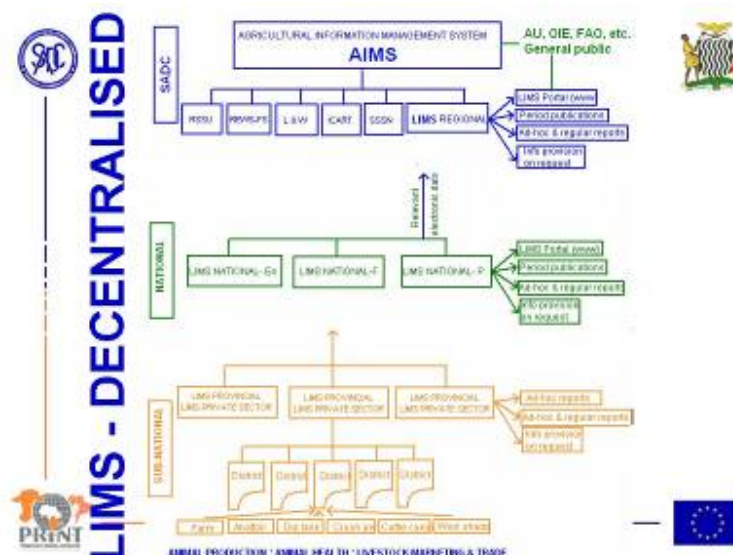
Figure: a simplified and structured Diagram of the potential ways of transferring data within a country and between SADC and countries. All layers cannot be equipped with **computers** or connectivity so far, therefore the use of **excel templates** and **paper report** mimicking the excel templates is also recommended. The use of some **cell phone and 3G modem technology** should soon facilitate the sending of some information from a stage to another.

Every time a template is filled (equivalent of a data screen in the application) then a **header must be filled** with the given template to indicate e.g. the methodology used to get the data, the source of the data and the person responsible for the module. There are 11 modules, some have quantitative attributes (9/11) and two are non-quantitative (listing). All modules have such a header, which is almost similar in all templates, indicating the frequency of reporting and of submission to SADC, the person responsible and some indication on methodology and source for data submitted to the secretariat.

Metadata

SoP worksheet embeded into the LIMS Excel files (there is also a word version for a comprehensive SoP, with an indication of the process to follow to build SoP by the LIMS LIMS national networks, cf. Annexe)

It is then essential to derive from such diagrams and SoP's (hardcopies or Excel) the roles and functions that will be implemented into the database (cf dedicated screens in the Administration Module), therefore giving access to some or all the functionalities and/or modules.

The person who submits the information should always be indicated into the header of the template and therefore its details should be well described into the database.

5-4-1 Stages recommended for implementing the LIMS in a given country.

In general, we recommend MS be gradually implementing the LIMS, by upgrading **hardware, software and humanware** given a national road map (a business plan specific to the country) taking into account with due respect some **regional milestones** agreed upon at LTC and in sub committees of the LTC.

First stage
Firstly, it is advisable to make an **inventory** of what **data is available** without effort (already available in some institutions being major sources) therefore only requiring a networking exercise.

Second stage
Secondly, the system shall be improved by adding information when it will require little effort.

Third stage
A third stage will be when the completion of the data collection which will require significant effort. It is advised to benefit from other project funds, especially when such projects have been tasked to implement an **information system or a monitoring tool** for a part of or the entire Livestock sector.

An important aspect to consider is **HOW** the contributors will send their contribution **WHO** will, **WHEN**, **WHERE** with which **WHAT** i.e. their dataset (therefore contributing to the LIMS).

5-4-2 Last stage: Contribution and adoption of LIMS procedures, system and tools into other global information chains designed for monitoring the economic development of a country

In some instances, one could insert the LIMS system into a more global system therefore reinforcing it. Here the diagram is highlighting how LIMS can be inserted into the information chain of DEVinfo; all supported by UN, and generally carried out by CSO's in SADC region. These systems are generally weak in capturing indicators and information related to the LS sector. We can actively change this by adopting LIMS as a standard in MS. The same principle applies for chain of information on agricultural statistics that can be sometimes a bit weak on the livestock sector.

5-5 Constitution of a LIMS task force
It is recommended that a **LIMS task force** be constituted and that it meets at least **quarterly**.
It can be constituted at the minimum of DVS and DAP and CSO. The LIMS task force (or network) once established should develop the SoP's for running the LIMS modules accordingly. The participants of the LIMS training in Botswana were not representing enough institutional diversity to be the basis for the first LIMS task force; the group should be therefore enlarged.

The LIMS task force (or network) once established should describe the various responsibilities and develop the SoP's for running the LIMS modules accordingly.

5-5-1 Contributors to Modules by the LIMS task force (Module by Module)
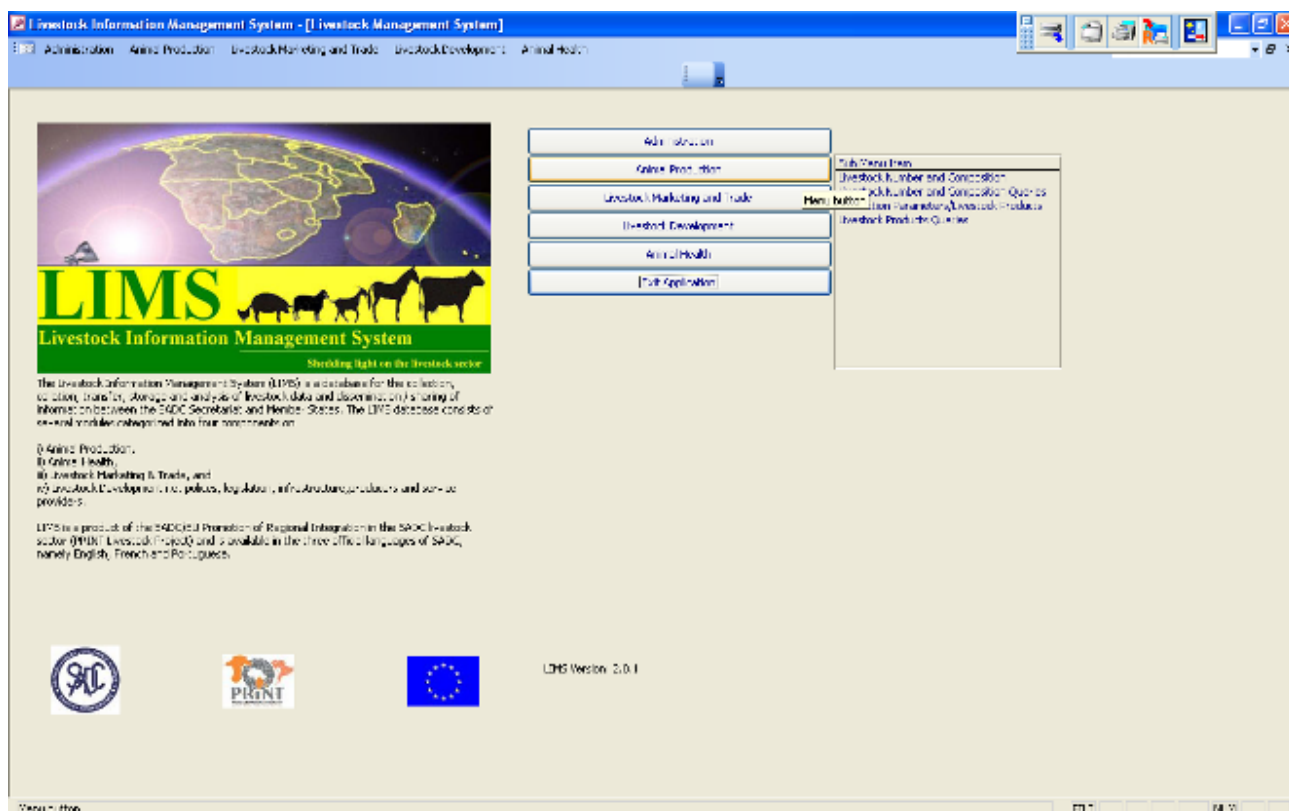
5-5-2 LIMS SoP's Sheet

A SoP sheet has been proposed by PRINT to be used as a guideline when drafting Standards procedures for exchange of information between the various members of LIMS network and sources (such SoP should be designed and improved by MS during their networking exercise).

This sheet shall be used to respond to the questions: **Who** will do **What** regarding LIMS templates and LIMS application? **Why When and Where**? This check list requires firstly the description of all potential actors: Institutions and name of a personnel and its details etc..

The objective of such guideleine is to develop and gradually finalize the **National & specific LIMS SoP's** in the country, i.e. **standard operating procedures** for running the LIMS system, therefore generating a **national network** of **stakeholders** (with their names and positions) which will have **FUNCTIONS** regarding data contribution and use of the system, such as:
- Be part of the **LIMS national Taskforce** which meets quarterly
- Take a responsibility or/and leadership to **provide** data (**contributors** as **primary** source **or secondary** source) and/or **submit dataset** to a "**parent**" **partner** (it could be NALEIC…) in the information chain. Such function can be broken down like:
  - filling some templates (paper work or possibly into the corresponding excel worksheets)
  - entering data into the screens of LIMS application (where ever it is installed)

- **Coordinate** the data capture, **follow up** the versioning of the LIMS application and update LIMS software in locations where it is installed (update may include changes in the reporting excel templates), and coordinate and **monitor** the submission to SADC
    - **Act as** a national coordinator for the regular **submission to SADC**, but it could be required for any level of submission in the information chain
    - **Download** the new **versions** of the LIMS **application** and **templates** (cf. versioning code) and of the **training material** (manuals) when released and
    - **Revise** the national **SoP's** regularly (yearly)
- Act as a **Trainer** on LIMS, using generic manuals and update manuals by drafting country specific contents to better illustrate the use of LIMS (to **customize manuals** for a national purpose)
- **Use and Interact on the AIMS** / LIMS **portal**: use and contribute to the portal with general information on LS related events and information
- Participate to the **AIMS national network**

Drafting the first **country SoP's**, one by LIMS module, will also ensure:
1/ the proper **starting of the data reporting** to SADC (in excel or with LIMS) after the date of the visit of PRINT to MS (firstly using LIMS templates and preparing the compilation of datasets, secondly and gradually using the LIMS application)

    - by using **TEMPLATES in EXCEL** if one cannot use the application for some reasons, or if one wishes to use the excel templates in hard and soft copies in the field (at province and district levels). One should then also follow up updates of new versions of templates (if any) on the LIMS AIMS portal
    - by using **LIMS application** facilities, one should then also follow up updates of new versions on the LIMS AIMS portal: http://aims.sadc.int (Livestock part) or http://lims.sadc.int

The drafting of SoP will again need to clearly:
- **Identify and list the various and potential source**(s) of information, the **types of data** that sources could provide and manage, one should acquire and share the knowledge on when and where data are available and published (.i.e. sources like web sites) in institutions where data are managed by experts (CSO etc..).
- **Prioritize** and **Select** a few **sources** which will contribute to the core system of 11 modules and start dispatching the LIMS roles and functions: list functions firstly so that *in fine* one institution will be selected to report to SADC

2/ A second goal during the networking effort with partners (when drafting SoP's) is also to start an in depth collection of the most recent **dataset available in the country for a year of reference** (**retrospective and detailed data** in hard or electronic copies using the LIMS templates).
It is needed in order to properly analyse some trends in the sector and therefore adequately prepare presentations for various SADC meetings like the LTC. It is also needed to prepare the drafting of the Regional Agricultural Policy during the planned workshops, where such data will be used). Electronic files should be preferred and sent to SADC PRINT.

3/ thirdly to **start process of collecting** elements for a "*5 years data retrospective time series*" in hard or electronic copies as well (in order to properly continue trends analysis)
(Particularly ask NSO to provide all relevant documents (possibly purchased for PRINT))

6. Conclusions & Way forwards

The road map for the way forward shall be decided by MS regarding the development of LIMS in their respective country, by **establishing a 5 years roll out plan for LIMS**. It is expected that almost all MS will be visited by PRINT for the adoption mission before end of 2008 (except RSA and DRC & Seychelles planned in 2009), missions which are aiming at a first sensitization to the SADC information system. The success of the LIMS relies on the **formation and the activity of national LIMS network**s (human-ware) and on the **collaboration between national institutions** holding information on the LS sector. Therefore, we recommend MS use the SoP's provided for guiding such exercise and convene frequent meetings of the LIMS network.

PRINT will attempt to continue providing its support to MS in 2009 through the CIRAD service contract lasting up to November 2009, whereas the program estimate PE4 of PRINT ends in March 2009. The 5 years rolling plan for LIMS should be ready by then. The support in 2009 will be devoted to more training on LIMS and AIMS and to the support to MS to form their LIMS network..

Countries are expected to start drafting their **national SoP's** firstly for the 9 quantitative modules (and particularly for the following Five modules i.e. M1 census, M3 production , M5 trade, M10 outbreaks, M11 vaccination on one hand, which are considered as priority Modules, plus when possible on M2 Households and M6 infrastructures).

Member states should also **collect and send information** to SADC secretariat (to Livestock unit FANR c/o PRINT LS project), i.e. the last numerical datasets available for these priority Modules. To do so they could use firstly the **templates provided in Excel,** as the use of LIMS software will be heterogeneous and gradually implemented in MS. It is nevertheless recommended that LIMS software is used asap to familiarize with the application and rely on PRINT staff support when facing problems. Moreover it is the only way to get enough control on the metadata and quality of data transferred to the secretariat.

MS should start by providing data on **M1, M3, M5, M11**, and continue reporting on **M10** which are essential Modules if we want to publish a **production and trade yearbook** plus a **disease control yearbook** by end of year 2009. M10 is relatively well advanced because of the historical accumulation of data regarding outbreaks in the region, and a first disease yearbook has already been published. It is expected to compile data on animal production and trade (M3 and M5 mainly, M1 if necessary) before July 2009 i.e. for the next APVM sub committee meeting to be convened by Zambia as chairing the SC.

Finally all MS should start adjusting their procedures and collecting retrospective data to provide elements for a trends analysis (5 years retrospective data).

ANNEX

Annex 1. List of participants of the LIMS stakeholders meeting held at Central Veterinary Laboratory, 21 April 2009, Botswana

No.	Name	Surname	Gender	Designation	Institution	Telephone	Mobile (+26	Fax (+267	e-mail
1	Wame Shimane	Boitumelo	Male	Farmer/Consultant	Masokwana Farms	4720465	71660994	4720465	wbeetwo@yahoo.co.uk
2	Batungamile	Boitumelo	Female	Farmer		3913385	71604381	3191437	bsekhute2@yahoo.com
3	Lebani	Nthoyiwa	Male	Principal Scientific Officer	MoA		72214732	3951120	
4	Hezlet Gerald	Mphinyane	Male	Principal Scientific Officer II	Animal Production, MoA		74200775	3951120	hymphinyane@gov.bw
5	Tshepo Yvonne	Sereetsi	Female	Veterinary Officer	MoA, Gaborone field office	3974152	72499038	3900914	sereetsi@yahoo.com
6	George	Selete	Male	Poultry farmer	Poultry farm		72528997		
7	Wazha	Nfila	Male		Caterplus Botswana	3924284	71498294	3923270	wazha@caterplus.co.bw
8	Eliot Neo	Phindela	Male	Dairy farmer	National Dairy Association	5920012	71508866	5920012	tupyarina@botsnet.bw
9	Mompati	Solomon	Male	Consultant	Natsol consultancy	3165662	71615910	3165662	mompati@hotmail.com
10	Elias	Marope	Male	Farmer		3972650	71780025		
11	Cecilia Tlamelo	Opelokgale	Female	Principal Vet. Technician	MoA, Veterinary Dept.	3928816	72221824	3928956	copelokgale@gov.bw
12	Dreeditse	Letebele	Male	Director	Omlis Investment Pty Ltd.	3923028	72232786		
13	Lengsen Buzwani	Habana	Male	Principal Technical Officer	MoA, Veterinary Dept.	3928816	72764887	39288956	lhabana@gov.bw
14	Letlhogile	Modisa	Male	Deputy Director	MoA, Veterinary Dept.	3974235	71630121	3903744	lmodisa@gov.bw
15	Neo Joel	Mapitse	Male	Principal Veterinary Officer	MoA, Veterinary Dept.	3950628	72145779	3951120	nmapitse@gov.bw
16	Jaone J. Mazebe	Sebina	Male	Senior Veterinary Officer	Vet. Dept. Francistown	71112555	73332333		jjmsebina@yahoo.co.uk
17	Kefilwe	Ntesang	Female	Scientific Officer	MoA	3973745	71647321	3951120	Kentesang@gmail.com
18	Kebonye	Phorego	Female	Scientific Officer	MoA		71628127	3951120	kkootswetse@yahoo.co.uk
19	Lesitamang	Paya	Male	Director, Animal Prod. Dept.	MoA, Animal Prod. Dept.	3689013	72439211	3951120	lpaya@gov.bw

Annex 2 Agenda for the stakeholders' meeting

SADC/FANR/PRINT Livestock Project
DRAFT AGENDA
THE LIVESTOCK INFORMATION MANAGEMENT SYSETM (LIMS)
STAKEHOLDERS MEETING, 21 April 2009
National Veterinary Laboratory, Gaborone, Botswana
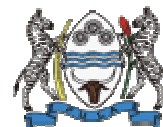
8:00 – 8:30	Arrival & Registration
8:30 – 08:45	Introduction & Welcoming remarks: Director of the Veterinary Services
08:45 – 09:15	Opening address and launch of LIMS: Deputy Permanent Secretary (Livestock Services)
09:15 – 09:45	**Tea/Coffee Break**
09:45 – 10:30	Background of Agricultural Information and Management System (AIMS) Mr. Krishan Bheenick
10:30 – 11:15	Introduction to LIMS – Dr. Berhanu Bedane
11:15 – 12:15	Demonstration of the LIMS templates – Dr. Pascal Bonnet
12:15 – 13:00	Demonstration of LIMS database – Dr. Berhanu Bedane
13:00 – 14:00	**LUNCH**
14:00 – 14:30	Demonstration of LIMS database (Cont.) – Dr. Berhanu Bedane
14:30 - 15:00	Demonstration of LIMS Portal (Web mapping) - Dr. Pascal Bonnet
15:00 – 15:15	Discussion
15:15 – 15:45	**Tea/Coffee Break**
15:45 – 16:15	Data sources and networking with stakeholders / Participatory stakeholders mapping Dr. Pascal Bonnet
16:15 – 17:00	Discussion
17:00	Closure

Annex 3 Detailed list of participants to the LIMS training of trainers course (22 – 24 April 2009)

No.	Name	Surname	Gender	DOB	Designation	Institution	Postal Address
1	Lebani	Nthoyiwa	Male	30/09/1963	Principal Scientific Officer	MoA	P/Bag 0032, Gaborone
2	Hezlet Gerald	Mphinyane	Male	04/04/1956	Principal Scientific Officer II	Animal Production, MoA	P/Bag 0032, Gaborone
3	Tshepo Yvonne	Sereetsi	Female	13/07/1977	Veterinary Officer	MoA, Gaborone field office	P.O.Box 10019
4	Cecilia Tlamelo	Opelokgale	Female	01/06/1969	Principal Vet. Technician	MoA, Veterinary Dept.	P/Bag 0035, Gaborone
5	Lengsen Buzwani	Habana	Male	08/01/1959	Principal Technical Officer	MoA, Veterinary Dept.	P/Bag 0035, Gaborone
6	Jaone Jayson Mazebe	Sebina	Male	30/11/1971	Senior Veterinary Officer	MoA, Vet. Dept. Francistown	P.O.Box 19, Francistown
7	Kefilwe	Ntesang	Female	21/02/1980	Scientific Officer	MoA	P/Bag 0035, Gaborone
8	Kebonye	Phorego	Female	05/05/1980	Scientific Officer	MoA	P/Bag 0035, Gaborone
9	Kabo	Thema	Male	25/02/1981	Veterinary Officer	MoA, Veterinary Dept. Lobatse	P/Bag 0012, Lobatse
10	Ratsatsi Witness	Mokotedi	Male	09/07/1955	Principal Scientific Officer	MoA, Veterinary Dept. Mochudi	P.O.Box 342, Mochudi
11	Benjamin	Ditsele	Male	07/01/1974	Principal Veterinary Officer	MoA, Veterinary Dept. Lobatse	P/Bag 008, Lobatse

No.	Name	Surname	Physical Address	Telephone	Mobile (+26	Fax (+267)	e-mail
1	Lebani	Nthoyiwa	Plot 1707, Station road, MoA		72214732	3951120	
2	Hezlet Gerald	Mphinyane	House Number 18318, Phase 2, Gabs		74200775	3951120	hymphinyane@gov.bw
3	Tshepo Yvonne	Sereetsi	Gaborone field office, Village	3974152	72499038	3900914	sereetsi@yahoo.com
4	Cecilia Tlamelo	Opelokgale	House Number 49886, Bolck 5, Gabs	3928816	72221824	3928956	copelokgale@gov.bw
5	Lengsen Buzwani	Habana	Plot 18401, Phase II, Gaborone West	3928816	72764887	3928956	lhabana@gov.bw
6	Jaone Jayson Mazebe	Sebina		71112555	73332333		jjmsebina@yahoo.co.uk
7	Kefilwe	Ntesang	Plot 1707, Station road, MoA building	3973745	71647321	3951120	Kentesang@gmail.com
8	Kebonye	Phorego	Plot 1707, Station road, MoA building		71628127	3951120	kkootswetse@yahoo.co.uk
9	Kabo	Thema		5330032	72624941	533255	themakabooteng@hotmail.com
10	Ratsatsi Witness	Mokotedi	Phaphane Ward	5777288	71867354	5777523	rmokotedi@gov.bw
11	Benjamin	Ditsele		5300152	71201155		bendits@hotmail.com

Annex 4 timetable for LIMS template and application training in Botswana

**SADC PRINT Livestock Project in collaboration with
the Ministry of Agriculture, Botswana**

**AGENDA FOR LIMS TRAINING OF TRAINERS
22 to 24 April 2009, Sebele, Botswana**

a

DAY 1 – Wednesday 22 April 2009

8:00 – 8:15	**Introduction - Training objectives**

8:15 - 9:00   **Installation**
1. First time installation
2. Key files and folders
3. Uninstalling
4. Re-installing

9:00 – 10:30   **Basic concept of LIMS operation**
1. Opening, navigation and closing the application
2. Menu and sub-menu structure

10:30 – 11:00   **TEA BREAK**

11:00 – 11:30   **Basic concept of LIMS operation (Continued)**
3. Standard tool bar and other GUI

11:30 – 12:00   **Administration: Access Control**
1. Creating users
2. Assigning roles and granting rights

12:00 – 13:00   **Data entry, modification and saving**
1. Livestock numbers and composition (Module 1 – Template and database)

13:00 – 14:00   **LUNCH**

14:00 - 14:30   **Data entry, modification and saving (continued)**
1. Livestock numbers and composition (Module 1 - Template and database)

14:30 – 15:30   2. Livestock Products (Module 3 - Template and database)

15:30 – 16:00   **TEA BREAK**

16:00 – 17:00   3. Livestock Trade (Module 5 - Template and database)

DAY 2 – Thursday 23 April 2009

8:00 – 9:00   **Revision of day 1 - Discussion**

9:00 – 10:30   **Data entry, modification and saving (continued)**
  3. Livestock Infrastructure (Module 6 - Template and database)

10:30 – 11:00   **TEA BREAK**

11:00 – 11:30   **Data entry, modification and saving (continued)**
  4. Meat Inspection (Module 7 - Template and database)

11:30 – 13:00   **Data entry, modification and saving (continued)**
  5. Laws, regulations and acts (Module 9 - Template and database)

                         Data entry, modification and saving (continued)
  6. Disease Report (Module 10 - Template and database)

13:00– 14:00   **LUNCH**

14:00 – 15:30   **Building queries, generating reports and exporting query results**
                         1. Livestock numbers and composition (Module 1)
                         2. Livestock Products (Module 3)

15:30 – 16:00   **TEA BREAK**

16:00 – 17:00   3. Livestock Trade (Module 5)

DAY 3 – Friday 24 April 2009

8:00 – 9:00   **Revision of day 2 - Discussion**

9:00 – 10:30   **Building queries, generating reports and exporting query results (continued)**
                     4. Meat Inspection (Module 7)
                     5. Disease Report (Module 10)

10:30 – 11:00   **TEA BREAK**

11:00 – 11:30   **Building queries, generating reports and exporting query results (continued)**
                     5. Disease Report (Module 10) Cont.

11:30 – 13:00   Data exporting for further analysis

13:00 – 14:00   **LUNCH**

14:00 - 15:30   **Administration**
                     1. Data Management: sending and receiving files (electronic reports)
                     2. Data Management: backup and restore

15:30 – 16:00   **TEA BREAK**

16:00 – 17:00   **General Discussion**

                     Installation and configuration of clean copy of the database

                     End of training course

ANNEX 5 – Proposed SoP sheet (excerpt to be improved by MS)

			LIMS / Botswana

LIMS Standard Operating Procedures
SoP 'elaboration Sheet for a module or some excerpts of a Module (template) (to complement the LIMS Comment sheet)

_____
Country: **Botswana**

_____

Preamble

This sheet is used to respond to the 5W questions: Who will do What regarding LIMS templates (harmonized reports on LS stats) and LIMS application (software), Why? When? and Where? (Who = Institution and name of a personnel with details etc..)?

Why such a procedure?: The objective is to develop and gradually finalize the **national & specific SoP's** on **LIMS** in the country (SoP: i.e. **standard operating procedures).** The SoP is used for running the LIMS system, using a **national network** of **stakeholders** (with their names and positions) which will have **FUNCTIONS** regarding data contribution and use of the system, such as:

- Be part of the **LIMS national taskforce** which establish the organizational chart and specific procedures for the country
- Take responsibility and **leadership** to **provide data** (**contributors** as **primary of secondary** sources) and **submit** dataset to "parent" partner within the country (could be e.g. Meat board transmitting information to DVS…) following an organizational chart established for the country (decentralized system)
    - e.g. fill some templates (Paper report or Excel based)
    - e.g. enter data into screens of the LIMS application (MS Access based)
    - e.g. transfer (send) such data regularly to a parent partner
- Take responsibility and **leadership** to **coordinate** the LIMS system and its various functions e.g. data capture within the country and the submission of regular statistics to SADC (i.e. manage the centralized database in the country and liaise with SADC secretariat)
    - Submit to SADC and **liaise** with the Livestock unit of SADC
    - Download the new **versions** of LIMS application and of training material (manuals) when released and
    - Revise the national SoP's regularly (yearly), make sure that the procedures used by the contributors follow the one agreed upon

- o Organize **refreshing training** when need be
- Act as a Trainer on LIMS system using the generic manuals and update some contents by drafting "**country specific contents**" (to customize manuals for national purpose)
- Interact on the **AIMS LIMS portal**: use the tools provided and contribute to the forums through the portal, participate to the **AIMS national network**

This activity of drafting the very first SoP will also insure the proper collection of data in three folds:
1/ the proper **starting of the data reporting onwards** (to SADC) from the date of the visit to MS or from the date agreed upon during the 2008 LTC' and sub committee's meetings,
    - By using TEMPLATES in EXCEL, if you cannot use the application for some reasons, or if you wish firstly to use the excel templates in hard and soft copies in the field (at province and district levels)
        firstly use LIMS templates and prepare the compilation of datasets, and gradually move to use of the application)
    - By using LIMS application, you will also have to follow up updates of new versions on the LIMS software and manuals on the AIMS portal; http://aims.sadc.int; http://lims.sadc.int (new specific LIMS pages will be added after the first round of country visits achieved by PRINT by end of 2008)

This activity needs to clearly:
- **Identify and list the various & potential source**(s) of **information** / **data** in the country, with the type of data that they could provide / manage. One should know when and where data are available and published, .i.e. use some sources like the web sites of institutions where data are managed by experts and published after finalization of specific surveys, like the CSO agricultural surveys, or the Meat board regular compilation of data on trade & commodity prices etc...
  - o **Prioritize** and **Select** the **most relevant sources** that will contribute to the system (relevant means also that the methodology to acquire the data is well described and known and accessible, cf. Metadata) and start dispatching the roles and functions in the organizational chart established by the LIMS national task force (network)
    - ▪ list sources firstly so that one or two will be selected to report / contribute to the system

2/ the start of an in depth collection of at least **one year of detailed data** in hard or electronic copies. This dataset is needed in order to properly prepare the **SADC Animal Production and Trade yearbook** for 2007-2008 (year of reference according to stat available in the MS) to be published in 2009. This dataset should be used as well in order to support various on going initiatives at SADC level, like the drafting of a regional livestock policy part of the RAP Policy of FANR
       -(Electronic files are preferred)

3/ thirdly to **continue the process by collecting** and sending elements for a "*5 years data retrospective time series*" in hard or electronic copies as well (in order to properly prepare trends analysis which will complement the simple snapshot of one year data from 2/)
       -(Particularly ask NSO to provide all relevant documents (possibly purchased for PRINT))

SoP LIMS for Country = **Botswana**
For a Component or a Module = Templates / Screens part of a Module

SoP's per Module (11 Modules with their Template) / part of component (4 components see LIMS structure)
Use **one individual SoP sheet per template / screen** so that we can update one individually if the source or the procedure is changing

Recap on Modules and templates
- • Headers
- • Module 1 Numbers & Composition of Herds
  - • 1. Nr by species
  - • 2. Nr by economics
  - • 3. Nr by breeds
  - • 4. Nr by herd struct
- • Module 2 Human Households & Population in Livestock farming
  - • 1. Human Population

- Module 3 Production Parameters
    - 1.Slaughter
    - 2.Milk
    - 3.Dairy products
    - 4.Eggs
    - 5.Hides, skins
- Module 4 Livestock & Products Price
    - 1. Live animals
    - 2. Meat products
    - 3. Milk products
    - 4. Eggs
    - 5. Hides & skins
    - 6. Fiber & feathers
- Module 5 Livestock & Products trade: import/export
    - 1. Live Animals
    - 2. L.stock Products
    - 3. L.stock Inputs
- Module 6 LS Infrastructures
    Agreg.
    - 3.Dipping
    - 4.Pens
    - 5.Vet clinics
    - 6.Govt Offices
    - 7. Mun Abattoirs & slabs
    - 8.Milk Collection
    - 9. Livestock Markets
    - 10.Storage Products
    Generic Partitions
        - 1.Admin
        - 2.Technical
    Detailed
        - 1.Vet Diagnostic Labs
        - 2.Vet Vaccine Labs
        - 3.Industrial Abattoirs
        - 4.Dairy Processing Plants
        - 5.Secondary Markets, etc
        - 6. Port of Entry & Exit

- Module 7 Meat Inspection / Food safety
    - 1.Ante-mortem
    - 2.Post-mortem
- Module 8 Livestock Associations and Service Providers
    - 1.Umbrella org & assoc
    - 2.Private companies
    - 3.Government
- Module 9 LS related Laws, Regulation and Acts, policy docs
    - 1.National Docs
    - 2.International Docs
- Module 10 Disease Outbreak notification
    - Outbreaks
- Module 11 Vaccinations (e.g. TAD's)
    - 1.Vaccination

Part 1: Header of the SoP

Date of elaboration of the SoP:

Persons who elaborated the SoP:

(Generally elaborated after a meeting of the LIMS taskforce in MS, give details and email of contact persons for the modification requested):

This SoP is for which Template / Screen : Give Number: (code : **Component** - **Module** - and **Template** Number / **Screen number** taken from Excel templates or MS Access Screens read from left to right if possible, or copy paste the image of the screen or template)

Part 2: Image of the templates / screens dealth with (when needed)

Template
e.g. Module 3, Template 4 / Screen 4 (with header accounted for in numbering Excel working sheets)

4. Processed Dairy Products (from all species)											
Partition 1, e.g. Region/Province	Partition 2, e.g. District	Pasteurized milk Lt**	UHT milk Lt	Fermented milk Lt	Yoghurt Lt	Cheese Kg**	Butter Kg	Cream Lt	Powder milk Kg	Other* products	Other * products	Other * products
Reg/prov 1…….	Dist 1…..										
	Dist 2…..										
	Dist 3…..										
Reg/prov 2…….	Dist 1…..										
	Dist 2…..										
	Dist 3…..										
etc											

* Specify which product
** Lt= Litres, Kg= Kilograms

LIMS: Milk equivalent not working
LIMS: unit of measure kiloliters??

LIMS gives option for cattle and goat = wrong
LIMS: take out option "milk"
Not in LIMS: fermented milk, cream, other products
LIMS: Yoghurt/fermented products together

Corresponding Screen
e.g. Module 3, Template 4 / Screen 4 (with header accounted for in numbering Tab of screens)

Livestock Products

LIMS - [frmLiveStockProductsMain]

Administration   Livestock Development   Animal Health   Animal Production   Livestock Trade and Marketing

Tapez une question

Country	Year	Period
Malawi	2005	January

Country: Malawi   Year: 2005
Period: January   Date Of Report: 22/06/2008
Officer: Chirambo   Date of Submission :

Report Header | Animal Slaughtered & Meat Produced | Milk production & Milk processed | Dairy Products processed | Eggs | Hides,Skins,Fibre & Feathers

Records Selection

Partition Type
Partition Level
Partition Name

Product Category
Species

Partition Type	Partition Leve	Partition Name	Species	Product
Administrative	1	Central	Cattle	Fermented Milk/Yoghurt
Administrative	1	Central	Cattle	Cheese (Hard)
Administrative	1	Central	Cattle	Butter
Administrative	1	Central	Cattle	Powder Milk
Administrative	1	Central	Goats	UHT Milk

Partition Level	Partition Name	Quantity	Unit of Measure	Equivalent Milk Liters	Date Created	Created By	Date Modified	Modified By

Mode Formulaire   FILT   NUM

Part 3: Comments on who could / will be responsible for the templates / screens of the module studied, and with which functions?
Firstly List all potential sources of information for the Module / Template / Screen

Make assumption on where the system will be centralized at national level. Here it is assumed that DVS will take this leading role.

List them: e.g. hierarchical role of DVS from HQ to region, districts, and elaborate on Partnership / Functional role of other institutions (Meat Dairy Boards, CSO's, Agric Stats…)
e.g. Hierarchical role: how the information will flow from fields to HQ DVS

SADC LIMS
LIMS coordinator submit to SADC
National LIMS
National level / Data Capture Screen by Mr SADC & Institution

Template by Mr XX & Institution

Sources of data in M3
Dairy Board National
Data provided by Mrs YY

LIMS Module 3 / Template - Screen Dairy ##
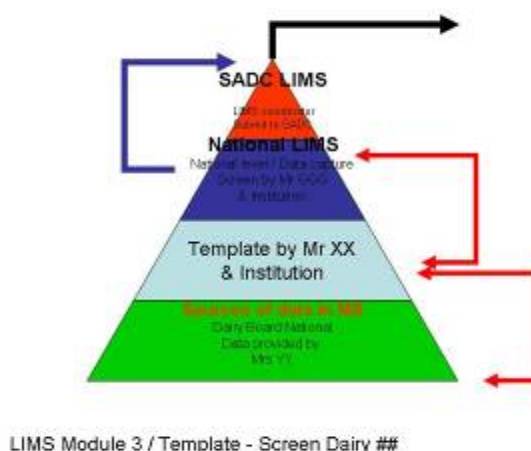
e.g. Functional role: Which institutions outside DVS could take a role , or have a function regarding this template? Do they cover the entire territory or not (partial coverage of a commodity association for instance)? Therefore, should they report to intermediate levels like to regions / province / district offices or to HQ? etc..
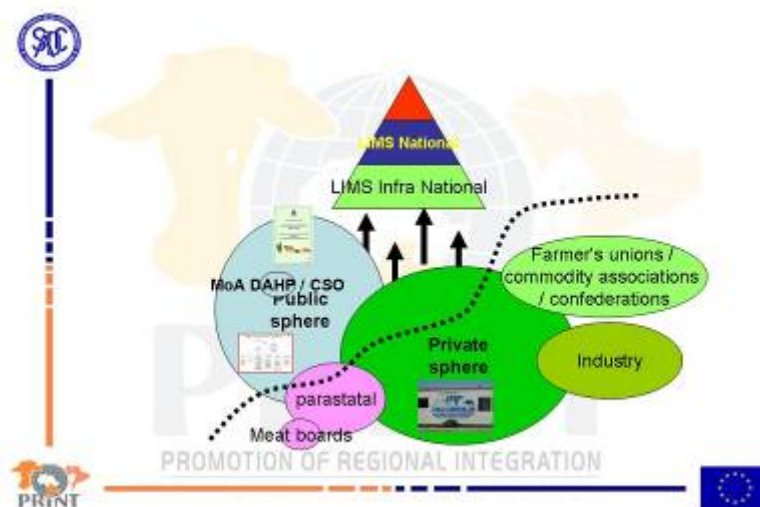
Link such institutions to the hierarchical system at the appropriate level to start drafting the organisational chart for running the LIMS system (here for a selection of templates or modules)
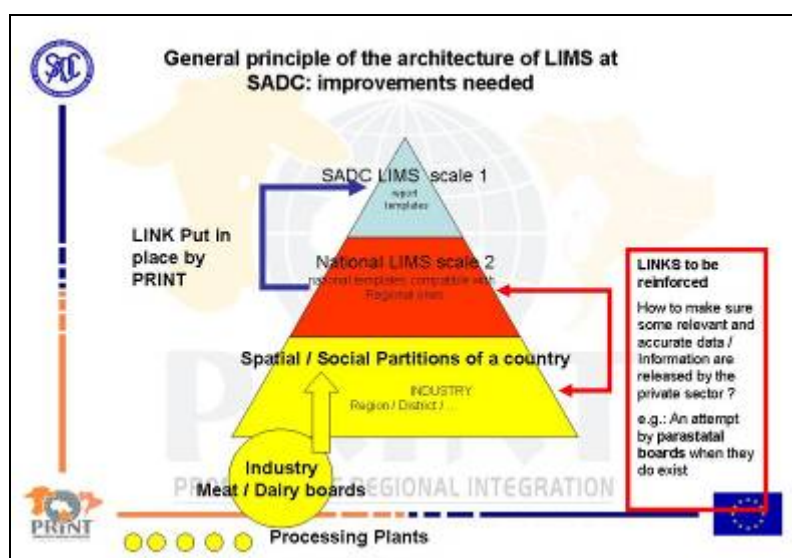
e.g. a dairy board having national coverage may report to HQ where LIMS is installed
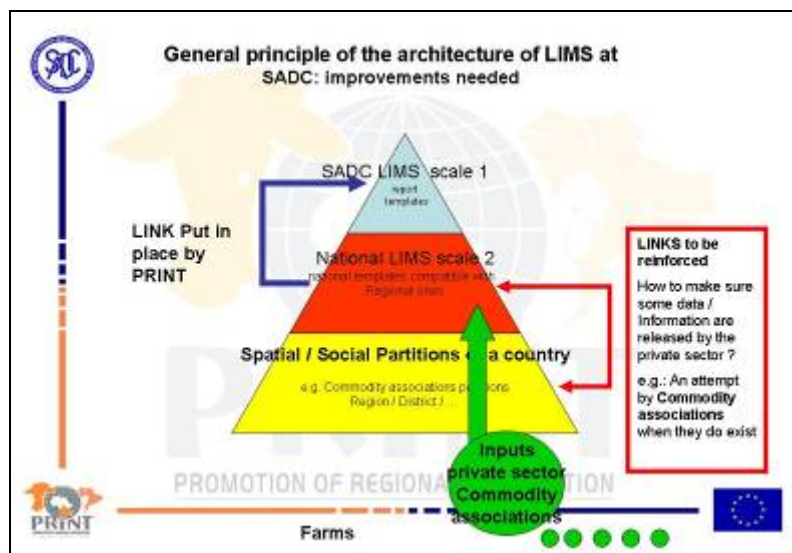
e.g. a commodity association having provincial coverage may report to HQ or to the province where LIMS is installed

Selection of sources: after having listed them now rank the "players", make the selection for the best bet (and also keep some alternatives, therefore the ranks 2 and 3)
a/ Major Role for the template / module to be distributed to:
1/
2/
3/

b/ **Describe role** and responsibility of selected sources / methods they use / frequency of their reports
1/
2/
3/

_____

Part 4: Elaborate a Diagram with Boxes (institutions) and Flows (relationship between institutions) for SoP / i.e. an Organisational chart for the template / module
i.e. take an image of what you have drafted on a flip chart with the flow of data between partners, type of transfer, i.e. who does what? Each flow can be given attributes like in this small table attached to the flow

Source involved directly into LIMS which will contribute to the system	Parent partner? (primary source) if any one	Child partner to receive data
What is transferred		
How is it transferred		
Who is transferring		

When is it done		
Where: From Where to Where ?		
Etc..		

<u>Functions to be achieved: Stage 1</u>: collection and capture of data
What?
- Collection with paper report?
- Collation into Excel templates (and compile report by printing in hard copy when needed)
- Direct Data capture into LIMS screens?

- **Who is responsible for <u>filling</u>** the paper report / template / **<u>capturing</u>** data into LIMS excel sheets or application' screens (can be private / public sector)
- Name of stakeholder(s) and **Institution(s) of reference** at **national** level
  - o (email of contact person)
- **Name of Institution**(s) of reference at **regional/provincial** level
- Name of Institution(s) of reference at **district** level

<u>Functions to be achieved: Stage 2</u>: Supervision and submission
Data transfer is **controlled** by a supervisor / Data **submission** to upper scales / levels (the data collected will flow to "child partners": HQ? province etc..? and eventually to SADC

Who is responsible for <u>coordinating</u> & **<u>controlling data quality</u>** for this module? = Who is responsible for **coordinating the completion** on time, and **submission to SADC** for this set / component / module?
- Name of stakeholder(s) and **Institution(s) of reference** at **national** level
  - o (email of contact person)
- **Name of Institution**(s) of reference at **regional/provincial** level
- Name of Institution(s) of reference at **district** level

How to formulate responsibility in the SoP

e.g. LIST of players

ORGANIZE FLOW of DATA between players
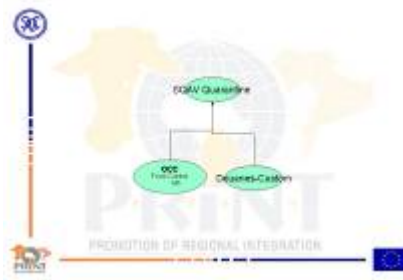
Diagram of REPORT USING TEMPLATES or ELECTRONIC FILE + DIRECT input into LIMS Screen

_____

Part 5: Rank the difficulty of this module / screen / template in terms of contents and organisation of data flow

- Easy to fill with little effort: ☐ Y/N ☐
- Relatively Easy to fill with significant effort: ☐ Y/N ☐
- To gradually o fill with strong effort: ☐ Y/N ☐

_____

Part 6: Can this Module/ Template be integrated in another IS and methodologies of surveys that co exists at national level (by CSO etc..):
e.g. DEVinfo, VACinfo, M and E systems of Programs, CSO surveys etc..
if yes then this module could be adopted as one component of a larger survey initiative

_____

Part 7: In conclusion Decision Table (to be consolidated for all modules)
5 W : What to do / when? where? who is in charge, why?

After having elaborated the diagram, try to fill in a summary table a bit like this one:

What	Who	When	Where	Why	How
Module Number Screen / template number					
e.g. supervising M10 / S2 / T2	Name of the Institution and name of a person and his functions:	Frequency will be monthly	At National level HQ		LIMS application Or TEMPLATES in EXCEL

Note:
When various sources coexist in an information chain, put them by order and indicate the one used to input data into LIMS
  • Primary source: Institution & Person in charge for the template in Module
  • Secondary source: Institution & Person in charge for the template in Module
e.g. Institution that will enter data into LIMS
e.g. Institution who will submit data from LIMS to SADC: Frequency of submission

Part 8: How to gradually implement the LIMS in the entire territory with its hierarchy /Comments on Hierarchical partition

Hierarchical partition

Try to indicate in which Partitions you should start implementing the **LIMS system** with:
a/ **LIMS application** installed on computers or/and
b/ **Paper Report + Excel sheet (template)**

According to WHO and the BNA BW atlas there are 10 "administrative" regions in Botswana with various topo-names used.

Country:	Botswana
Representativity:	January 2000
Source of the data:	Department of Surveys and Mapping
Source of the codes:	SALB project, Copyright © United Nations 2003. All rights reserved
Comments:	According to the National Mapping Agency, there was no 2nd administrative level in Botswana in January 2000

1st administrative level names	**1st administrative level codes**
Central	BWA001
Chobe	BWA002
Ghanzi	BWA003
Kgalagadi	BWA004
Kgatleng	BWA005
Kweneng	BWA006
Ngamiland	BWA007
North-East	BWA008
South-East	BWA009
Southern	BWA010
10 units	

LBL	ADM1	ADM2
BOT-1	Central	Bobonong
BOT-2	Central	Letlhakane
BOT-3	Central	Mahalapye East
BOT-4	Central	Mahalapye West
BOT-5	Central	Palapye
BOT-6	Central	Selebi-Phikwe
BOT-7	Central	Serowe
BOT-8	Central	Tonota
BOT-9	Central	Tutume
BOT-10	Ghanzi	Ghanzi
BOT-11	Kgalagadi	Hukuntsi

BOT-12	Kgalagadi	Tsabong
BOT-13	Kgatleng	Kgatleng
BOT-14	Kweneng	Kweneng North
BOT-15	Kweneng	Kweneng South
BOT-16	Kweneng	Kweneng West
BOT-17	North-East	Tati
BOT-18	North-West	Chobe
BOT-19	North-West	Ngamiland East
BOT-20	North-West	Ngamiland West
BOT-21	South-East	Bamalete-Tlokweng
BOT-22	Southern	Barolong
BOT-23	Southern	Ngwaketse Centra
BOT-24	Southern	Ngwaketse North
BOT-25	Southern	Ngwaketse South
BOT-26	Southern	Ngwaketse West

From which Major towns
- Molepolole
- Selebi-Phikwe
- Maun
- Serowe
- Kanye
- Mahalapye
- Mochudi
- Mogoditshane
- Gabane
- Lobatse
- Palapye
- Tlokweng
- Ramotswa
- Thamaga
- Moshupa
- Tonota
- Jwaneng
- Orapa
- Letlhakane
- Bobonong
- Orapa
- Jwaneng

From which technical partitions ?

The Field Services Division comprises six Regional Veterinary offices headed by Principal Veterinary Officers (PVOs). Each Regional Veterinary Office comprises three to four District Veterinary Offices. The PVOs supervise the district veterinary offices (headed by veterinarians) which are demarcated into Veterinary Extension Areas. Each extension area comprises several crush pens numbering up to 15, the crush pen being the smallest epidemiological unit. Animal health data collection and flow starts at crush pen level and is collated at extension and district level before being submitted to the head office. The crush pens serve 10 to 15 holdings or house holds, covering an area of roughly 4 Kilometre radius. In other words, the approximate distance between two crush pens is about eight Kilometre. This distance is larger in communal farming areas.

Signatures of partners

LIMS PRINT officer

Stakeholders

ANNEX 6 – Proposed Comment sheets (templates/screens)

			LIMS / Botswana

Comment sheet on LIMS Modules (to complement the SoP sheet)

Country: Botswana
- Headers
- Module 1 Numbers & Composition of Herds
  - 1. Nr by species
  - 2. Nr by economics
  - 3. Nr by breeds
  - 4. Nr by herd structure
- Module 2 Human Households & Population in Livestock farming
  - 1. Human Population
- Module 3 Production Parameters
  - 1.Slaughter
  - 2.Milk
  - 3.Dairy products
  - 4.Eggs
  - 5.Hides, skins
- Module 4 Livestock & Products Price
  - 1. Live animals
  - 2. Meat products
  - 3. Milk products
  - 4. Eggs
  - 5. Hides & skins
  - 6. Fiber & feathers
- Module 5 Livestock & Products trade: import/export
  - 1. Live Animals
  - 2. L.stock Products
  - 3. L.stock Inputs
- Module 6 LS Infrastructures
  Agreg.
  - 3.Dipping
  - 4.Pens
  - 5.Vet clinics
  - 6.Govt Offices
  - 7. Mun Abattoirs & slabs
  - 8.Milk Collection
  - 9. Livestock Markets
  - 10.Storage Products
  Generic Partitions
      - 1.Admin
      - 2.Technical
  Detailed
      - 1.Vet Diagnostic Labs

- 2.Vet Vaccine Labs
- 3.Industrial Abattoirs
- 4.Dairy Processing Plants
- 5.Secondary Markets, etc
- 6. Port of Entry & Exit

- Module 7 Meat Inspection / Food safety
  - 1.Ante-mortem
  - 2.Post-mortem
- Module 8 Livestock Associations and Service Providers
  - 1.Umbrella org & assoc
  - 2.Private companies
  - 3.Government
- Module 9 LS related Laws, Regulation and Acts, policy docs
  - 1.National Docs
  - 2.International Docs
- Module 10 Disease Outbreak notification
  - Outbreaks
- Module 11 Vaccinations (e.g. TAD's)
  - 1.Vaccination

Comments sheet and reports to be sent to
<mark>A generic address will be created at LIMS@sadc.int</mark>
Meanwhile use PRINT: BBedane@sadc.int
CC to Livestock Unit BHulman@sadc.int
If bugs reports: CC to the developer: INFORMATIX INDUSTRY SERVICES Pty Ltd / Thulagano Segokgo tsegokgo@gmail.com
If bugs reports: CC to the external tester: Xavier Juanes Xavier.Juanes@cirad.fr and pascal.bonnet@cirad.fr

_____

Part 1: Header
Comments on which Template Number & Screen number: (code : **Component** - **Module** - and **Template** Number / **Screen number** from left to right when possible to account like this)

Date:

Name of stakeholder(s) commenting & Institution(s) of reference
(email of contact person for the modification requested):

_____

Part 2: images (when needed)
e.g. Module 3, Screen 4 (with header accounted for)

Template

4. Processed Dairy Products (from all species)												
Partition 1, e.g. Region/Province	Partition 2, e.g. District	Pasteurized milk Lt**	UHT milk Lt	Fermented milk Lt	Yoghurt Lt	Cheese Kg**	Butter Kg	Cream Lt	Powder milk Kg	Other* products	Other* products	Other* products
Reg/prov 1…….	Dist 1…..											
	Dist 2…..											
	Dist 3…..											
Reg/prov 2…….	Dist 1…..											
	Dist 2…..											
	Dist 3…..											
etc												
	* Specify which product											
	** Lt= Litres, Kg= Kilograms											
						LIMS gives option for cattle and goat = wrong						
		LIMS: Milk equivalent not working				*LIMS: take out option "milk"*						
		LIMS: unit of measure kiloliters??				*Not in LIMS: fermented milk, cream, other products*						
						LIMS: Yoghurt/fermented products together						

Corresponding Screen

_____

Part 3: Comments on the template

_____

Part 4: Comments on the screen

_____

Part 5: Modifications / Adjustments suggested / requested by categories (referring to the application screen, and template)
e.g. Contents, functionalities (export etc..) , categories / parameters etc..

Part 6: Comments on the **Queries** / **Reports** implemented in LIMS screen / Module
e.g. Request for Modifications / Addition of some queries, to provide tables as input to other external info. System e.g. to export to CSO (CSO surveys, Agric. Stats…)

Part 7: Comments on **specific contents** that would be useful in **national manuals** used during a LIMS training (on line or classic training)
LIMS Manuals: Manual for Data Clerk (reporting manual) / Manual for trainers (these manuals are pending and will be posted on line and send to the group)
e.g. special "convention" or definitions for proper interpretation of some categories implemented into the screens and templates (e.g. Grading system, follow up of an outbreak, names of category for small stock)

Part 8: Bugs identified (please use the form attached): *Error detection sheet2.doc*
and send the table to:
A generic address will be created at LIMS@sadc.int
Meanwhile use PRINT: BBedane@sadc.int and PBonnet@sadc.int
CC to Livestock Unit BHulman@sadc.int
If bugs reports: CC to the developer: INFORMATIX INDUSTRY SERVICES Pty Ltd / Thulagano Segokgo tsegokgo@gmail.com
If bugs reports: CC to the external tester: Xavier Juanes Xavier.Juanes@cirad.fr and pascal.bonnet@cirad.fr

Part 9: Validation of ADMIN and TECHNICAL partitions

ADMIN Partition list as implemented into LIMS

CountryCode	PartitionLevel	PartitionType	PartitionName	ParentPartitionName
BW	1	Administrative	Southern	
BW	1	Administrative	Francistown	
BW	1	Administrative	Western	
BW	1	Administrative	Central	
BW	1	Administrative	Maun	
BW	1	Administrative	Gaborone	

BW		2	Administrative	Ngwaketse South	Southern
BW		2	Administrative	Tutume	Francistown
BW		2	Administrative	Tsabong	Western
BW		2	Administrative	Tonota	Francistown
BW		2	Administrative	Tati	Francistown
BW		2	Administrative	Serowe	Central
BW		2	Administrative	Selebi-Phikwe	Central
BW		2	Administrative	Ngwaketse West	Southern
BW		2	Administrative	Ngwaketse North	Southern
BW		2	Administrative	Ngwaketse Centra	Southern
BW		2	Administrative	Ngamiland West	Maun
BW		2	Administrative	Ngamiland East	Maun
BW		2	Administrative	Chobe	Maun
BW		2	Administrative	Palapye	Central
BW		2	Administrative	Mahalapye West	Central
BW		2	Administrative	Bamalete/Tlokweng	Gaborone
BW		2	Administrative	Bobonong	Central
BW		2	Administrative	Ghanzi	Western
BW		2	Administrative	Hukuntsi	Western
BW		2	Administrative	Kgatleng	Gaborone
BW		2	Administrative	Kweneng North	Gaborone
BW		2	Administrative	Kweneng South	Gaborone
BW		2	Administrative	Kweneng West	Gaborone
BW		2	Administrative	Letlhakane	Central

BW		2	Administrative	Mahalapye East	Central
BW		2	Administrative	Barolong	Southern

Other options (from various sources)

According to WHO and the BNA BW atlas there are 10 "administrative" regions in Botswana with various topo-names used.

Country:	Botswana
Representativity:	January 2000
Source of the data:	Department of Surveys and Mapping
Source of the codes:	SALB project, Copyright © United Nations 2003. All rights reserved
Comments:	According to the National Mapping Agency, there was no 2nd administrative level in Botswana in January 2000

1st administrative level names	1st administrative level codes
Central	BWA001
Chobe	BWA002
Ghanzi	BWA003
Kgalagadi	BWA004
Kgatleng	BWA005
Kweneng	BWA006
Ngamiland	BWA007
North-East	BWA008
South-East	BWA009
Southern	BWA010
10 units	

These regions are also called districts some times and serve to map socio-economic data in the Botswana atlas

Source (FEWS)
There are districts under the regions, like shown in the next table and map.

NAME1_	PCODE	NAME2_Districts
Maun Region	BWA004	Chobe
Maun Region	BWA004	Ngamiland West
Maun Region	BWA004	Ngamiland East
Francistown Region	BWA002	Tutume
Central Region	BWA001	Letlhakane
Francistown Region	BWA002	Tati
Western Region	BWA006	Ghanzi
Francistown Region	BWA002	Tonota
Central Region	BWA001	Serowe
Central Region	BWA001	Selebi-Phikwe

Central Region	BWA001	Bobonong
Central Region	BWA001	Mahalapye West
Central Region	BWA001	Palapye
Central Region	BWA001	Mahalapye East
Gaborone Region	BWA003	Kweneng North
Western Region	BWA006	Hukuntsi
Gaborone Region	BWA003	Kweneng West
Gaborone Region	BWA003	Kgatleng
Southern Region	BWA005	Ngwaketse West
Western Region	BWA006	Tsabong
Gaborone Region	BWA003	Kweneng South
Gaborone Region	BWA003	Bamalete/Tlokweng
Southern Region	BWA005	Ngwaketse North
Southern Region	BWA005	Ngwaketse Centra
Southern Region	BWA005	Ngwaketse South
Southern Region	BWA005	Barolong

Other sources (Wikipedia) or Maplibrary

Botswana has 28 "sub-districts" (Maplibray says 26) and 9 regions also called « districts" :

10. Central
11. Ghanzi
12. Kgalagadi
13. Kgatleng
14. Kweneng
15. North-East
16. North-West
17. South-East
18. South

Maplibrary has 26 sub districts

LBL	ADM1	ADM2
BOT-1	Central	Bobonong
BOT-2	Central	Letlhakane
BOT-3	Central	Mahalapye East
BOT-4	Central	Mahalapye West
BOT-5	Central	Palapye
BOT-6	Central	Selebi-Phikwe
BOT-7	Central	Serowe
BOT-8	Central	Tonota
BOT-9	Central	Tutume
BOT-10	Ghanzi	Ghanzi
BOT-11	Kgalagadi	Hukuntsi
BOT-12	Kgalagadi	Tsabong
BOT-13	Kgatleng	Kgatleng
BOT-14	Kweneng	Kweneng North
BOT-15	Kweneng	Kweneng South
BOT-16	Kweneng	Kweneng West
BOT-17	North-East	Tati
BOT-18	North-West	Chobe
BOT-19	North-West	Ngamiland East
BOT-20	North-West	Ngamiland West
BOT-21	South-East	Bamalete-Tlokweng
BOT-22	Southern	Barolong
BOT-23	Southern	Ngwaketse Centra
BOT-24	Southern	Ngwaketse North
BOT-25	Southern	Ngwaketse South
BOT-26	Southern	Ngwaketse West

ADMIN type, Level 1 and 2, Region / Province and District names
Proposed Edited Version of Partitions agreed on during the mission **to be implemented into LIMS**

TECHNICAL Type
Vet regions **districts and sub districts as implemented into the LIMS** e.g. what is in the LIMS about Technical partitions

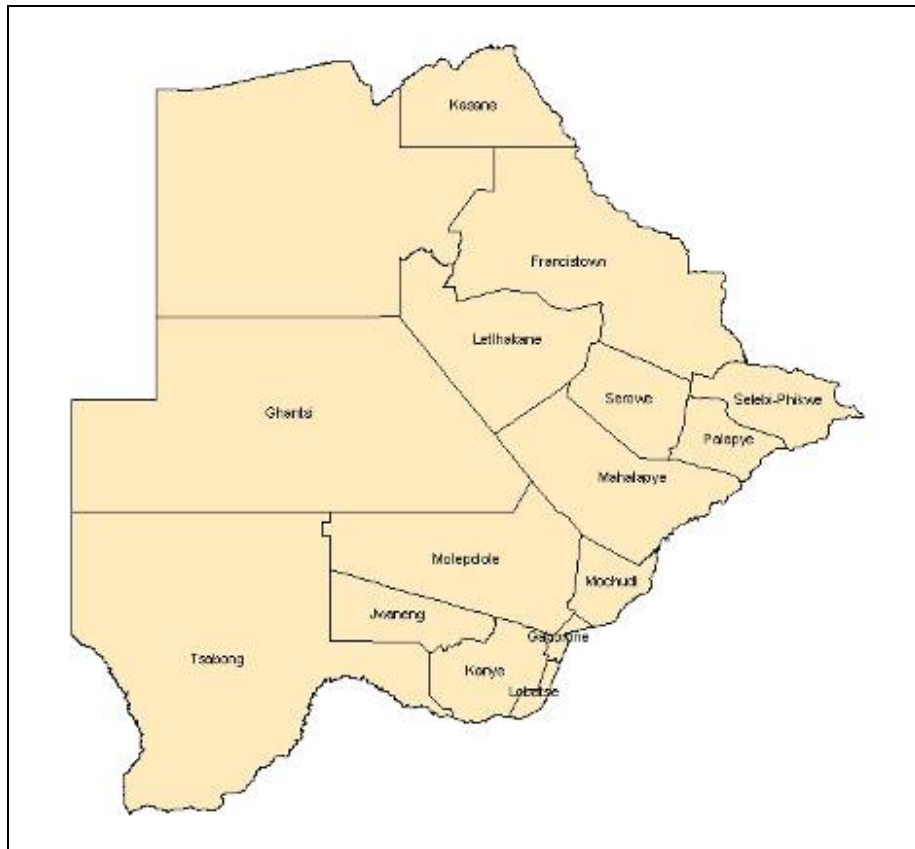| CountryCode	PartitionLevel	PartitionType	PartitionName	ParentPartitionName
BW	1	Technical	North East	
BW	1	Technical	North West	
BW	1	Technical	South	
BW	1	Technical	South East	
BW	1	Technical	South West	
BW	1	Technical	Central	
BW	2	Technical	Tsabong	South
BW	2	Technical	Mochudi	South East
BW	2	Technical	Molepolole	South East
BW	2	Technical	Nata	North West
BW	2	Technical	Palapye	Central
BW	2	Technical	Selibe Phikwe	Central
BW	2	Technical	Maun	North West
BW	2	Technical	Shakawe	North West
BW	2	Technical	Letlhakane	North East
BW	2	Technical	Serowe	Central
BW	2	Technical	Lobatse	South West
BW	2	Technical	Kasane	North West
BW	2	Technical	Kanye	South West
BW	2	Technical	Jwaneng	South West
BW	2	Technical	Hukuntsi	South
BW	2	Technical	Gantsi	South
BW	2	Technical	Gaborone	South East
BW	2	Technical	Francistown	North East
BW	2	Technical	Mahalapye	Central

Proposed Technical partitions to be implemented into LIMS: Status of our discussions
Vet districts and sub districts used at DVS DAP etc.. with suggestion from the meeting
Cf. excel file in a CD folder

There are 15 "veterinary districts" in Botswana as shown in the next table and map, though 19 are shown in some instances (Maun + Shakawe+Nata) / (Tsabong + Hukuntsi). These are used when dealing with LS issues. There is also a partition dealing with OIE status i.e. a partition appropriate vis à vis export market of meat (cf. chapter 6.1).
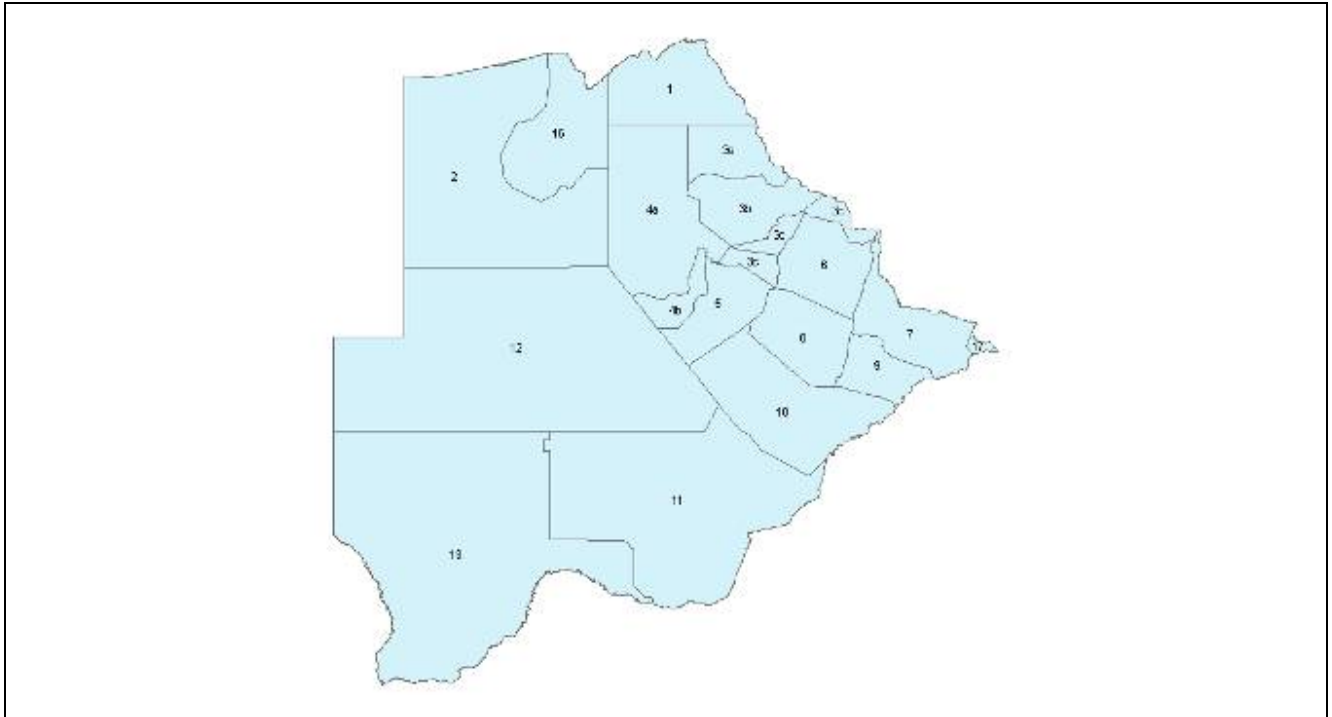
| DISTRICT |
| --- |
| Kasane |
| Francistown |
| Letlhakane |
| Ghantsi |
| Serowe |
| Selebi-Phikwe |
| Mahalapye |
| Palapye |
| Molepolole |
| Tsabong |
| Mochudi |
| Jwaneng |
| Gaborone |
| Kanye |
| Lobatse |

Vet districts

The Field Services Division comprises six Regional Veterinary offices headed by Principal Veterinary Officers (PVOs). Each Regional Veterinary Office comprises three to four District Veterinary Offices. The PVOs supervise the district veterinary offices (headed by veterinarians) which are demarcated into Veterinary Extension Areas. Each extension area comprises several crush pens numbering up to 15, the crush pen being the smallest epidemiological unit. Animal health data collection and flow starts at crush pen level and is collated at extension and district level before being submitted to the head office. The crush pens serve 10 to 15 holdings or house holds, covering an area of roughly 4 Kilometre radius. In other words, the approximate distance between two crush pens is about eight Kilometre. This distance is larger in communal farming areas.

VET Zones OIE zone = idem
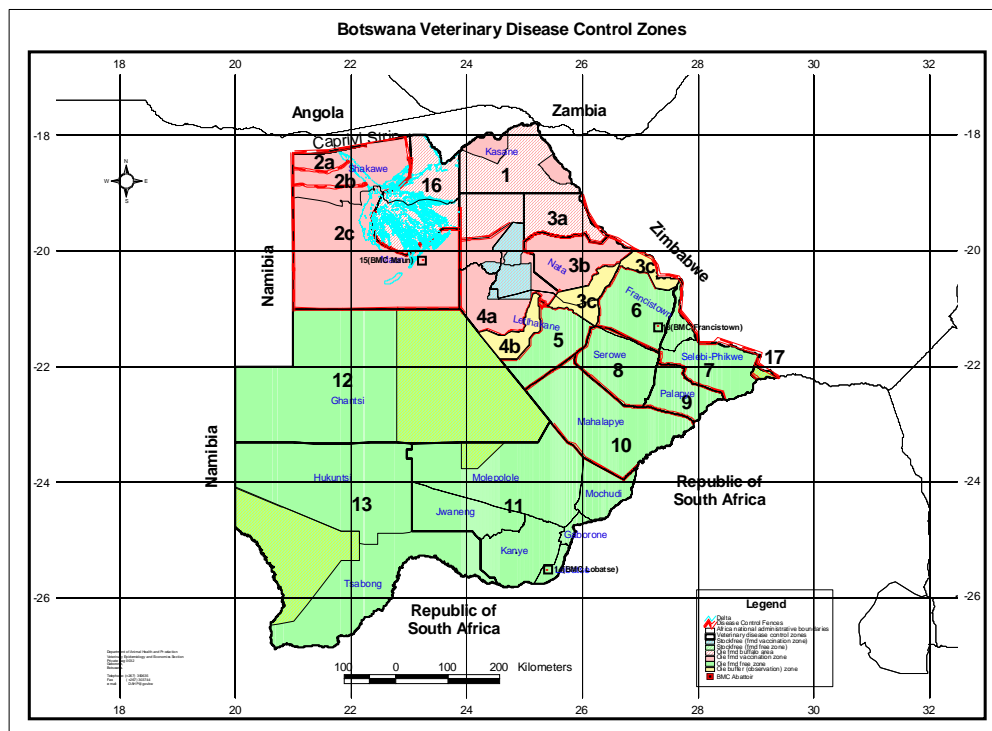
Extra comments
Part 10: Comments on the **Functionalities of AIMS portal** (cf. portal) and LIMS portal (web mapping so far) on the web that you would like:
http://aims.sadc.int / http://lims.sadc.int

Reminder: objectives of functionalities:
- To present spatial and non-spatial information
- To develop directories of institutions (and experts) – information exchange standards
- To carry out customised search for projects, technologies, people, institutions, publications
- To establish electronic networks- thematic & national, with associated tools (discussion forums, collaborative, dissemination)
- To devolve content generation to level of information producer
- To aggregate national news/events at regional level
- To host Learning tools and materials
- …

Facilities to use / Facilities to contribute to:

- Web pages: create new contents and Web pages (e.g. national LS pages)
- Web mapping
- Post News and use News list (events list) and their aggregation (i.e. of most recent news, through « syndication » of news and RSS feeds)
- Use Search engine (custom search with specific engine)
- Use and contribute to a Non spatial library: documents of interest
- Wiki : contribute to an encyclopaedia of LS sector in SADC, to the LIMS manual enriching the manual about the country livestock profile
- Use D-groups (discussion), e.g. one group for LIMS Botswana, possibly link to SMS
- Build contents for a Distance learning and Training on line – (Moodle platform), e.g. training on LIMS adapted for the National context
- Use links to important Information sites thanks to E-Frame (web frame of other sites into AIMS)
- Use RSS feeds
- ……
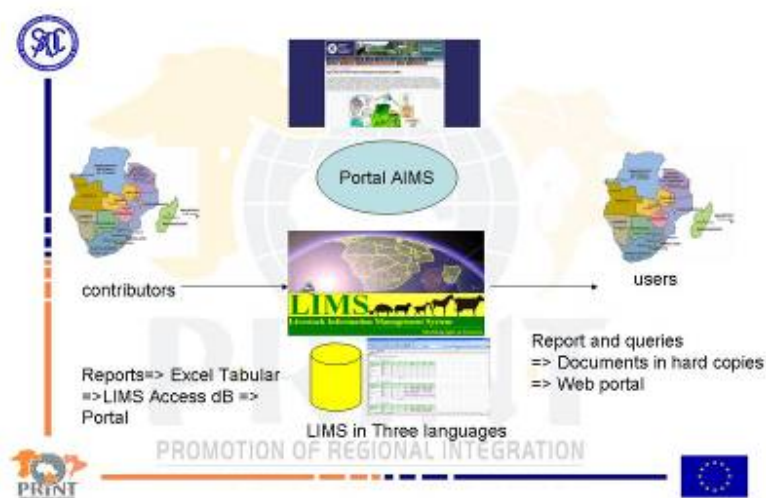
e.g. I would like a web page to get the updated versions of LIMS and of the manual
I would like a FAQ questions page
I would like a D-Group for discussing agric. stats in a forum

Most feature to be used:

Most feature to contributed to:

Signatures

LIMS PRINT officer

Stakeholders

ANNEX 7 – Terms of reference for LIMS adoption mission

TERMS OF REFERENCE FOR PRINT LIVESTOCK PROJECT MISSION ON LIMS
Launching in Botswana

LIMS Adoption Missions: Stakeholder Consultations & Training: July 2008 to October 2009)

A major expected output of the PRINT Livestock Project is the development of a Livestock Information Management System (LIMS) for the collection of livestock data, processing and reporting of information between Member States and the SADC Secretariat. LIMS is a component of the SADC/FANR/AIMS i.e. Agricultural Information Management System.

The development of LIMS has necessarily, been undertaken in stages as follows:
- Situation Analyses to establish systems of livestock data management in Member States;
- Consultative workshops on the development of reporting templates for data-capture with Sub Committees of the SADC Livestock Technical Committee, namely:- 1) Epidemiology & Informatics, 2) Animal Production, Veld & Marketing, 3) Veterinary Public Health & Food Safety, and 4) Veterinary Laboratories & Diagnostics;
- Approval of the data-capture templates by the Livestock Technical Committee; and
- Sub-contracting of the LIMS database development.

The LIMS application is now in its final stages of development. The stage has been reached where the LIMS application must be rolled out to Member States for installation, training and final testing, whilst providing an opportunity for establishing institutional networks for livestock data collection at the national level.

To this end, so-called LIMS Adoption Missions to Member States are planned from July to December 2008. Attached is a table giving details regarding the month and proposed dates relevant for each Member State.

The LIMS Adoption Missions will comprise the following activities:
- A stakeholders workshop to present the entire SADC/FANR information strategy i.e. the AIMS portal, the LIMS application, the LIMS Web/GIS, associated reporting templates, national standard operating procedures (SOPs), and the institutional network for implementation;
- Training of trainers on the LIMS application for a limited number of key personnel who will conduct further training at national level;
- A final evaluation of sources of information and use of the harmonized data-capture templates;

Therefore member(s) of the PRINT Livestock Project will firstly hold a one-and-half day workshop whose participants should include representatives of livestock departments, public and private institutions who are a source of livestock data and / or information, including all livestock personnel

who have participated in previous workshops or training courses organized by the project as well as selected participants to recent AIMS workshops.

The one-day workshop will be followed by a three-day LIMS training course of a maximum 8 identified personnel involved in livestock data management.

Please note that there will be follow-up communication with each Member State close to the date of the mission. The PRINT Livestock Project will meet all costs associated with the above-mentioned activities i.e. per diems, travel and workshop facilities.

We look forward to your usual support in this important regional activity.

Yours Sincerely,

Dr. Welbourne Madzima
Project Coordinator
PRINT Livestock Project