SUCCESS AND FAILURE FACTORS OF MANAGEMENT INFORMATION SYSTEMS IN THE LIVESTOCK INDUSTRY OF DEVELOPING COUNTRIES.

Mpofu I. Umutara Polytechnic University, Faculty of Veterinary Medicine, P.O. Box 57 Nyagatare Rwanda. Fax (250) 565191, E-mail: impofu66@yahoo.com

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Abstract
Management Information Systems (MIS) enable commerce and industry to collate and manipulate their data in a methodical manner and use the records, facts and figures to generate quality intelligent information. Information generated is knowledge which is used in making timely decisions. There is an increase in the interest of MIS in the Agro-Industry, especially the livestock production and animal products processing operations. MIS projects in the Livestock Industry are quite different from each other from the technology standpoint, but we can reach similar conclusions about the factors that enable each of them to succeed in the implementation process and in putting the systems into operation. This paper seeks to appraise the importance of MIS in the Livestock Industry by elucidating real factors of success and failure that developing nations needs to pay attention to if livestock is to play a bigger role in economic development. The paper recognizes that some key factors in the success and failure of any implementation MIS project have hinges more on telecommunications infrastructure. This article therefore supports the idea that it is important to have the right policies, then infrastructure and have clear processes in place for data collection, processing and generation of quality information.

1.0 Introduction
Management Information Systems in the livestock industry means the employment of a record systems that create databases from which information can be retrieved, processed, batch or real time, to generate quality information that is usable in decision making. MIS in the livestock system can be applied in the following areas (departments):
1. Animal production and management (milk, meat, eggs, wool),
2. Nutrition (Feed analysis, fabrication, and feeding),
3. Animal Herd Health (epidemiology, prevention and treatment),
4. Breeding and genetics (artificial insemination, multiple ovulation and embryo transfer, gene banks),
5. Animal products processing and

Many experts have talked of sustainable livestock production, integrated croplivestock systems and organic livestock farming methods for many years and yet their real impact is very small especially in the developed world. Information is power, they say but are we distributing it enough and using it to make decisions! If developing countries can take the known, good MIS technologies to another level of magnitude then they can contribute significantly to the supply of 300 million tones of meat (by the year 2020) from non-industrial systems that the world so need [1]. It is a major challenge that relies on the success or failure of the promotion, implementation, and sustenance of an MIS in each country and within regional groupings like Southern African Development Community (SADC), Common Market for East and Southern Africa (COMESA), Economic Community of West African States (ECOWAS), to mention a few.
2.0 Critical Success or failure factors of a Livestock MIS
2.1 MIS Livestock Policy
The first factor is the presence of a policy statement within countries spelling out the importance hence the need for the implementation of a Livestock centered MIS. Policies with set milestones are critical but there must be a system in place to monitor and evaluate progress, benefits, difficulties, experiences, effectiveness and efficiency of the system. This will allow either change of course or fine tuning where necessary. At the policy, producer and processor level, the provision of safe and wholesome animal products as human food must be recognized as the cornerstone to sustainable livestock and product development. At the end of the day, policy decisions must be made. At least these policies should remove the obstacles for small producers and, in some cases, restrain the big companies. Policies directly promoting MIS in the livestock industry in the developing countries are not explicitly pronounced. One can only make inferences from the national livestock strategies which consistently aim to commercialize animal production. Commercialization of livestock production succeeds if relevant and current information is used in decision making. For the developing countries, this can only be possible through facilitation backed by specific policy statement that encourages a deliberate attempt to promote distribution and hence intelligent use of data and information.

2.2 The central role of Telecommunications Infrastructure
One problem that directly hinders success or cause the failure of an MIS in the livestock sector is infrastructure. This is in terms of telecommunication infrastructure to enable transfer of data and information via telephones (fixed and or mobile), internet or VOIP. How can small producers (who are usually the ones applying the more sustainable technologies and integration of farming activities) have access to the livestock information market? The answer probably lies in governments developing elaborate communications technology infrastructure. A case in point is the NEPAD initiative of laying an optical fiber from Cape to Cairo by committing member countries to an ICT protocol. This will allow livestock farmers to participate in telemarketing, and telecommuting. A case in point is the mobile phone, being used as a village communication tool in Bangladesh (Grameen Bank) and Venezuela, which has had a positive impact on marketing from small producers [2].

A functioning telecommunications infrastructure allows all classes of livestock farmers (smallholder farmers, large scale commercial farmers, and specialist animal breeders), agro dealers, middle men, veterinarians and other animal science practitioners to access information about, animal breeds, feeds, veterinary drugs and medicines. There is also a need and demand for low cost and simple processing technologies for livestock products whose supply and demand can be assessed and accessed for the benefit of livestock resource development.

In many situations, the middle-men or traders take the lion’s share of the profit in the livestock industry because they have the means, the knowledge and the access to the consumer market. Emphasis needs to be given to the development of an inclusive Livestock MIS that collects data and feed back information to the small-scale and village level livestock cooperatives, livestock products processors, including information on equipment, training, distributions network and marketing channels. Availability of information on suitable equipment, which can make small-scale processing competitive, can easily make livestock development advance significantly. There are examples on the African continent for example there is a successful project in Uganda to develop value-added meat products by village women and young people. An information system has been put in place to equip the same group of farmers, promoting a
method of milk preservation (the Lactoperoxidase System or LPS) which keeps milk fresh for 7-8 hours longer [3]. The widespread adoption of the low-cost system stems from a sustained inflow of technical information. This means increased income for farmers who rely on livestock, enabling them to sell their fresh milk beyond the village and supply the growing urban centers. The farmers use the information about supply from primary production levels as well as demand trends from the market. Sustained communication infrastructure has recently helped to prop up activities in meat preservation in Ghana [4]. This has resulted in the development of highly effective solar meat drying equipment.

Fulfillment of consumer demand is not only quantitative but also qualitative. Livestock producers need timely systematic information for example that livestock products must be produced from disease-free animals and under hygienic conditions. They must have readily available information about the question on the use of additives that 'improve' production but are unacceptable to the consumer if they are to create opportunities for export markets.

The best way to stimulate livestock production is to allow producers easy access to information on good return for their products. This provides real incentive for livestock production at farm level as farmers can make correct decisions on adjusting the scale of their operations.

There is progress in some places, like Bangladesh where women farmers have been assisted with both microcredit and training. There has also been effective training of technicians in farm and village work and information technologies. A Livestock MIS that combine new communications methods and greater focus on village-level action seems to be the only way to expand and sustain livestock production.

There is a global 'knowledge base' that FAO is developing (through its World Agricultural Information Centre (WAICENT)) which can provide solutions to production, health and processing so as to enable small producers worldwide to meet food security challenges of the future [5]. This must get through the system, via the technicians, to the village level and telecommunications infrastructure holds the key to the success or failure of these endeavors.

As production and consumption of meat and other animal products increase, the problems will become even more pressing and acute making the need for improved communications infrastructure more critical. Individual livestock farmers and livestock cooperatives can not develop this kind of infrastructure due to the huge capital outlay needed. As a result it is up the national governments to create an enabling environment by making necessary investments in telecommunications now not later.

2.3. Examples of Information Communication Technologies (ICT) that have a potential for working under Developing Country constraints

In the crop agricultural industry, there has been adoption of commodity indexing system in countries like South Africa through Agricultural Marketing authorities. This information exchange system captures data on supply, demand and price trends. It has helped small holder farmers to take part in formal markets to their advantage. If such a system is put in place in the livestock sector, it will make a big difference in allowing farmers to participate in competitive market. The advantage is significant as the cattle farmers can be able to cut off middlemen who are currently exploiting them.

Another tool that has been adopted completely by commercial farmers in South Africa, Zimbabwe, Botswana, Namibia and Kenya is the LIVESTOCK IDENTIFICATION SCHEME. In this scheme, only beef animals that are registered by a
national trust qualify for exports to European markets. The scheme captures a lot of data from producers and feedback useful information which help the farmers to improve their production levels. Wide adoption of such a scheme by smallholder farmers who have the majority of beef animals can place them into the main stream of their national economies and contribute meaningfully to wealth creation.

Dairy herd management data capture systems used in the developed world presents an opportunity to improve milk production so as to match demand and supply. The scheme exists only for big commercial milk producers in some developing countries and it is possible to extend this to small scale dairy producers.

Computer aided feed formulation and computer based record keeping at the production level has a potential of modernizing livestock production in the developing countries. Use of correct and accurate data is critical for decision making. Individual farmers may find these packages expensive, but there is an opportunity for government extension staff to do it on the behalf of the farmers. Most extension staff in the developing countries are computer literate and they can easily be organized into information agents.

3.0 Requirements for successful Livestock MIS

3.1 Empowered and enabled livestock-keepers

In order to achieve buy-in by the users of information of a Livestock MIS and achieve pro-poor economic growth, it is imperative that resource-poor livestock-keepers are involved right from the start of any livestock MIS intervention. Large scale farmers operate from a business stand point and usually buy-in easily due to the desire to remain profitable. But for the majority of the smallholder livestock farmers, resources must be allocated to identifying them, targeting them and planning, with them, appropriate interventions. There is no MIS system that is applicable to all levels of information consumers. So targeting and wealth ranking is always necessary so that relevant information channeling creates effective communication. In each country or regional grouping, there is need to first obtain information on where resource poor livestockkeepers live, i.e. at province and district level [6], and on their systems of production. This information helps direct investment into the most appropriate geographical locations. Care should be taken in the process so that the local elite do not bias decisions at the expense of poorer farmers.

The expectations are that a local Livestock MIS facilitates all the activities in livestock farming e.g. herd management, feed management, inventory management, herd breeding and genetics, interaction with centralized feed centers, pasture management and fattening feedlots. A database is created that would provide the national herd management services with information on management of each herd as a profit center, cost accounting and economic analysis and the economic assessment of the animal husbandry aspects, knowledge mining from the data sets, logical deviations, algorithms, reports, knowledge feedback from researchers and scientists. This system also allows for connectivity to all providers and recipients of services, automatic report generation and dissemination.

3.2 Participatory Livestock MIS planning and management

The development of a Livestock MIS must make it clear to all stakeholders and address the fundamental questions about the situation to be improved and what constitutes an improvement. It may be necessary that the existing situation is assessed by livestockkeepers themselves and that they actively participate in defining their problems and developing realistic solutions [7]. For long-term sustainability of any Livestock MIS, stakeholders must see clearly into the future, what roles each one of them individually or collectively will perform, as well as the roles of government and the private sector. This is
critical for the farmers to understand because they will sustain the Livestock MIS with relevant data on say livestock numbers, breeds and breed structure, disease morbidity, take off rate etc. which the government and private sector will use to make decisions that benefits all.

### 3.3 Role and Potential of Farmer Organizations and Groups

It has been proved the world over that farmers acting as a group are stronger than when they act as individuals. Groups, commodity associations and cooperatives can serve a variety of purposes including, mutual support and encouragement through comfort in numbers and sharing of experiences and novel ideas, provision of non-formal microfinance (through savings and credit schemes), animal breeding services (e.g. sire services, Artificial Insemination (AI), registration, livestock identification schemes), veterinary services (e.g. vaccinations, clinical procedures, diagnostic services, herd health management calendars), feed and forage analysis, feed formulation, cost-effective input supply through economies of scale (e.g. bulk procurement of feed, drugs, forage planting material), technical support and training, product collection, bulking and processing (e.g. bulk milk collection), improve access to markets, increase bargaining power and effective lobbying. So, how organized the farmers and animal products processors are, has a huge bearing on the success or failure of a Livestock MIS. For example, the Israel Cattle Breeders Association (ICBA) represents all dairy cattle farmers in Israel. For the past 8 decades the organization has been the sole representative of all milk producers in the country, taking care of all their professional needs and sustaining a vibrant and modern industry [8]. The organization supplies essential assistance to its members and the satellite organizations connected (through a Livestock MIS) to the industry. As a representative organization the ICBA is involved in national milk pricing and milk production quota policy, milk quality assurance, information dissemination, bull certification and more [8]. This Dairy Management Information System (MIS) was developed by the Israeli Cattle Breeders Association (ICBA) to oversee the professional management of the National Dairy Herd. Its main function is to give the individual and national herd managers updated relevant and quality information regarding all aspects of dairy activity, addressing all aspects of dairy farming. This Livestock MIS has been successful because it represents a concept of optimizing each individual cow’s performance as the basis for dairy management rather than using “averages”. This concept in turn is aggregated to practicing dairy herd management at the local, regional and national levels. Infrastructure on Information and Communication Technologies (ICT) are critical success factors enabling implementation and sustenance of this concept.

### 3.4 Marketing Livestock MIS

It is important to end this paper by reviewing success factors linked to the process of innovation especially in the introduction of an electronic auction system for livestock. While this might suit big livestock producers, small producers are part of it as they often constitute the catchment area of most animals that are taken for fattening. The growth and development of the system takes a number of years to implement and requires substantial seed capital. Models of the innovation process implemented in the developed world provide useful and powerful frameworks for the developing countries to emulate were possible, resources and technical expertise allowing. The growth of ‘trust’ in the system (where it has been implemented) was found to be an important additional factor in determining successful innovation [9]. Since electronic auctioning is high-tech, appropriateness, defined in terms of the ability of the system to benefit the stakeholders, is used to determine the competitive advantage over simpler marketing channels and hence
success. The gains accrued to stakeholders and the long-term changes in the appropriateness have been found elsewhere to determine the long-run sustainability of this kind of Livestock MIS.

4.0 Conclusion
The main support that the Livestock MIS provides is data updating and refinement – mainly correcting current management programming issues. This exposes the users of information so generated by the system to new management applications and supports the integration of the various animal husbandry systems involved in all aspects of the livestock industry. The critical point is that for the Livestock MIS to succeed, it must be adopted, creating in the process, capabilities among information users so that they make decisions that are compatible with the expected animal husbandry and market developments over time. Apart from telecommunication infrastructure, it is necessary to emphasize the importance of good leadership and putting in place enabling policies. It is also vital to recognize the importance of stakeholder involvement to insure that participants will make a good transition from implementation to maintenance. Livestock businesses are spread out in different regions within a country and it is always important for constant contact hence networking technologies are a big challenge to the success of Livestock MIS.

5.0 REFERENCES