Income Intervention Quick Scan: Market Information Systems

Farmer Income Lab Intervention Quick Scan

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Abstract UK This quick scan, commissioned by the Farmer Income Lab, is part of a wider research effort looking at, “What are the most effective actions that lead buyers can take to enable smallholder farmers in global supply chains to meaningfully increase their incomes?”. The quick scan provides an overview of the publicly available evidence on the impact of market information systems have had on raising farmer income. Such subsidies have had little positive effect on farmer income, are not notably beneficial for women nor is this effect long-term. They have been applied at large scale. This quick scan is part of a series of 16, contributing to a synthesis report “What Works to Raise Farmer’s Income: a Landscape Review”.

Keywords: farmers’ income, intervention, agriculture, smallholders, market information systems, transparency, mobile tools, networks, trade

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List of abbreviations and acronyms

AMIC	Agricultural Market Information Center in Zambia
AMITSA	Agricultural Input Market Information and Transparency System
CIRAD	French Agricultural Research Centre for International Development
FAO	Food and Agriculture Organization of the United Nations
ICT	Information and Communication Technology
LMIS	Livestock Market Information System
MAMIS	Agricultural market information system in Tanzania
MIOA	Market Information Organization of the Americas
MIS	Market Information System
OMA	Agricultural Market Observatory in Mali
RATIN	Regional Agriculture Trade Intelligence Network
SIMA	Agricultural Market Information System in Mozambique
SIPAG	System of Agricultural Information Products Guinea
WCDI	Wageningen Centre for Development Innovation, Wageningen University & Research
WUR	Wageningen University & Research
ZNFU	Zambia National Farmers Union

1 Introduction

Market information system emerged as an accompanying measure to market liberalization to improve competitiveness and functioning of markets. Market information systems were intended to correct the asymmetries created by economic liberalization, give bargaining power to farmers, create a transparent open trading environment and foster an efficient market systems for all stakeholders.

A majority of farmers are smallholders living in isolated rural areas and thus lack appropriate access to markets for their products and also they are deprived of agricultural market information. As a lack of these, smallholder farmers have not enough information on demand and supply, what to produce and when, and therefore can be exploited by other actors in the chain and receive low prices for their agricultural produce.

1.1 Definition

Market information systems collect, process and disseminate information on the situation and the dynamics of agricultural markets in order i) to improve public policies through increased awareness of market realities and ii) to increase market transparency and, by this way, to lead to a fairer and more efficient allocation of resources.

Originally, MIS delivered mostly price information, and not necessarily in timely manner, e.g. once/week or once/month. These MIS systems were set up and managed by governments with mostly policy improvement in mind (first generation MIS). Later, to meet the needs of private sector actors, MIS started to deliver additional services: more frequent price information at different markets, information on different produce from input to final produce, selling – buying offers, sellers / buyers contacts, weather forecast, stock availability, market analysis, etc.

1.2 Theory of change

By providing access to market information for smallholders, they can better decide what to plant, when and where to sell their produce, and can negotiate better prices for their agricultural produces.

1.3 Role of actors

First generation MIS share a set of characteristics:

- They are created and managed by government departments or projects and financed by international aid funds.
- They are focused on a country and a specific type of products (cereals, cattle etc.);
- They deliver almost exclusively price information;
- They collect price data at sample markets throughout the country, computed average price information and then disseminated it for free.

The rise in accessibility of new information and communication technologies in Africa—first internet-based web applications and then mobile phones—led to the emergence of second generation market information systems in the 2000s. In second generation MIS, market prices were integrated with other mobile agriculture information tools to provide additional information, including agricultural extension advice, input price information, weather forecasts and trading platforms to match producers with buyers. These systems tended to be created and led by the private sector or farmers' or traders'

associations rather than governments and they at least attempt to achieve financial sustainability by charging user fees, permitting advertising and providing fee-based additional services.
Public sector initiated: investment of public funds in MIS has historically been justified based on the three factors (Henderson et al., 1983).

a. A more equitable distribution of bargaining power within the food system
b. Improved market efficiency from better private decision-making in relation to consumer demands
c. Improved design and implementation of government programs and technology development

The role of MIS in informing public policies and providing the information to implement public programs continues to be a major motivation for public support of MIS. For example, Mali's Council of Ministers requests weekly reports from the country's agricultural market information system and uses these reports for making food policy decisions, such as setting the level of taxation on rice imports.

Table 1 presents examples of first and second generation MIS's.

Table 1 *Examples of market information systems.*

Actor initiated MIS	**Government** **First generation MIS**	**Private sector** **Second generation MIS**
Examples	• Agricultural Market Observatory in Mali (OMA) • Agricultural Market Information Center in Zambia (AMIC), • Siarm in Senegal • Agricultural Market Information System in Mozambique (SIMA) • Information System of Agricultural Markets in Niger, Information Systems on Livestock Markets in Niger, • System of Agricultural Information Products Guinea (SIPAG) in Guinea Conakry	• Housed in or run by farmer organizations (e.g. Observatoire du Marche´ Agricole in Mali) • Economic Information System of Vegetables in Madagascar • Zambia National Farmers Union SMS 4455 in Zambia • Private-sector systems that offer the promise of financial sustainability through the sale of information to users, typically through SMS and specialized reports (e.g. Esoko Ghana, Infotrade in Uganda, KACE Market and Information Linkage System in Kenya, and Reuters Market Light in India), • Regional Agriculture Trade Intelligence Network or RATIN (based in Kenya but operating throughout East Africa). • Agricultural exchanges, such as the Ethiopia Agricultural Exchange, which generate some aspects of market information as a by-product of their facilitation of open and forward-market trading

2 Summary and justification of assessment

Strength of outcome		
Assessment criterion	**WUR score**	**Rationale for score**
Scale: Size of the population intervention could impact and potential to scale to other contexts (i.e., geographies, value chains)	Medium	• Due to development of technologies large number of smallholders can be achieved via mobile phones or internet o Esoko has reached 350,000 farmers in 10 countries across Africa (reference 5) • However, there are a lot of smallholders left behind (Table 1 and 2) (reference 1) • There is wide variety of results from Asia and Africa showing that both large and small scale interventions can fail or be successful For more information, please see table 3
Impact: degree of increase in incomes	Medium	• Result regarding income is mixed across the literature o smallholders producing coffee in Ethiopia obtained higher revenues and profits than non-MIS users, in magnitude, a 37% increase for profits and a 25% increase for revenues (reference 10) o having access to regular market information via radio was associated with 15% higher farm gate prices in Uganda. (reference 2) o in Uganda mobile phone coverage had a positive effect on farm-gate prices for bananas. They did not find a significant impact on prices for maize, however. (reference 2) For more information, please table 3
Sustainability: financial ability of farmer income increase to endure independent of ongoing external support	Low	• There is general reference to the lack of financial viability of MIS, with an on-going discussion whether this is a public good that should be paid by public funds, or a private service that should be paid for from business profit.
Gender: Potential of intervention to positively impact women	N/A	• No data and information on this at all

Strength of evidence		
Assessment criterion	**WUR score**	**Rationale for score**
Breadth: amount of rigorous literature that exists on the impact of the intervention, as defined by the minimum quality of evidence for this paper	Low	• There is a lot of literature on how to set up on MIS, but much less on evaluating its impact on different users and different aspects (5% of literature)
Consistency: Degree to which the studies reviewed are in agreement on the direction of impact (i.e., positive or negative)	Medium	• Mixed result when it comes to impact on prices / income / margin of smallholders; both the increase in any of the mentioned categories as well as the number of users vary so much across the literature that it is impossible to draw more precise conclusion here on scoring. • The availability literature is extremely diverse when it comes to consistency.

3 Methodology

1. Meta studies
    a. By World Bank Group (reference 1)
    b. CIRAD on FOODNET, Uganda; RML, India; West-Bengal; Peru; Esoko, Ghana (reference 2)
    c. Market Information Organization of the Americas (MIOA) (reference 3)
    d. Esoko has reached 350,000 farmers in 10 countries across Africa. It has sent 9.5 million messages on one million prices in 170 markets collected by 150 field agents. In 2014, Esoko operated 29,344 calls in Ghana, of which 40% were related to weather data. (reference 5)
    e. MIS in East Africa
        i. Agricultural Marketing Information Services (Cameroon)
        ii. Agricultural Input Market Information and Transparency System – AMITSA (East Africa)
        iii. Esoko (Many countries in Africa)
        iv. Infotrade Market Information Services (Uganda)
        v. Lima-Links (Zambia)
        vi. Livestock Market Information System - LMIS (Ethiopia)
        vii. M-Farm (Kenya)
        viii. Nokia Life Tools (Nigeria)
        ix. Regional Agriculture Trade Intelligence Network – RATIN (East Africa)
        x. Zambia National Farmers Union – ZNFU (Zambia) [incomplete information collected]
2. Specific studies
    a. Zimbabwe: The average income for most of the farmers interviewed for this study increased by less than 15% (focus group interviews with 82 farmers on services of Esoko) (reference 9)
    b. Coffee, Ethiopia - 546 smallholder coffee farmers in Ethiopia (reference 15)
    c. E-choupal, Central India (reference 12)
    d. DrumNet, Kenya , sunflower (reference
    e. MAMIS, Tanzania, tomato - 73,200 users took advantage of the system in 2012/2013, and roughly 20% of these users received tangible benefits (reference 14)

4 Impact

There are two major categories of challenges in assessing the impact of investments of MIS

1. Choosing appropriate impact indicators. For example, one critical characteristic of market information is its timeliness. For a policy analyst interested in the long-term evolution of prices in the horticultural market, monthly average tomato prices may be entirely satisfactory. For a trader trying to decide where to send tomatoes the next day, such prices are worthless and an option that allows a more accurate forecast of tomorrow's prices in alternative markets is required.
2. Identifying the causal effects of the MIS: if farmers can get higher prices when they are using MIS, it is difficult to conclude that the higher price is solely due to using MIS. It could be due to using improved production technologies, and therefore, better quality.

Mixed results regarding impact on prices

A number of recent empirical papers have investigated the effects of better market information on producer prices, although results have been mixed. Svensson and Yanagizawa (2009) found that having access to regular market information via radio was associated with 15% higher farm gate prices in Uganda.

The results from an experiment in Rwanda, on the other hand, found no effect of having a mobile phone on prices received by farmers (Futch and McIntosh, 2009).
Fafchamps and Minten (2012) look at the effect of SMS-based agricultural information on producer prices in India and find that access to information did not significantly increase the prices they received, whereas Muto and Yamano (2009) found that in Uganda mobile phone coverage had a positive effect on farm-gate prices for bananas. They did not find a significant impact on prices for maize, however.

Aker and Fafchamps (2015) also find that the effect of mobile phones varies by crop in Niger. They report that there is no significant effect on average producer prices, however there is a reduction in the variability of prices for cowpea but not for millet.

Using examples from Tanzania, Molony (2008) argues that the ability of producers to use price information may be limited by the fact that they are tied in to relationships with particular middlemen and are dependent on them for credit. Since they do not have an option to trade with someone else if they are unsatisfied with the price they receive, being informed about the market price does not help them. These results suggest that the benefits of information to farmers vary depending on what options are available to them.

According to Guenwoo Lee and Aya Suzuki (2015) smallholders producing coffee in Ethiopia obtained higher revenues and profits than non-MIS users, in magnitude, a 37% increase for profits and a 25% increase for revenues. This increase could be more attributed to an increase in harvest volumes and in sales volumes by MIS users rather than an increase in their selling prices. Another finding is that this positive effect of MIS on the farmers' performance is magnified further with more years of education, indicating that more educated benefit more from using MIS. This suggests that how the information is used matters in improving the performance, not just the fact of having the information.

Results of Goayl (2010) show that on average, the traders' price of soy increased by 1-3% after the introduction of kiosks, and there was a significant increase in the area under soy cultivation due to the intervention.

Drumnet in Kenya managed to shorten the value chain. Prior to joining DrumNet, farmers earned only 65% of the sale price (i.e., price paid by BIDCO Ltd). The rest was taken by the various intermediaries

namely transporter (9%), brokers (23%) and others (3%) go towards paying for marketing costs and fees. After joining DrumNet, farmers earned much higher margin (i.e., 86%). In addition, farmers earned much higher and stable price after joining the DrumNet project than before.

MAMIS in Tanzania showed that

- Access to market information is not independent of farmers' age groups. Specifically, farmers in the age group of 31-40 are able to make better use of information than farmers in other age group mean gross margins for beneficiaries are more than five times larger than those for non-beneficiaries. reasonable conclusion is that beneficiaries realize much
- MAMIS users have larger gross margin relative to non-beneficiaries because they market their tomatoes to outlets that pay higher prices and limited price fluctuations. By contrast, non-beneficiaries face more price fluctuations for their tomatoes because they have access to lower quality of information and make less timely sales.
- As an indication of the true value of information, the results revealed that farmers having access to market information have larger sales than those lacking access. More importantly, farmers selling larger quantities received higher prices because they sold their tomatoes to the main market that is endorsed by MAMIS.
- Additionally, even when beneficiaries of market information used retailers and wholesalers, they often received higher prices than non-beneficiaries who used these same outlets because they could bypass intermediaries who skim a percentage of market price.

Financial sustainability remains a challenge

The issue of financial sustainability of MIS remains a crucial point. Even for those MIS that sell most of their services, they are still largely dependent on projects funds or private foundation supports. The problem is that, on the one hand, the cost of gathering, processing, disseminating information is high, while on the other hand the users, especially small farmers, can only afford small expenses. Cell phones address this problem (partly) by offering per unit call request or per subscription. A MIS can be made more financially sustainable by covering a wide range of products at the national level or regional block of countries. However, to be effective, a MIS needs to be adapted to each market's specificity, which is in contradiction with a one-size-fits-all system at large scale. Even the MIS that generate revenues through user fees (such as charges for receipt of market information via SMS) typically require substantial initial funding from outside sources, such as governments or donors.

Scaling remains a challenge

Access to technology (reference 1)

While mobile phones have spread quickly even in low-income countries and among poorer population groups, access is by no means universal. And internet access remains very low in many countries. For example, the digital divide is large between and within 12 countries in Sub-Saharan Africa for which reliable data are available (Table 2 and Table 3). Mobile phone access is as high as 84% in South Africa, and as low as 18% in Ethiopia. Internet access is 34 and 3%, respectively, in the same two countries. Access is significantly lower in rural versus urban areas. Residents of rural areas in Ethiopia are only about one-fifth as likely to have access to a mobile phone as urban residents. On average, these disparities are as high as those between the bottom 40% and the upper 60% of the income distribution, and much greater than those between women and men, or between the old and the young.

Table 1 *Individuals with mobile phone access.*

	All (percent)	Ratio rural / urban	Ratio women / men	Ratio age 45+ / 15-24	Ratio bottom40 / upper60
South Africa	84.2	0.94	0.96	1.04	0.89
Botswana	80.0	0.80	1.09	0.86	0.76
Kenya	74.0	1.01	0.81	1.09	0.73
Nigeria	66.4	0.86	0.72	0.87	0.74
Ghana	59.5	0.61	0.95	1.09	0.60
Namibia	56.1	0.60	1.04	0.85	0.57
Uganda	46.7	0.78	0.61	1.40	0.65
Cameroon	44.5	0.31	1.02	0.92	0.53
Mozambique	42.5	0.44	0.99	0.77	0.49
Tanzania	35.8	0.46	0.74	1.31	0.49
Rwanda	24.4	0.38	0.77	0.52	0.36
Ethiopia	18.3	0.22	0.42	0.79	0.27

Source: World Bank (2016). Ratios refer to percentages, e.g. percent rural / percent urban.

Table 2 *Individuals with internet access, 2014.*

	All (percent)	Ratio rural / urban	Ratio women / men	Ratio age 45+ / 15-24	Ratio bottom40 / upper60
South Africa	34.1	0.52	0.70	0.32	0.74
Botswana	29.0	0.55	0.81	0.23	0.51
Kenya	26.3	1.02	0.57	0.54	0.46
Nigeria	18.4	0.69	0.59	0.23	0.40
Namibia	16.2	0.15	0.76	0.37	0.32
Cameroon	14.1	0.11	1.09	0.48	0.48
Ghana	12.7	0.61	0.48	0.44	0.29
Mozambique	11.1	0.13	0.74	0.27	0.24
Uganda	7.9	0.38	0.26	1.92	0.28
Rwanda	6.0	0.24	0.76	0.58	0.15
Tanzania	3.5	0.20	1.04	0.60	0.22
Ethiopia	2.7	0.14	0.28	0.54	0.23

Source: World Bank (2016). Ratios refer to percentages, e.g. percent rural / percent urban.

Willingness to pay for services: farmers see great value in market information services but the majority of them are not willing to pay for the service.

Studies reviewed suggest that basic price and market information systems can improve efficiency and welfare. The evidence, though strong, is still limited to certain countries and in certain contexts. A number of recent studies have cast doubt on the overall novelty of information provided to the farmer with modern tools and the degree of competition in many markets.

One explanation of weak effects is low take-up of fee-based price information services (Futch and Mcintosh 2009, Mitra et al 2015). But even when farmers are seemingly better informed, they may not necessarily be able to act on that information because of inaccessibility of alternative markets and the complex interlinked relationships between buyers and sellers in poor developing economies. Rather than assuming that an ICT approach will always be cost-effective and yield a better outcome, a more nuanced understanding of the underlying institutional environment and constraints is warranted.

The versatility and near-constant innovation that characterize digital technologies can sometimes be a distraction that can cause interventions to focus more on the technology than on the demands and

priorities of the intended beneficiaries and the trade-offs imposed by resource constrained environments.

Finally, ICT policies and the broader regulatory environment in a country have to be discussed jointly. Whereas the expansion of mobile phone access has been rapid and commercially self-sustaining even among many of the poor, the same is not true of the internet. In the long run, the internet can have an even greater impact on rural growth and much depends on finding sustainable business models to encourage its spread in the poorest parts of the world.
While some positive effects have been recorded, the conclusions on MIS utility are still far from unequivocal. Some of the studies conducted are described briefly below:

Table 3 *Summary of FAO and CIRAD study.*

Svensson and Yanagizawa (2009)	Uganda	Farmers equipped with radios in areas where market information was broadcast received 15% more for maize than farmers without access to market information.
Jensen (2007)	India	Phone signals could be picked up at sea, and fishermen were able to contact buyers on the coast. Jensen showed that the adoption of mobile phones by fishermen and wholesalers was associated with a dramatic reduction in price dispersion, the complete elimination of waste, and a near-perfect adherence to the "Law of one price"
Muto and Yamano (2009)	Uganda	Expansion of the phone network had a greater impact on the market participation of banana farmers in areas farther away from district centres. However, for maize, which is much less perishable, the expansion of the phone network was not found to have any impact.
Goyal (2010)	India	Introduction of free Internet kiosks showing daily agricultural information (e-Choupal), combined with the entry of a new corporate buyer, significantly increased average market prices for soybeans in Central India.
Aker (2010)	Niger	Phones were used to access price information from other traders rather than from a formal MIS. The study discovered a significant reduction in variability across markets. Phones were found to be more useful when markets were further apart. It was concluded that the reduction in search costs and in inter-market price dispersion led to improvements in trader and consumer welfare.
Fafchamp and Minten (2012)	India	No significant impact in price Interpretation: most farmers sell on auction markets where they already receive a "fair price" for their products.
Aker and Fafchamps (2014)	Niger	While mobile phone coverage reduced spatial producer price dispersion by 6 per cent for cowpea, a semi-perishable commodity – with these effects being strongest for remote markets and during certain periods of the year – there had been no effects on producer price dispersion for millet and sorghum. A possible explanation for these results was the fact that farmers resorted to greater storage for storable commodities such as millet and sorghum.
Labonne and Chase (2009)	Philippines	Farmers using cell phones reported improved relationships with their trading partners, possibly because the ability to compare prices led them to trust their buyers more.
Molony (2008)	United Republic of Tanzania	The ability to communicate using cell phones did not significantly alter the trust relationship between buyers and sellers. It was inferred, rather, that farmers often had to accept the price offered because their buyers were also their creditors. Therefore, many farmers were unable to exploit new cell phone-based services to seek information on market prices and potential buyers in other markets, as this risked harming long-term trust relationships with buyers who were willing to supply credit precisely due to their established business relationship.
Kizito (2011) and Kizito et al. (2012)	Mozambique	Mean price difference per kg of maize sold between households with and without information was 12%. The estimated aggregate marginal gain in income by an estimated 250 000 households that received information and sold maize was estimated at US$723 121 annually in the main marketing season. The authors noted that these gains were approximately six times greater than the operational costs of the Government's MIS in 2002, equivalent to US$130 000.

Camacho and Conover (2011)	Colombia	Market price information was not translated into a significant difference in the actual sales price
Fafchamps and Minten (2012)	India	SMS price information messages provided by Reuters Market Light (RML). The experiment covered one hundred villages in Maharashtra. While there was some evidence that the market information affected spatial arbitrage and crop grading, the magnitude of these effects was found to be small, without any statistically significant effects. These results were consistent with the take-up rate for the RML service in the districts under study, which had been disappointing.
Ogutu et al. (2013)	Kenya	Compared farmers in Kenya with access to ICT-based market information to those without any such access. They found a positive and significant effect on the usage of purchased seed, fertilizer, labour productivity and land productivity, but a significant decline in the use of hired, family and total labour, which could be attributed to the greater efficiency resulting from market information use.
Nakasone (2013)	Peru	13% increase in selling price for smallholders, who used MIS
Courtois and Subervie (2014)	Ghana	Farmers who benefited from an MIS programme received a 10% price increase for maize and a 7% price increase for groundnuts, compared to the price that they would have obtained if they had not participated
Hildebrandt et al. (2015)	Ghana	Impact of Short Message Service (SMS) messages distributed by the Esoko market information service had an impact on prices received for yam, a crop characterized by high price variability, the absence of a reference “market price” and a high prevalence of bargaining.

Studies on the impact of market information and of growing cell phone coverage without formal MIS seem to show mixed results. The conclusions that could be drawn are that the impact varies considerably, depending on the crop and on the structure of the marketing system. Generally, from the cases cited above, there appears to be evidence that market information is more valuable for farmers of perishables and semi-perishables, rather than for those who grow crops suitable for long-term storage. However, as Staatz (2011), Aker (2011) and Staatz et al. (2014) have emphasized, there are considerable methodological difficulties in measuring the impact of MIS and of various dissemination techniques. Clearly, research techniques must be refined further before definitive conclusions can be drawn.

5 Key success factors

Numerous studies of MIS have been conducted around the world. Although some are now rather obsolete, they still provide useful information and practical pointers for those wishing to establish new MIS or improve existing ones. For example, Mendoza (2006), working with the Market Information Organization of the Americas (MIOA), established a list of “Best Practices” (MIOA, 2006) and assessed MIOA members according to these criteria. Among the best practices identified were the following:

- A written manual is available and compliance with it is ensured;
- An adequate budget has been allocated to carry out planned activities;
- Norms for the validation of the information obtained have bene established;
- Data collection activities are carried out on the basis of previous studies of the most appropriate sources;
- Manuals on data processing exist and staff knows how to use them;
- The software programme used is fit for purpose and the programme can be modified;
- Reports can be generated easily and are simple to understand;
- Staff have been trained on how to promote the service;
- Reports are distributed to those who supply the data and a registry of information suppliers is kept up-to-date;
- Users or customers are classified according to their preferred means of dissemination;
- The MIS’s website is easy to use and up-to-date; and
- Procedures are in place to obtain user feedback.

Elementary information is useless without a minimum understanding of market “rules” and possible alternative strategies. Smallholders need face to face discussions (through extension workers, discussion groups) and relevant educational programs: MIS use, global understanding of markets, how to use information (direct interaction)
Information alone is not enough, there are other constraint to market access that smallholders need to overcome, which requires integrated approach to improve market access for famers: credit access, storage facilities, WRS, collective marketing, market places facilities, commodities exchanges, transport infrastructures, standards, etc.

Technology-enabled interventions are no panacea in themselves, and need to be backed by complementary investments in physical infrastructure, electricity, literacy, and so on (Toyama 2015).

6 Barriers addressed

Based on the reviewed studies, marketing information systems may help to address

- Transparency/information in prices and margins; where to sell and what to sell at what potential price: buy providing relevant information, e.g on price to actors in the chain transparency can be increase as well as trust that buyers does not want to take advantage of smallholders, but offer fair prices. Information on consumer demands can reach farmers, who then, in return can produce what is needed on the market.
- Low prices and high price volatility through enhancing bargaining power of smallholder: buy providing information on market demand to smallholders in timely manner, production can be smoothed out (yearly, monthly, weekly) to ensure that the right products will get to the right market at the right time, thereby fetching fair price.
- Farmer organizations through technical assistance to enhance their business skills: despite providing the right information to smallholders, they still might not be able to act on that information. They need to learn how to analyze and utilize the provided information. Business trainings are great help to provide that kind of support to smallholders.
- Access to affordable inputs through linking smallholders to input providers: by providing relevant price and stock information to smallholders, they are able to purchase input at fair price.
- Development program of governments – feed the decision-makers with relevant data: certain types of MIS can support policy makers with price and production information across the country that can help them make decisions regarding ensuring food security; what should be produced more next year, e.g. rice, corn, etc.

7 Questions for further research

Lack of monitoring and evaluation tools

As it has been explained above, there is limited study available on the impact of MIS. Tools and approaches are needed to make evolution of MIS more efficient, effective and harmonized across the MIS so that benchmarking becomes possible. If an improvement is identified over time, it is not easy to isolate the MIS contribution from the contribution of other elements of the market environment (such as market liberalization, infrastructure investments, spread of new ICT). Therefore, MIS impact assessment studies should rather be used to understand the causality chain through which MIS generate changes and impacts.

Quest for financial sustainability

As it was mentioned above, currently the biggest challenge of MIS is financial sustainability and they have to rely on donor support. United Republic of Tanzania and Ghana, Farm Radio International (2011) developed a radio-based MIS campaign that responded to the smallholders' need to access local and regional markets. MIS radio programmes provided farmers with more than conventional commodity price data, as they also discussed marketing topics. A survey found that 84% of listeners considered the programmes to be "very useful", although no research was conducted into whether this translated into improved incomes. However, the popularity of the service did attract increased private sector sponsorship, suggesting a future model for sustainability.

Most governments do not see the need to finance MIS, although they are providing important public goods. They are also a business development service opportunity for the private sector. Public-private sector partnerships are probably the best institutional arrangement.

In order to generate income, MIS have to balance generic information accessible for free and the more targeted information invoiced. What potential business models could work in this respect to ensure financial sustainability?

Potential future for MIS

The potential impact of cell phones on enabling farmers to contact buyers directly does raise the question as to whether, in the long term, traditional MIS will be needed. As prices of calls drop, farmers are more likely to prefer direct contact to second-hand information. For example, Reardon et al. (2012) report that in Bangladesh, India and China, cell phone ownership by rice farmers varied from 73% India to 97% in China; usage of those phones to contact buyers ranged from 19% in India to 71% Bangladesh. Thus, the future for MIS may be as a part of a bundled package of agricultural support available on smartphones, rather than as a separate activity.

References

1. Will Digital Technologies Transform Agriculture in Developing Countries? Policy Research Working Paper 7669., Uwe Deichmann, Aparajita Goyal, Deepak Mishra, World Development Report Team & Development Research Group, Environment and Energy Team, 2016
2. The Renewal of Agricultural Market Information Systems in Developing Countries, Webinar Series. Dr. Hélène David-Benz and Dr. Franck Galtier (CIRAD) Washington DC, United States, March 4th , 2015
3. Agricultural Market Information System MIS. Mendoza, G. MIOA 2006.
4. Building Agricultural Market Information Systems: A literature review. FAO, 2017
5. Esoko – Leveling the Information Playing Field for Smallholder Farmers, Ghana. Francois van Schalkwyk, Andrew Young, Stefaan Verhulst, Open Data's Impact, 2017
6. Challenges in measuring the impact of Market Information Systems. John Staatz, Michigan State University; Andrew Kizito, Makerere University; Michael Weber, Michigan State University; Niama Nango Dembele, Ministre delegue auprès du ministre du Developpement rural, charge de l'Élevage, de la Pêche et de la Securit alimentaire, Mali, 2014
7. Agricultural Market Information Services in Developing Countries: A Review Mawazo M. Magesa, Kisangiri Michael, School of Computational and Communications Science and Engineering, The Nelson Mandela, African Institution of Science and Technology, Tanzania; Jesuk Ko, Department of Healthcare Management, Gwangju University, Korea 2014
8. Market information systems. Using information to improve farmers' market power and farmers organizations' voice Hélène David-Benz, (CIRAD), Franck Galtier (CIRAD), Johny Egg (CIRAD), Frederic Lançon (CIRAD), Gerdien Meijerink (LEI Wageningen UR), AGRINATURA, 2011
9. An Analysis of the Impact of the Use of Mobile Communica tion Technologies by Farmers in Zimbabwe. A Case Study of Esoko and EcoFarmer Platforms. Odunze Daisy Ifeoma, National University of Science and Technology Ascot, Bulawayo; Hove Tawanda Mthitwa, Windmill Pvt, Zimbabwe, 2015
10. Evaluating the Impact of Market Information System on Coffee Producers' Revenues and Profits in Ethiopia Guenwoo Lee, Aya Suzuki, 2015
11. Does use of ICT-based market information services (MIS) improve welfare of smallholder farmers? Evidence from Kenya. Julius J. Okello, Department of Agricultural Economics, University of Nairobi, Kenya, 2010
12. Information, Direct Access to Farmers, and Rural Market Performance in Central India. Aparajita Goyal, The World Bank, Development Research Group, Agriculture and Rural Development Team, 2010
13. Market Information Systems in sub-Sahara Africa. Challenges and Opportunities. Eric F. Tollens , Catholic University of Leuven (K.U.Leuven), Faculty of Bioscience Engineering, Centre for Agricultural and Food Economics, Belgium, 2006
14. Measuring the Impact of an Agricultural Market Information System (MIS) on Household Income for Tomato Smallholder Farmers. Victoria Boniface Nkuba, The Ohio State University, 2016
15. MIS Assessment for East Africa. USAID, 2012

Additional reference material

1. Getting Prices Right: The Impact of The Market Information Service in Uganda. Jakob Svensson, David Yanagizawa, IIES, Stockholm University, 2008
2. An Evaluation of Market Information System Of Finger Millet Farmers in Teso South District, Kenya Lydiah Ominde Nyambok, University of Nairobi, 2014
3. Market information and smallholder farmer price expectations. Mekbib G Haile, Matthias Kalkuhl, Muhammed A Usman. Centre for Development Research (ZEF), Germany, 2015

4. Why Don't Farmers Use Cell Phones to Access Market Prices? Technology Affordances and Barriers to Market Information Services Adoption in Rural Kenya. Charles W Steinfield, Michigan State University, 2015
5. Agricultural Risk Management Information Systems (ARM-IS) in Uganda, Working Papers. Agnes Atyang, Platform for Agricultural Risk Management 2015

Appendix 1

Summary of characteristics of selected MIS (reference 15)

	Lima-Links	M-Farm	LMIS	AMITSA
Source of Start-up Funds	Gates Foundation	IPO48 award	USAID	USAID & DGIS
Self-sustaining?	Not yet	Not yet	Not yet	Not yet
User Fees	No	Yes	No	No
# of Current Users	200 daily transactions	200 daily transactions	8000+	Hundreds of thousands
Platform Functions				
Send Prices	Yes	Yes	Yes	Yes
Send Alerts	No	No	Yes	Yes
User Profiles	No	No	No	Yes
Producer/ Trader Matches	Yes	Yes	Yes	No
Input Prices	No	Yes	No	Yes
Regional Trades	No	No	Yes	Yes
Library	No	No	No	Yes
Weather	No	No	Yes	No
MIS Users				
Producers	Yes	Yes	Yes	Yes
Traders	Yes	Yes	Yes	Yes
Private Business	No	Maybe	Yes	Yes
Government, NGOs, Research Firms, Universities	Maybe	Maybe	Yes	Yes
Donors	No	No	Yes	Yes
Any government role?	Yes - at local level	Yes – gov't uses M-Farm platform	Yes - Ministry taking over mgmt	Provides secondary data; data user
Future Plans	Regional Expansion	Adding new features	Adding new features	Adding new features

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The mission of Wageningen University and Research is “To explore the potential of nature to improve the quality of life”. Under the banner Wageningen University & Research, Wageningen University and the specialised research institutes of the Wageningen Research Foundation have joined forces in contributing to finding solutions to important questions in the domain of healthy food and living environment. With its roughly 30 branches, 5,000 employees and 10,000 students, Wageningen University & Research is one of the leading organisations in its domain. The unique Wageningen approach lies in its integrated approach to issues and the collaboration between different disciplines.

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The Centre for Development Innovation works on processes of innovation and change in the areas of food and nutrition security, adaptive agriculture, sustainable markets, ecosystem governance, and conflict, disaster and reconstruction. It is an interdisciplinary and internationally focused unit of Wageningen UR within the Social Sciences Group. Our work fosters collaboration between citizens, governments, businesses, NGOs, and the scientific community. Our worldwide network of partners and clients links with us to help facilitate innovation, create capacities for change and broker knowledge.

The mission of Wageningen UR (University & Research centre) is 'To explore the potential of nature to improve the quality of life'. Within Wageningen UR, nine specialised research institutes of the DLO Foundation have joined forces with Wageningen University to help answer the most important questions in the domain of healthy food and living environment. With approximately 30 locations, 6,000 members of staff and 9,000 students, Wageningen UR is one of the leading organisations in its domain worldwide. The integral approach to problems and the cooperation between the various disciplines are at the heart of the unique Wageningen Approach.