

Collaborative Statistics For Livestock Development, Animal Production And Health, An example In The SADC Region With The LIMS Livestock Information And Management System, A Regional System Based On WEB 2.0 Principles

Bonnet P. (1), Berhanu B.(2), Bheenick K.J.(2), Wanda G.(2), Madzima W.(2), Oosterwijk G.(2)., Juanes X. (3), Chavernac D. (3).

(1) CIRAD, UPR 18 Montpellier, France, SADC FANR PRINT, Gaborone, Botswana, pascal.bonnet@cirad.fr

(2) SADC FANR Gaborone, Botswana

(3) CIRAD, Montpellier, France

ABSTRACT

The paper aims at presenting new ways of bringing livestock statistics and information together in a collaborative system (LIMS, Livestock Information Management System), in the context of the regional integration of a regional economic community (SADC, Southern African Development Community). The initial problem stated that stakeholders of the region and in the livestock sector were not sharing enough information, because of accessibility problems, fragmentation of dataset lying under the responsibility of too many stakeholders, or sociological and institutional barriers. In theory, regional integration is achievable through a combination of state policy (e.g. SADC Regional Indicative Strategic Development Plan, RISDP), market interdependence (e.g. SADC Free trade Area, complementarities between states) and functional cooperation between the various networks of stakeholders and organizations (de Waal A. *et al* 2002). All aspects require a component on information management (stretching from livestock market information to disease status). These three components of regional integration can only be successful if stakeholders are sharing the same vision, which should be reflected in a sharable set of information exchanged within an overarching collaborative information system. In this context the aim of the LIMS system is firstly to bring people together at national and regional levels and secondly to monitor the progress of regional integration in the livestock sector.

KEYWORDS

Information system, Livestock sector, Regional Integration, Animal Health, Animal Production, Trade, SADC

INTRODUCTION

The primary role of SADC is to define regional priorities, facilitate regional integration and development. The regional approach is designed to complement, support and enhance national activities rather than replace or compete with them. There are currently 15 SADC Member States (Angola, Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia, Zimbabwe). They have contrasted situations regarding their livestock sector (production, import, export), and its characteristics (disease status, industrialisation, level of organization and of vertical integration of commodity chains). In this context accurate livestock-related statistics available at their appropriate temporal and spatial scales are essential in order to design regional policies and monitor their implementation. Nevertheless such a regional database and information system was not existing at the start of the PRINT project (Promotion of Regional Integration in the SADC Livestock Sector).

Methods

In order to highlight some of the common features or specificities of the various national livestock information systems in the region (in 14 Member states of SADC, i.e. before Seychelles joined SADC in 2008), the authors have firstly undertaken a situation analysis. The regional situation analysis was based on the current vision and status of the national LIMS using the following analytical dimensions and models: information flows in the country, within and between institutions; sources, types and formats of the numerical data collected (including their spatial and temporal dimensions); technical database and platforms used including the WEB; degree of interoperability between the various systems; types of needs for policy analysis in the livestock sector. Besides, the authors did a review of many information systems used at various scales of operation, from development-oriented systems having a component on livestock & agricultural issues, e.g. DEV-info (www.devinfo.org), to national systems entirely devoted to animal health (TAD-info of FAO), or

systems monitoring trade and SPS issues (e.g. WTO SPS IMS <http://spsims.wto.org>, SADC trade database www.sadctrade.org/tradedata) only to mention a few.

Additionally the system development was constrained by the need to share a common solution with the entire agricultural sector falling under the AIMS Agricultural Information Management System of SADC (FANR, 2007). Therefore the authors did a critical review of communication tools from the WEB 2.0 arena (discussion groups, wikis, collaborative cartography, social bookmarking, RSS feeds and syndication, WEB search tools, News aggregators, blogs etc..) to assess their potential to foster social and professional networking towards knowledge management in the SADC agricultural context. Finally an assessment was made towards the selection of a simple relational database software, after having compared the degree of maturity on database management, computer and web literacy of stakeholders met, bearing in mind the strict requirements imposed by quality information management.

Finally the authors have established a gradual approach for improving livestock information sharing in the SADC region. This approach was four folds; strengthening regional networks of stakeholders aiming at establishing the rules of information sharing; standardizing statistical contents and methods of collection therefore improving potential for regional comparisons; providing a database that could be decentralized (multi-scale) at three hierarchical levels but also usable for functional collaboration, with independent thematic modules allowing a division of workload; and providing a web portal and ICT tools for fostering information sharing based on an overarching AIMS system.

Results

The appraisal of national LIMS has shown a remarkable diversity in the way livestock statistics are gathered, collated, exchanged, published and utilized (including by national statistics offices). It also revealed the vast amount of information and data available to analysts but in a fragmented manner. There were multiple sources of information which were all good candidates to receive incentives for information sharing. Besides, the nature of the information processed (public good versus private information), and the perceived thresholds of separation between the following three concepts, raw data, information and intelligence was not always well understood. Based on this evaluation, the solution adopted for the LIMS system is a combined approach between new IT technologies (a WEB 2.0-based portal with communication and social networking tools) and a classic relational database but with collaborative and interoperability features.

The portal architecture was designed in collaboration with other SADC projects and it consists of a series of components assembled under the same banner and based on four technical dimensions: numerical dataset that should be accessible on line (though some with restricted access), a web-mapping interface to display data (web map service standard and a Geoclip© flash mapping), content management and communication tools to remotely manage the various types of information (e.g. wikis), and repositories of documents. The content management is ruled by international standards on contents or for exchange protocols.

The LIMS software and database was designed in collaboration with SADC member states and offers innovative features in order to support the various technical channels for collaboration and information exchange (off line and online). Such collaboration follows two main data transfer channels: the classic hierarchical channel (e.g. from extension service to national head quarters within the Ministry of Agriculture), though adapted to the decentralized environment of some countries (three levels of installation), and functional channels using well formed and recognized institutions owning a bit of information within a country with at minimum a district or provincial coverage (e.g. a farmer's or commodity association, or meat & dairy boards). The later is the support of alliances & interoperability and a basis for forming a national livestock forum to share information and data, which finally can be inputted into the national and regional SADC LIMS databases through an import facility. Data can be collated following the classic administrative boundaries but also using technical partitions (like livelihood zones, veterinary divisions, wildlife management zones, association's catchment areas), therefore allowing for consolidation of many sources of data. It consists of a series of eleven independent modules that can be dealt with independently (divisibility of workload) or in combination, at various scales (scalability) and levels of organisation (decentralization). The first 11 core modules with standardized information deal with numbers & composition of herds, households & population in livestock farming, animal production (marketed) figures, livestock & products price (along commodity chain), inventory of livestock & products trade, infrastructures (from abattoirs to milk collection centres, kraals & diptanks..), meat inspection findings, livestock associations and service providers, regulation & acts and policy documents (metadata only), disease outbreaks (suspicion and confirmed), vaccinations. This set represents the core solution adopted to collaborate and collate statistics on animal production, marketing and trade, livestock sector development and animal health. The software facilitates firstly the controlled administration of the direct capture of data originating from the various field collection systems at national level (given the chain of information in place), or the capture through the import of data from external

databases (interoperability); secondly the exchange and transfer of data between the different layers and actors of the decentralized and collaborative system (e.g. regional, national, infra national levels, private and public sectors); thirdly the query of the database and the export of data to provide to interested SADC units (publication of FANR bulletins), or to external partners in order to input their respective information systems (AU IBAR, FAO).

The LIMS system is actually composed of more components. The human interface (humanware) is formed by the networks of collaborating professionals within one LIMS national taskforce per country (national staff trained on the system), four thematic regional sub committees; i.e. the SADC networks on Animal Production Veld, Marketing and Genetic Resources, on Epidemiology and Informatics, on Disease diagnostic and Laboratory and on Food Safety, all reporting to the SADC Livestock Technical Committee (LTC) in coordination with the Livestock Unit at SADC. Their members are the custodians of the LIMS and its moderators, and therefore do interact by means of meetings and virtual communication (e.g. web forums). They will establish and regularly update the standard operating procedures (SoP's) for running the LIMS and provide the rules of collaboration between stakeholders in a country and between countries. They also are in charge of updating the reference technical documents and other training material (i.e. LIMS modules manuals, training handouts etc..) which are disseminated as hard copies or posted on the web portal (wiki manuals).

Discussion

The information which will be aggregated by such a system together with the type of medias used to collect exchange or display information (database, portals..), is found suitable to perform the vital functions of knowledge management systems, geared towards learning by sharing in its three accepted dimensions: cognitive, affective, psychomotor (Bloom B. S. 1956). The LIMS portal has been embedded into the AIMS portal shared by several FANR information sub systems. The web domain is <http://aims.sadc.int> and the livestock part is devoted to firstly access information derived from LIMS collaborative database and to secondly foster interaction and collaboration between LIMS stakeholders in Member states and at SADC secretariat. Moreover, the LIMS is a system centered on networks of professionals, organized in recognized institutions at national (forums) or regional levels (SADC Livestock technical committee), exchanging information with standard procedures, through a WEB Portal, or with an application (database) using a series of regionally harmonized templates with metadata. It is being promoted and put in place in member states of SADC since 2008, in order to trigger a better collaboration between stakeholders of the livestock sector. The intention here is not to replace existing regional or international databases, but rather to make sure that national custodians control the regional integration agenda under SADC mandate and vision.

CONCLUSION

We consider the initiative paves the way for the development of new approaches towards collaborative information systems. It is not a panacea since the fundamental triggering factor in such an endeavour is building the collaboration between people. If well monitored, it will therefore provide guidance and experience to get better statistics to develop the Livestock sector in the region.

REFERENCES

Bloom B. S. (1956) *Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain*, David McKay Co Inc., New York.

de Waal A., Dupasquier C., Davidson L. and Dagnachew S. (2002) In *The Third African Development Forum (ADF III)*, Economic Commission for Africa, Addis Ababa, Ethiopia.

FANR (2007) In *Agricultural Information Management Systems (AIMS)*,(Ed. SADC FANR Food Agriculture and Natural Resources) SADC, Johannesburg, South Africa.

ACKNOWLEDGEMENTS

We would like to thank all members of the Epidemiology and Informatics, the Veterinary Laboratory, the Animal Production Veld and Marketing & Genetic Resources, the Veterinary Public Health and Food Safety subcommittees of SADC who regularly participated to biannual meetings of their groups since 2006 and collaborated with the SADC PRINT project. Moreover we would like to thank all members of the AIMS task force within FANR Food Agriculture and Natural Resources Directorate of SADC for their commitment.