Case study: The role of mobile technologies in promoting sustainable delivery of livestock insurance in the East African Drylands: Towards sustainable Index-Based Livestock Insurance (IBLI) for pastoralists

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Abstract

The International Livestock Research Institute (ILRI) together with its partners launched a pilot index-based livestock insurance (IBLI) product in January 2010 in the Marsabit District of northern Kenya. It has since been scaled across the drylands of Kenya, and is also gaining momentum in Ethiopia where a pilot insurance project was launched in 2012. One problem inspired ILRI's IBLI agenda: finding a sustainable way to help pastoralists to recover quickly from the considerable losses they incur during severe droughts. Over the years, evidence of IBLI impact and value for money, and continued research and development on product design, as well as innovations along the service delivery chain, have helped with uptake, in convincing governments and development partners of its importance as a risk management tool, and have won IBLI a plethora of international awards.Briefly describing the key elements of the IBLI agenda, this presentation focuses on how the IBLI team leveraged a suite of digital technologies – largely mobile based – to help surmount some of the main obstacles to the provision of IBLI. Even in the sparsely populated drylands of northern Kenya, which the IBLI product targets, socioeconomic evolution has resulted in a growing density of mobile network coverage and a proliferation of mobile phone ownership, and use. Exploiting this trend, the IBLI team and partners have developed mobile applications for offline sales transactions and drastically reduced the cost and time to delivery of indemnity payments, as well as a whole host of other applications in information exchange and knowledge dissemination.

I am leading a program on index-based livestock insurance. This is a product that we developed having identified that risk of drought-related mortality of livestock was the greatest source of vulnerability faced by extensive-livestock keepers, pastoralists. This product was a solution. As we went about designing, developing and implementing this program we came across a lot of challenges, for which we found a number of solutions through the use and exploitation of mobile technologies.

First, some background about the context and why we use insurance. The area that we are targeting is the arid and semi-arid lands of Kenya, Ethiopia and East Africa, which account for over 60% of the land in this region. These areas

This paper has been prepared from a transcript and the Powerpoint slides of the presentation.

are pastoral regions, and extensive-livestock keeping is the key production system. There is plenty of evidence, over decades – collected and written up by myself, my colleagues and others – showing that risk in these areas not only makes people poor by reducing their incomes and destroying their assets, it also keeps people poor by discouraging investment and distorting patterns of asset accumulation. And in an environment such as this where livestock is the key productive asset, the key source of income, we hypothesised that there would be great development impact in providing these pastoralists with a risk-reduction risk-management technology, such as insurance.

The question was, how do we develop an insurance contract that is suitable to this kind of agro-ecology, to this risk profile, and to the basic infrastructure-deficient and remote environment these pastoralists live in?

We stumbled upon new technology in insurance: index-based livestock insurance (IBLI), which uses satellite data to estimate the amount of forage available within a season and related livestock losses. We were able to develop a formula upon which insurance could be written. So then the objective of our research and development program was to test our hypothesis, namely that insurance could make a significant and sustainable contribution to reducing the challenge pastoralist populations face in managing risks of drought-related livestock mortality.

The first product was launched as a pilot in northern Kenya, at Marsabit, in 2010. In 2012 it was rolled out in southern Ethiopia, and since then the program has grown quite a bit with governments being involved. The sustainable index-based insurance program has five components:

- precise contract design – over the years we have brought in new technology using the intersection of remote sensing and spatial econometrics, to make sure we design value-adding contracts that actually manage the risk being targeted.
- evidence of value and impact – in both northern Kenya and southern Ethiopia we have been following a range of households across the years to ascertain household-level social and economic welfare benefits of insurance, as well as value for money. The positive evidence generated therein has helped uptake and support by governments and development partners across the years.
- establish informed effective demand – it was critical to make sure that we catalyse and stimulate demand from the pastoralists, and that they understand what they are purchasing, because they have very low literacy and insurance is utterly new for them. This was quite a difficult challenge.
- low cost, efficient delivery mechanisms – we worked with our insurance and other delivery partners to reduce the cost of delivering insurance and delivering the services that are necessary along with insurance, and it is in these two areas that mobile phone technology has helped us quite a bit.
- policy and institutional infrastructure – we're currently working very closely with the Kenyan Government, the Ethiopian Government and other partners as they take up the product and integrate it within their own government

systems. The Government of Kenya has the Kenya Livestock Insurance Program partnering with this project. They have taken up the contract that we have designed and are working in a private–public framework to help scale it sustainably. We provide them with technical support.

Delivery challenges

The lands where we are working are quite remote and deficient in infrastructure, which leads to challenges in delivery of insurance. This problem could be solved by application of mobile and digital technologies. Figure 1 shows our data from annual surveys on mobile phone use in Marsabit. Round 1 was in 2010 and round 6 was in 2015. Essentially we asked householders: "How often do you use a mobile phone: never? once a year? ... every day?", and you can see the line for 'every day' increasing steadily to 2014 and then drastically in 2015.

We have been able to leverage mobile technology in three different ways in support of IBLI:

- mobile phones as a service delivery tool – delivering sales; delivering premiums; delivering information;
- mobile phones as a training and performance assessment tool – mlearning and gamification; tracking impact of training on sales;
- mobile phones as data provisioning tools – crowd-sourcing for rangeland conditions; livestock market information systems;

and we think the technology could be valuable for other types of interventions in this area also.

Service delivery. One of the big challenges we faced from the outset was that the insurance companies we partnered with were using point-of-sale devices. In 2010 each of these cost about US$12,500, and that limited the number of

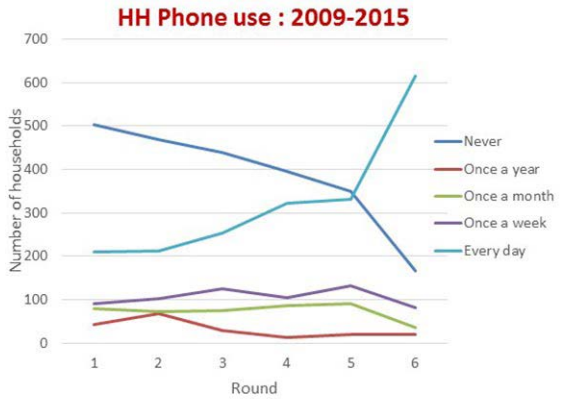

Figure 1. Leveraging mobile technologies for IBLI and beyond.

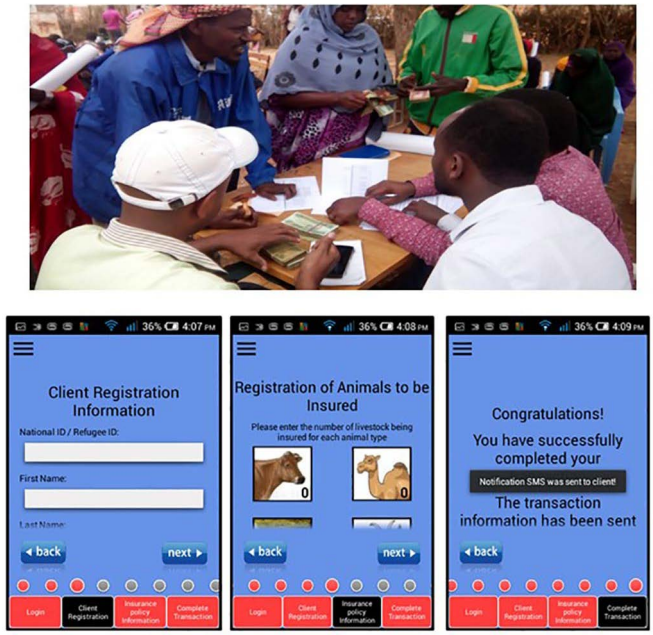

Figure 2. Contrasting the manual and mobile methods for engaging new IBLI clients.

agents that could be employed to provide products for sale to clients. The lack of sales agents was really affecting sales and accessibility. So we worked with insurance companies to develop sales transactions applications (Figure 2). At the time, 2011, this was quite novel. These applications really helped increase the number of active sales agents and therefore the awareness and availability of the insurance, and they allowed for better data management and a range of useful analytics on agent behaviour.

They also helped with the delivery of indemnities, because the pastoralist population then had few phones; indemnities were being delivered manually, via Toyota LandCruisers ... if the agents could identify where the pastoralists were. As you can imagine, the cost of trying to deliver indemnities was a lot more than the value of the indemnities. We were at the pilot stage of the program and wanting eventually to promote and catalyse a sustainable market, so we really needed to solve that issue! Now, with mobile technology, indemnity payments are increasingly paid through M-PESA, a popular and innovative mobile money transfer service in Kenya, or online bank accounts.

Another challenge we faced with service delivery was how to build awareness and trust in the product. Clients often asked, "If this is working really well now, what was the situation in 2009 or 2011?", which are years that they identify with drought. So we developed an application that sales agents could use to show the index of data on a hypothetical contract in the past, to answer that question (Figure 3). It has proved quite an important tool for the agents.

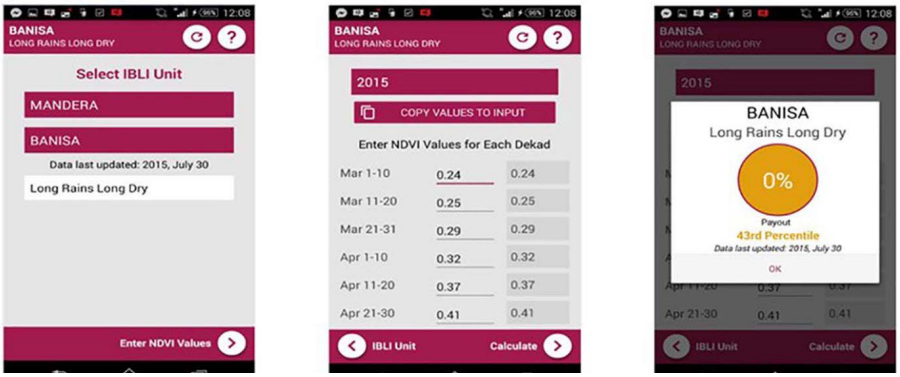

Figure 3. The index calculator showing IBLI performance and what would have been the payout on a hypothetical contract in a previous drought year.

***Training and performance assessment*.** Currently the two insurance companies offering the product have over 500 insurance agents, and one of their largest costs is in training, extension and performance assessment to make sure the agents understand the product enough to catalyse and generate demand. As well as being very expensive, literature has shown that this type of training is not very effective. So we began developing learning tools to provide the standard IBLI training curricula. Again, we started rolling these out via a pilot trial with a particular type of insurance company using a randomised controlled-treatment type of design. We found that agents who trained with the mobile application (which offered incentives either as cash or via gamification – leader boards) brought in three times the volume of sales. That result led the insurance companies to ask us to work jointly with them to continue developing their mobile learning profiles for IBLI.

Data provisioning

As satellite data in regional conditions does not show how palatable and nutritious the forage is, we have run a crowd-sourcing pilot project with

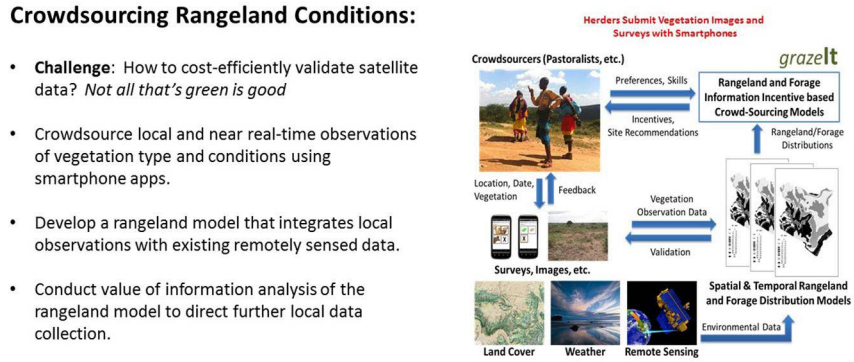

Figure 4. The data provisioning project with pastoralists providing data on forage quality.

pastoralists (Figure 4). In this project, about 100 pastoralists over four months sent up over 120,000 photos of forage, which were processed by our partners at Cornell University's Institute for Computational Sustainability. The success of this showed us that illiterate pastoralists were able to collect various types of data.

Now we have begun a new program using crowd-sourcing logic to try to improve on livestock market information systems here. Over the years much money and many resources have failed to come up with a sustainable system of data that is of high resolution and quality, and we think our method may be able to solve this. Again, we have begun a pilot trial and it is ongoing at the moment.

In outline, a client organisation requests reports on specific types of data on, say, cattle. Our system administrator designs surveys, reports and dynamic incentive structures that can facilitate collection of the required data. The survey is sent out to the crowd-sourcing population. On contributing information, members of the population receive an incentive payment via a mobile platform. The data is validated and delivered to the client in usable formats.

Conclusion

This talk has given a snapshot of the emerging influence of mobile applications in challenging physical terrain. As you see, mobile phones are an asset that can allow access to far away markets and opportunities, unlock underutilised resources, and make innovative applications available to otherwise isolated users.

As we collect this data, we are referencing 'big data' and analytics for generating evidence-based and data-informed policies and also behaviour change for all the various actors, from policy makers to farmers.

Critical regulatory questions remain, such as:

- issues of data ownership and security;
- privacy; and
- the enabling environment and digital literacy.

Acknowledgements

Figure 5 acknowledges the large range of partners that we work with.

Figure 5. Acknowledging the partners in the IBLI program.

Andrew Mude is a Principal Economist at the International Livestock Research Institute based in Nairobi, Kenya. His portfolio deals largely with developing innovative evidence-based technological solutions to ensure the productive and sustainable use of livestock by dryland populations. Andrew leads the multiple-award winning effort to design, evaluate and scale livestock insurance to help millions of poor herders and their families who care for and depend upon their livestock under conditions of considerable drought risk. Widely published in peer-reviewed journals, and featured in numerous prestigious media outlets, Andrew was the 2016 recipient of the Norman Borlaug Award for Field Research and Application, which recognises exceptional science-based achievement in international agriculture and food production by an individual under 40 years of age. Andrew completed his doctoral degree in economics at Cornell University in 2006 and was a mid-career fellow of the Sustainability Science Program at Harvard's John F Kennedy School of Government in 2011.