



## From LINKS to NLMIS: Issues, Challenges and Lessons Learned

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*Information communication technology, specifically the mobile phone, is becoming an integral tool for development, as there is increasing recognition that information is an important tool in empowering people to make progress both economically and socially. The suite of technologies developed by the Livestock Information Network and Knowledge System (LINKS) project was adopted to develop and implement a national livestock marketing information system (NLMIS) for Kenya. The system was formally launched on July 31, 2007 as a single rich system that provides opportunities to add value by gathering national information and reaching a wide clientele through collective dissemination efforts. The system, the first in Kenya, provides the country with a unified system of information on prices of different livestock species traded in key livestock markets. This brief provides an overview of the market-based training programs conducted to launch the NLMIS, along with the challenges and lessons learned in its implementation. The authors find that following introduction of the NLMIS, data collection and uploading were proceeding smoothly in the markets networked, and that a large number of people, both at the offices and in the markets, were able to access the information. The NLMIS is part of the vision for the development of pastoral areas; through improving information flow to livestock producers and traders, they become equipped with the knowledge to make better choices on livestock marketing, thereby enhancing income and livelihoods.*

### Background

Following a successful stakeholder collective approach in investing resources and adopting Livestock Information Network and Knowledge System (LINKS) technology towards developing a national livestock marketing information system (NLMIS) for Kenya (Kariuki and Kaitho, 2006), the system was formally launched on July 31, 2007 by Kenya's Minister for Livestock and Fisheries Development. The NLMIS, an integrated suite of technologies based on GL-CRSP LINKS project research, is designed to capture market price and trade information as well as characteristics critical to the supply side of livestock marketing throughout Kenya. The system, which links cell phones operated by producers and traders with a centralized livestock market information database, has proven useful in unlocking information flow, allowing improved access to spatial information on livestock marketing for even those in Kenya's remote pastoral areas. The NLMIS is considered to be yet another milestone in livestock development in Kenya, and is set to revolutionize the way business in this sub-sector is conducted in future. This Research Brief investigates the progress of the NLMIS in Kenya (for a detailed account of NLMIS development, see Kariuki and Kaitho, 2006), specifically the efficiency and outreach capacity of the system.

**Reaching out to users.** In late 2007, the NLMIS coordinating team organized a number of market and producer level training workshops in several districts and markets to publicize the system (Mwangi et al.

2007). To support these workshops, the Kenya Livestock Marketing Council applied for funding from the Food and Agriculture Organization (FAO). The funding enabled a team of four collaborators to visit 31 markets spread over 13 districts in four provinces of Kenya. The Ministry of Livestock and Fisheries Development and LINKS project provided logistical support in the form of vehicles. Table 1 (next page) shows the distribution of markets, by province and district, where the trainings were conducted. In addition the team also visited and trained the management of the Kenya Meat Commission based at Athi River. In total, NLMIS training in Kiswahili (the national language of Kenya) directly reached over 5,000 people in 2007.

**The workshops.** During the visits, workshops were held to create awareness about the system. Participants were informed about reporting markets, the NLMIS database, and uploading and retrieval methods. One of the methods, for example, employs downloading information from the Internet, which includes information for all major livestock. Another method utilizes mobile phone short message service (SMS) technology, which has been expanded to include the prices of all livestock species from earlier models that provided price information on only an index cattle breed (the Boran mature male). Other practical demonstrations of the SMS information retrieval method followed, and participants were trained on the querying of prices from various markets, receiving all results in real time.

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Table 1. Distribution of markets by District and Province where LINKS NLMIS training workshops were conducted in 2007.

Province	Districts	Markets
Eastern	Isiolo Marsabit Moyale	Kinna, Oldonyiro Marsabit town, Merille Moyale town, Odida
Northeastern	Garissa Wajir Mandera Ijara	Garissa town, Dadaab Wajir town, Habaswein Mandera town, Rhamu, Takaba Kotile
Rift Valley	West Pokot Baringo Samburu Narok Kajiado	Chepareria, Kishaunet, Orolwo Tangulbei, Nginyang, Loruk Maralal town, Suguta, Baragoi, Lolkuniyiani, Lolkuru, Ilpus Suswa, Mulot Ewaso Kedong
Coast	Tana River	Garsen, Waldena

These NLMIS trainings elicited overwhelmingly positive responses among workshop participants. Discussions on support for data gathering and information dissemination were carried out with various agencies in the districts visited, including the Ministry of Livestock and Fisheries Development (MoLFD), Arid Lands Resource Management Project (ALRMP), District Livestock Marketing Councils (DLMC), Food for the Hungry International (FHI), Food and Research Management (FARM)-Africa, North Eastern Pastoralist Development Programme (NEPDP), CARE-Livestock Marketing Enterprise (LIME), Oxfam GB-Wajir, Millennium Village Project, and the Provincial Administration.

## Major Findings

Out of the 31 markets visited, 19 (61%) were already within the NLMIS network, while in four others (13%) the infrastructure for mobile network connectivity was under construction (at the time of writing this brief the system is now operational). The eight markets (26%) that are yet to be networked include Kotile, Tangulbei, Nginyang, Loruk, Baragoi, Ilpus, Ewaso Kedong and Waldena. The team observed that following introduction of the NLMIS to the districts visited over a year earlier, data collection and uploading were proceeding smoothly in the markets networked. Moreover, a large number of people, both at the offices and in the markets, were aware of the system and were able to download the information. However, for many people, regular use was hampered by constraints in dissemination, including the lack of sharing of information by the district livestock teams. Some stakeholders were still unaware of the system, or unable to download the information. The team stressed the importance of working together and disseminating information for the benefit of both producers and traders so as to improve the livelihoods

of the pastoralists. In addition, the district teams all cited general limitations in information dissemination due to the large areas covered by the pastoral districts, the poor road network, low mobile phone coverage, and lack of knowledge of the best media to use for various communities. It is apparent that traders and brokers had an undue advantage over producers when it comes to knowledge of prices in different markets. This is attributed to the traders use of wide networks that connect primary, secondary and terminal markets, most with access to information communication technology such as mobile phones. For producers, access to information is limited since they do not have absolute access to markets, let alone information communication infrastructure. Many cases were observed where traders coming from other areas first sat together to agree on prices they would offer to livestock owners, with a general disinterest in dealing with informed sellers; they would often bypass those with information and go to those they knew were less informed about prices outside their local markets. It is increasingly evident that producers need to organize in order to counteract these manoeuvres.

## Challenges and Lessons Learned

Livestock producers are participants in a world that is fast accelerating along the information superhighway, where access to mobile telephony and internet capacities are helping to alleviate isolation of rural producers and link them closer to initiatives that contribute to development (Kariuki and Kaitho, 2006). In implementing the NLMIS, there were a number of challenges encountered and lessons learned. Among these are that initial system start-up costs (servers, computers, mobile phones, bandwidth, e-mail, telephone calls, programming, trainings and field travel) are high, while running costs (airtime, replacement of phones, incidentals) are modest. Markets cannot be selected at will

as it depends on their importance as supply nodes, interest and support of stakeholders, availability of personnel to collect and report the data, and access to mobile phone network coverage. Turnover of staff also affects consistency in the flow of data.

The diversity of animal breeds, age classes, size, and body condition all present challenges in identifying which animals to select for representation. For some markets, the accuracy of aggregate supply of livestock offered in the market on a monthly basis is not assured given that the reporting is done only once a week, and the numbers should therefore be considered as indicators rather than absolute figures. Furthermore, it is possible that some animals are transacted more than once before leaving the market giving a variation in the selling price. However, on average, most animals are transacted only once, as sampling is by dominant breed/class/age/grade combination and the calculated average price is therefore a good representation of the price for that particular market day.

In some markets, development may not always be achieved due to limitations engendered by conflict and the fragmentation of markets based on ethnic considerations leading to emergence of mini-markets within the larger market. This also affects the use of infrastructure and facilities developed for the market, which may remain unused.

In terms of access to information, traders and middlemen have a competitive advantage over producers. This is because livestock trade is highly dominated by middlemen who provide brokerage services and handle most of the transactions on behalf of producers, many of whom hardly venture into the market, making it difficult to reach out to them during regular trainings conducted at the market level. Their knowledge of market dynamics is therefore greatly curtailed, and this is compounded by their limited access to information due to low levels of literacy, limited network coverage, and limited access to other channels of information such as the Internet. There also exists a large divide between traders/middlemen and producers in terms of spatial location, temporal difference, access to resources, knowledge, and often deliberate distortions in market information that favors traders and middlemen. Producers are often far removed from key markets resulting in temporal delays in getting information and limited knowledge on markets outside their immediate locality. It takes time and effort to change people's behavior and attitudes, and people continue to rely on traditional communication methods that are low in speed, reliability and efficiency.

At the macro-level, marketing of livestock is not given prominence compared to that of agricultural commodities, a situation compounded by poor infrastructure and lack of up-to-date policies to support the business.

## Practical Implications

It was agreed that the open-air approach used in the trainings helped break some barriers in terms of getting access to livestock producers and sellers who do not have good access to market information. Developing the technical and human capacity to meet market information needs and decision support for livestock producers helps to bridge the gap between markets on the one hand, and producers on the other. This allows producers to make better choices on where to sell their animals and creates leeway to have stronger bargaining power with traders, which translates to improved returns to their marketing transactions, and therefore an enhancement of their economic status. Research has shown that on average, producers receive only about half of the terminal market prices in Nairobi (Agrisystems, 2003), while traders reap proportionately higher returns. A marketing information system can lead to changes in marketing behaviour, while understanding market signals can play an effective role in orienting producers towards market opportunities (Ferris, et al. 2008). If the system can inform producers so that they can negotiate for better prices, then it will have achieved its primary objective.

If producers get better returns, the cash generated meets expenditure for goods and services that they cannot produce at home. This not only helps them to improve the livelihoods of their households but also creates demand for goods and services in the local and national market arenas. Socially it means that information can be targeted to reach specific gender, age, and wealth categories to reach a wider range of clientele, which helps producers to form and strengthen marketing associations and pool resources to invest in marketing that enables them to reduce per capita transaction costs.

Finally, to enhance the impact of the National Livestock Marketing Information System on communities of livestock producers, agencies also need to focus more on demonstrating and helping people to better understand the link between drought and changes in livestock prices, as part of early warning and contingency planning to assist in saving livestock assets during periods of emerging crises. While the LEWS technology embedded within LINKS and the NLMIS provides the toolkit, the agencies must simply enable the implementation.

## Concluding Remarks and the Way Forward

The NLMIS is part of the vision for the development of pastoral livestock producing areas; through improving information flow to livestock producers and traders, they become equipped with the knowledge to make better choices on livestock marketing, during both normal and distress periods. This model can be applied to collect,

report and analyze data, and also to disseminate information on animal diseases, water resources situations and conflicts over resources. To move the system forward, there must be commitments for long-term financing through a combination of public (Ministry budget line) and private investment. The media can play a role in facilitating dissemination of information generated by the system, and mobile telephone operators can explore ways of contributing to the system through support in sending data and accessing information.

To enhance decision making in livestock trade, it is useful to integrate livestock market information with other information such as disease outbreaks. Besides infrastructure development (roads, water, abattoirs, communication networks), there is a need for a clear policy favorable to the development and use of information communication technology (ICT) particularly

in livestock related activities. The proposed concept of digital villages, villages linked by ICT, should address the special needs of poor, small scale and remotely located livestock producing communities who are far removed from hubs of economic activity in time and space.

Other required interventions include continuation of the work in the remaining markets, increased support by local authorities, expansion of mobile network services and support to data gathering, processing and analysis, as well as information dissemination to feed into a livestock early warning system (Republic of Kenya, 2006). Networking markets with headquarters will allow easy access to information, while involving local institutions in developing training modules for users will enhance acceptability and confidence in the use of the technology.

## Further Reading

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The GL-CRSP Livestock Information Network and Knowledge System (LINKS) project developed from the GL-CRSP Livestock Early Warning System (LEWS) project established in 1997. The LEWS project developed and applied a suite of information communication technology to provide a regional decision-support framework for livestock early warning. The LINKS project is placing LEWS technology inside a broader livestock information and analysis system that is designed to improve livestock markets and trade, thereby enhancing the well-being of pastoralists in eastern Africa. The project was led by Dr. Jerry W. Stuth, Texas A&M University until his death in April 2006. The project is now led by Dr. Paul Dyke, Texas A&M University. Email: dyke@brc.tamus.edu.



The Global Livestock CRSP is comprised of multidisciplinary, collaborative projects focused on human nutrition, economic growth, environment and policy related to animal agriculture and linked by a global theme of risk in a changing environment. The program is active in East and West Africa, Central Asia and Latin America.

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