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Harsha de Silva, Director, E-development Labs (private) Limited and Senior Economist, LIRNEasia – Agricultural Market Development through Information and Communication Technology (ICT): A Developing Country Experience

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Abstract

One of the fundamental characteristics of a well functioning market is the ability to transmit useful information to decision makers at the micro-level, which will ultimately culminate in the development of effective macro-level policies. A key assumption in economics is that market information is readily available to role players in business and marketing. In reality however, farmers in the developing world, unlike their developed countries counterpart, are still faced with the challenge of accessing credible market information. Market information is an essential component of agricultural production, distribution and marketing. The availability of timely and accurate market information to farmers by means of fast and effective modern information technologies has enormous potential of greatly enhancing agricultural production, investment, financial and strategic decisions. The objective of this executive interview is to show how information and communication technology (ICT)–enabled agricultural market information service can improve productivity, bargaining power and market profitability of rural farmers in developing countries. Dr. Harsha de Silva, the architect and implementer of Govi Gnana Service (an agricultural knowledge service: GGS) in Sri Lanka shares his views and experience. The interview was conducted at the 15th Annual World Food and Agribusiness Forum, Symposium and Case Conference in Chicago, USA.

Keywords: Information and communication technology (ICT), agricultural markets, market information

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Introduction

Agriculture has been regarded as that field of human endeavor which exhibits the greatest gap between available knowledge and what is being practiced (Al-Sudeary, 1982 cited by Van Niekerk, 1995). This is probably more evident in the developing world. Agricultural markets in many developing countries are becoming more competitive, nevertheless it is characterized by an undersupply of relevant information in some cases, and inadequate access in others. In order to establish a competitive market for agricultural produce, it is essential that adequate market information be available to all market participants. It should be noted that having access to information is separate from making the best use of available information (Metcalfe, 1988). However, a common objective – direct or indirect – for all users of agricultural market information is to maximize returns to investment in the short, medium and long run (Frick and Groenewald, 1988; Russell, 1983; Craig, 1979). Therefore, it will be fair to assume that farmers, if given access, will over time take advantage of available information in making decisions that will improve their productivity and profit margins.

Economic Signal

A fundamental assumption in economics is that market information is readily available to role players in business and marketing. Market information can take various forms, and varies from market analysis and forecasts to market price data. The availability of market information (especially price data) provides the farmer with vital information with regards to market demand; this will help him determine what to produce and how much to produce. When farmers are able to access credible market information, it enables them to incorporate price considerations and market situation into their production, investment, financial and strategic decisions. This will in turn improve their bargaining power, as they would know which crops to grow and the market price of such crops. At the end, farmers will produce with a greater level of certainty at a scale that meets consumers' needs and also achieve the much desired profitability.

Transparency

The majority of the farmers in the developing world live in rural areas (Aina, 1995; De Silva, 2005); nevertheless they form part of the complex marketing system and need information. The methods of collection, collation, and dissemination of data are crucial to the provision of timely and relevant information to the end-users. For instance, the methods used in collecting price data will very much determine predictability of market situation. Unlike the sophisticated system of price gathering in developed countries where price data are gathered from well advanced wholesale markets and distributed via fast speed internet, several other less efficient methods are more common among rural farmers in the developing

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countries. In order to ensure that these farmers have access to timely and accurate market information therefore, there is need to determine what ways information can be communicated and understood by them. In cases where literacy and numerical training is not sufficient, it may be necessary to structure the method of dissemination to suit farmers' situation.

Asymmetry in Agricultural Market Information

A further challenge small-scale farmers in the developing world are faced with is that of asymmetry in information which leaves them at the mercy of the middlemen (De Silva, 2005). Asymmetric information usually gives bargaining positions in the market. Ultimately, the situation results in market failure which in turn attracts market regulating policies. But the availability of information to all market participants, on a symmetric basis, could serve as a countervailing power to market failure (Salin, Thurow and Elmer, 1996). Therefore instead of installing policies that regulate markets or counter market failure, a better solution to market failures will be to create an environment where information can be accessed by all participants in the market. Equal access to market information cuts down on marketing channels, reduces transportation costs and ensures fair transaction (De Silva, 2005). On the contrary, asymmetry in market information results in uneven distribution of benefits and risks between farmers and middlemen. In most cases, small scale and/or rural farmers in developing countries carry the larger portion of the risks while deriving the smaller benefits.

Cost/Benefit of Market Information

Agricultural markets in developing countries are becoming less dominated by government interference (Barrett and Mutambatsere, 2005). As such, information flow from these markets, when available and accessible, is becoming more reliable. Government agencies remain the primary source of general agricultural market information (Wu et. al., 1999). However when value is added to such information and it is tailor-made to meet specific needs, and when it is disseminated through modern technologies, it comes with a price. The cost of accessing value-added information disseminated by means of fast speed internet, telephone or other technologies may create a disincentive for many small-scale farmers (Rheingold, 2005). Unless the benefits derived from the information exceed the cost of accessing it, farmers will not patronize these initiatives. It is obvious that if the government plays a too small part, it will be to the disadvantage of poor rural farmers. This is not to say that government should take the role of private ventures. The solution therefore lies in the maintenance of closer collaboration among role players – non-governmental organizations, government institutions, extension agents and support service providers.

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Harsha de Silva[1]

Based on the above background, Harsha de Silva, shares his views and experience, particularly in the area of agricultural market development by means of information and communication technology (ICT). Dr. de Silva is the director of e-development labs (private) limited and a senior consultant economist with LIRNEasia. LIRNEasia (www.lirneasia.net) is the Asian affiliate of LIRNE.NET, collaboration among leading universities in Denmark, the Netherlands, South Africa and the United Kingdom.

Executive Interview

In your opinion, what are the major challenges hindering agribusinesses in developing countries from attaining global competitiveness and from linking up with the global value chains?

There are several issues; one is land issues that have a lot to do with competition in the global arena as much as competition locally, subsidies – things that are not in the control of the farmer but more in control of the government, the WTO. Basically things like that – things that are exogenous to the farmer. It is not because farmers are not productive or that farmers are incapable of producing in the global stage, but farmers in these developing countries do not have the knowledge, the technology and are therefore at a disadvantage competing with farmers, say from the United States. We just heard that in the US, the average farm size continues to grow and 1,500 acres was the average size of a farm and they have superior technology. John Deere showed us how you do not even need to be driving the combine anymore, it is driven by satellites. But if you look at Africa or developing Asia where people still use buffalos to sow paddy or pick teas manually; two leaves and a bud by hand, you will realize there is no level playing field. On top of all that you have WTO and policies which help subsidize US farmers and EU farmers at the expense of the developing countries farmers. So I see the picture as very challenging from a macro point of view.

Talking about knowledge and the gap between farmers in the developing countries and their counterparts in the developed countries, especially with respect to technology, how do you think farmers in the developing countries can survive this challenge?

The fundamental issue is that there is a vast difference between the technologies used in the West and the developing world. I think where to start in a sense would be partnership driven technology transfer relationships where it would be possible

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for big farmers in developing countries to link up with the value chain, with, maybe, processors or even other farmers in the developed countries and transfer technology. Without that I see it somehow impossible to break this vicious cycle of not having technology, not having technology meaning not being able to climb up the ladder.

In your mind, how do you think Information and Communication Technology (ICT) can help farmers in the developing countries in the delivery of and access to timely and widely available, accurate and credible market information?

I think that is the only saving grace to at least sort of bringing to the same level of technology between the developing and developed world. Like, I said earlier, technology in terms of farming practices, technology in terms of equipment that are used is so different, from buffalos to satellites driven tractors but information technology (IT) is an equalizer. The IT that is available in the United States in 2005 is the same IT that is available in Kenya, in Burundi or in South Africa, as long as the government in these countries do not prevent the people from using IT through bad policies (and I will get to that in a moment). But assuming there are good policies that help people – farmers, students – whoever it is to use IT, then that is the fastest way to bridge this information gap between the developing and developed countries, and especially in agriculture. Say for instance, Sri Lanka is the largest exporter of tea in the world, we produce slightly over 300 million kilogram of tea. Suppose IT is available, the tea garden owners will be able to figure out what the demand is in different locations, what the prices are in these places. Therefore they could perhaps enter into forward contract as with the buyers in Europe, Australia and the United Kingdom, perhaps even America. But right now they are just pretty much groping in the dark. They continue to produce whatever they can produce and hope to sell it in the auction in Colombo, hoping that tea-drinking countries around the world will buy. But you know the Colombo tea auction is a unique location, it is the best in the business, it is the best in the world and you have representation of all countries there on a weekly basis to bid for tea. So that is something that IT could enhance. However, if you look at some other agricultural produce which do not have the luxury of having the largest centre of the world market in that city, in that country, they are so far away from the customers. So I think IT that perhaps has the ability to enter into forward agreements will immensely help farmers in the developing world.

In many developing countries, we know that agribusiness stakeholders - government, Non-governmental organizations (NGOs) and other support service providers have responded to this challenge with various projects. So why does it still remain in most cases?

Yes you are talking more on a micro policy level. Yes people have been attempting to remove the asymmetry in information between farmers and other participants in the agricultural value chains for a long time. Universities have been attempting

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various techniques, there are ways in which the agricultural department officers have been collecting this information and publishing it in the newspapers and so on. So at the policy-level, there is acceptance of the problem and there have been several attempts to correct the problem but the problem remains. It remains because the traditional way of collecting information is always after the fact. Suppose you are a market trader, you sell something for a range of prices today, tomorrow the department officer comes and says, hey how are you, and how much did you sell your pumpkins for yesterday? He is going to say you know I sold it for between 20 and 30 rupees. He thinks why should I tell him how much I sold my pumpkins for? So he just tells him between 20 and 30 rupees in the best case, or even some fictitious figure. And he just marks it and reports it. That is wrong information; wrong information is worse than no information which further distorts the market and creates further inefficiencies in the market. So sometimes it is better not to have any information than to have wrong information. And across the world, this is what happens, people go collect information think it is right and they report it. But IT is what takes you out of that corner. You know how you get the information, the right information at the right time. In Sri Lanka, we have seen some work that is being done in this area where information is collected at the right time which is then accurate, which is then credible, which is then independent and disseminated across the island.

Dr. de Silva, I see you have been involved with an ICT powered market information and price gathering system in Sri Lanka. Can you share some of your experience and findings?

I have some very powerful findings. One is even though people talk about ICT for development all around the world and they mention how ICT can help farmers, few projects have actually been implemented. And even of those few, only some have worked and that is because sometimes expectations are too high. People think IT can do wonders and they want to do complex things and they fail. So lesson number one is keep it simple, farmers are not your suit and tie wearing stock-brokers in the city. They are simple, less educated, people who work with their hands. Give to them information that is relevant to them. No need of doing very complex analysis. Just tell him today price of potatoes started in the market at 20 rupees and went up to 30 rupees and now it is at 25 rupees, so what do you want to do. You see, it is gone up and it is coming down so you make your choice; or before coming to the market if he can find out in the market prices of potatoes are now 25 rupees. He then asks himself do I spend further transportation cost and bring it to the market or do I dispose of it in the local market. Before I pluck my cucumber from the farm, I found out for today cucumbers are selling at 4 rupees per kilo. I can have the cucumber on the tree for another one day, do I not pluck it today and hope for a better price tomorrow or do I pluck it today? So these are simple decisions that can be made if simple information is available. So one, keep it simple, make sure that it is disseminated in local languages. There is no point having this in English, people

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won't understand it and there is no point having it through high speed internet. So disseminate it in a way that is most usable, most accessible and most meaningful to the farmer; in a very simple way. Phones, both fixed and mobile are the best way. Sri Lanka already has some 2.5 million mobile phones and this is expected to grow to 8 million in three years. We have only some 4 million families so this means 2 mobile phones per family soon. Two, farmers' learning curves are very flat. You know we've gone to the university, done MScs. and PhDs and we feel it is very simple to see how information could enhance the farmer's income. Why doesn't he understand what I am trying to say? Every one should understand having information you will make a better decision than without it. In economics, we learnt every decision is based on omega t, which is the information available at time, t. So I figure I tell him how much pumpkins are selling at, why can't he make the right decisions, why can't he even find out the price of pumpkins before coming to the market and try to sell pumpkins; but he feels what for? So it takes a while for these people to learn. The last point is, once they find out, look they can actually use this information, and then they will flock to get that information. So in my experience, I have seen a very flat learning curve, which over time is now coming up, going up and more and more people are starting to ask for this information. Also I think the younger the farmer, the greater the interest. So these are some of the key findings.

You just mentioned that there are difficulties with farmers' adoption of complex technologies, especially in a place like Sri Lanka where farmers may not have adequate education and access to electronic facilities. What other ways have you employed in disseminating information among farmers in such an environment?

That is a good question. We have three ways in which we do it now. One is we have display screens in the market and outside. These are large 8.5 by 6.5 feet screens and the market is at night, it starts only after dark. So the screens are illuminated by multimedia projectors, very simple technology. We have also made sure the information is picture-based. So, suppose I am a tomato farmer and I come to the market and I am really interested in tomato, I see tomatoes picture, immediately my eye goes to tomato. This is the only place in the world where prices are depicted through pictures which is very effective because one, the literacy rate of farmers is low. So when he sees tomatoes he knows that is what I want. That is one way of simplifying the dissemination. Two, of course it is on the internet and you have to go to the internet café or telecentre to get it. Then we have a very nice technology where we convert the data into voice. If you call a short code, just three-digit number on any mobile phone in Sri Lanka, you are connected to this system and the data gets converted to voice and you press a number whether you want it on a local language one or two. It will then read out to you the highest price, the lowest price and then average price. So it is just a computer information technology transferring data into voice. Sri Lanka has a population of nineteen million people and right now the telephone growth is very rapid as I said earlier. As of today, many farmers are using phones to access information data which gets converted to voice and that is

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excellent. Again what we have done is we have printed calendars and we give the codes for the vegetables. Say the code for tomato is 315 and we print and distribute thousands of these calendars free of charge. The calendar has the phone numbers, so you are suppose to hang the calendars by your phone and dial the number and just put in the code. Next is we are going to be on radio and TV on a daily basis which will display the prices. So we use technology and ICT in a way. I continue to reiterate it is a very simple solution.

That is actually excellent. So with your experience with GGS - The Govi Gnana (Farmer Knowledge) Service in Sri Lanka, do you think that option has successfully aided the strength of farmers' bargaining power?

Most definitely it has. We just watch the farmers when they come to the market in the back of pick-up trucks. They do not own the truck; they just take a ride in it and put their things at the back of the pick-up truck to come to the market. When they arrive, they always look at the signs, they look at the pictures, and they look at the prices. Those days they never did. As soon as I installed it I saw reporters who have gone there and they interviewed the farmer. The reporter asked how much do you sell your tomato and the farmer replied five rupees a kilo. The reporter asked why do you sell it at five rupees per kilo, the small screen says it is ten rupees a kilo (those days we use small screens). Then the farmer says who believes that nonsense, how can the computer tell me how much to sell my vegetables. So the reporter looks for the stall which was actually buying this produce at ten rupees and he takes the farmer to the stall. Then he tells the farmer, look all you needed to do was to look at the screen and you would have doubled the price, and then he does. That is the kind of thing we are building. All we need now is for the farmer to look at the screen and slowly but surely, he will realize if he can say to the buyer/trader, I need fifteen rupees and the buyer says come on I will give you ten rupees, he can say to him look around, if you don't buy it for fifteen rupees I will sell it to somebody else for fifteen rupees because that is the going price. So that immediately builds bargaining power in the farmer.

How do you collect the market information disseminated through the GGS?

We have a network where a number of traders are connected to a central server at the Dambulla market where the GGS pilot is being implemented. Dambulla is the largest agriculture wholesale market in Sri Lanka with a turnover of some USD 300,000 a day. Here, the connected traders have every transaction they enter into recorded in real time. Say a trader does 500 transactions a session (these sessions are in the evening and night), each one will record what produce, how much of it and what price. For the unconnected farmers, we have people with PDA (personal digital assistants) walking around the 12 acre market and uploading it. From any point in the market, the servers are accessible on wireless basis. All what they need

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to do is to record the price on the little PDA that they carry in their hand and click enter.

Do you think there are additional strategies to be added to this technology so as to ensure the delivery of the sought after efficiency and profitability, and also to aid farmers' adoption level?

My objective is to have this all around the country to create a virtual exchange so that every farming community will have a place where they receive this information. Perhaps at a small telecentre, village group office or something. What I am doing now is adding forward information. I have got information about all the forward contracts that are signed through banks, that information will appear on the system. So even before I put beans on the ground, I will be able to decide on whether I should put beans on the ground. There is Mr. X and supermarket Y who will be willing to buy my beans at this price when my beans come up which is a much better situation to be rather than put beans without knowing who I can sell it to, and at what price. Also that gets the farmer to release himself from the grasp of the middlemen who otherwise are lending money at an almost usurious expense; you know like 25%, 30% rates. The moment you have got a forward contract, you can take it to the bank and get crop loans using as collateral the produce that will be sold on the forward contract. So if we can get to that level, then we have done a great favor to the farmers in Sri Lanka.

I see that this technology trickles down to helping farmers hedge against both price risks and market uncertainties. Apart from that, how does it strengthen the link between the farmer and other agribusiness participants/stakeholders?

That is what I was saying just a while ago, that this is not just IT system for the farmer. The farmer is linked, the farmer is part of the agricultural cluster; the bank is part of it, the fertilizer company, the phone company, the government, they are all part of it. So the information becomes valuable to everyone. Now from next month, all phone calls into the GGS through Dialog Telekom (www.dialog.lk) Sri Lanka's largest mobile phone operator (who now has two million subscribers) will be toll free. Why does he do that, why does he take the chance of saying okay every call is free on this network? It is because he sees value. For him it benefits not too many farmers but giving the phone to the farmers for free serves as corporate social responsibility, giving him more acceptance and then he will build on that.

Now for the banks, this system is excellent because the banks normally do not lend money to the farmers because they do not have collateral. But if we have forward sales agreement which can be facilitated through the system, then banks can lend money to farmers using the forward contract as collateral. So it strengthens the link the farmer has with the rest of his cluster through this. This is kind of a web; this is kind of glue that sticks farmers to the rest of the stakeholders.

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In short you consider this a key success factor for agribusiness practice among rural farmers in developing countries?

Absolutely! I think that still not enough attention is paid to this subject and people still do not realize because people who are in agriculture are not necessarily people who are IT savvy and people who are IT savvy do not understand a damn thing about agriculture. So that is where people like me and you perhaps could play a role because we understand both sides of this scheme. We will be able to show the advantages of IT to the farmers and show the IT guys; look there is a business model out there. So it is going to be a win – win situation and that would be the way to go.

Finally Dr. de Silva, based on the impact of ICT, what do you foresee as potential changes in global agribusiness chains and in what ways would these changes impact on agricultural production and supplies?

I envisage a shrinking world, meaning globalization. Sri Lankan farmers linked with Dubai processors, exporting to the US or some companies elsewhere, because everywhere people are specializing. People trade based on comparative advantage of countries; so I see a world where Sri Lankan tea garden owners will be mixing tea in Dubai centres and then exporting to Europe and so on. I see ICT linking these different players together, I see farmlands becoming larger and larger, and people unable to compete in the global arena falling out and then merging of small farms together. Also IT, the kind of things we are talking about helping farmers move up in the social ladder by being able to get better prices, by fighting poverty through better incomes and then linking up with banks to get loans and so on. So I see ICT playing a very big role in agriculture in the coming years. That is of course besides what John Deere was talking about, the next 80 years is ICT. So I think the application of ICT in agriculture will be across the board, from the most sophisticated satellite technology that drives combine in a 2,000-acre farm in the US to a small potato farmer in Sri Lanka getting the best possible price.

Conclusion and Analysis

The Govi Gnana (Farmer Knowledge) Service demonstrates how an ICT based market information system can be implemented successfully in a developing country. This interview with Dr. de Silva further supports the views of experts that market information disseminated through modern technology can be of enormous benefit to farmers, even in the developing countries. The potential benefits which can be derived from such projects if properly implemented, monitored and managed can evolve agricultural markets which will improve productivity, bargaining power, and market profitability of rural farmers.

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It should be noted that even though information technology provides small scale farmers the opportunity to access market information, the benefits they derive from it may be short-lived unless such technology is designed to suit their needs. Therefore, the success of any agricultural market information project lies not in the level of sophistication of technology used, but in how well it has met the farmers' needs. It should also be noted that farmers in developing countries benefit more from simple but effective price transmission systems, rather than complex ones.

In conclusion, it must be emphasized that the problem of small scale farmers in developing countries is a complex cluster. In many remote areas, other problems like lack of adequate infrastructures including good roads, water supply and access to electronic facilities may need more attention and may serve as pre-requisites to effective use of market information.

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