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Improving smallholders' productivity in Bangladesh: structural change or one-off success?

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Marieke de Ruyter de Wildt [1]

Abstract
Based on the experiences of a partnership between a multi-donor NGO, Katalyst, and a multinational life science company, Syngenta, we show that productivity levels of smallholder producers in Bangladesh can be increased by improving the quality and reach of information about agricultural inputs. In this case, this is achieved by strengthening existing but imperfect relationships between private market players. The impact of that has been rigorously assessed and proved real and positive for large numbers of farmers, input companies, retailers and the poor. Convinced by its scale, we debate here to what extent these improvements are in fact structural: to what extent are changes likely to continue without further support? Three policy recommendations follow from that.

1. Introduction

It took 40 years for radio to reach a market of 50 million. Television took 13, the Internet 5 and Facebook took only 2 years. Today, innovations can spread out very fast, also among poor people. For some innovations, however, it still takes a long time before their benefits reach the big masses. Public action can then be justified to accelerate a broad-based adoption. New practices in agricultural input usage, such as how much pesticide to apply to your tomatoes, are innovations that sometimes spread very slowly. This chapter presents an example of how the spread of information about appropriate input usage can be speeded up, thereby increasing productivity.[2] The central question discussed here is whether the achieved change is structural: will new information about input usage spread equally fast in future?

Information about appropriate input usage is fundamental to boost agricultural productivity. The case set out here shows an innovative approach to improving agricultural practices among vegetable farmers in Bangladesh at scale, rapidly and at a very low cost.[3] A successful experience in many ways, that could arguably have been even more successful.

The productivity problem and the - unusual - activities that were designed to address this, are clarified first. Then, results from an impact assessment, including a control group, are presented. Interesting here is that the discussion not only focuses on changes at farmers' level, but also on the actors in the environment around farmers. Although productivity gains are

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[1] Marieke de Ruyter de Wildt works at LEI Wageningen UR

[2] This chapter draws heavily on a forthcoming publication '*Bringing knowledge to farmers: from large-scale impact to systemic change*?', de Ruyter de Wildt, M and Alan Gibson, a study commissioned by Katalyst and carried out by The Springfield Centre for Business in Development Ltd. The three boxes and two figures in this chapter are directly taken from that publication.

[3] This paper has been written with funding from the Ministry of Agriculture, Nature and Food Quality of the Netherlands (BO-10-002-004)

significant, the following section points out a number of challenges if farmers are to maintain their productivity gains. The final part draws recommendations for government policies.

2. Productivity problem

The setting is Bangladesh, a densely populated, predominantly rural and poor country east of India. The crop focus is on vegetables. Agriculture is a major source of income, accounting for almost two thirds of employment. And although vegetables are modestly important in national statistics, virtually all farmers, small and large, grow some vegetables. Vegetables are cash crops with relatively short production cycles, high demands and high returns.[4] At the time of intervention, the total output of vegetables was growing but productivity was actually declining. Average yields were already far below regional averages (half that of China and India) and apparently, the tendency was to cultivate more land in stead of cultivating more efficiently.

Katalyst, a multi-donor NGO[5] that follows a pro-poor, market development approach, wanted to address this slide in productivity. It analysed the sector and concluded that bad practices of input usage was a major issue: farmers often used bad seeds, too much fertiliser and pesticides, at ill-timed moments. Further research pointed out that this lack of information about input usage was caused by traditional relationships between market players. The information was available - from agricultural research institutes, from inputs companies or for example from certain lead-farmers - but did not reach the majority of farmers, as relationships were generally information poor.

Katalyst wanted to understand more about this information exchange. A survey revealed that farmers saw retailers, local shops with agricultural inputs and small machinery, as their most trusted source of input related information. Retailers appeared even more trustworthy than fellow farmers and government officials. However, when buying inputs, the information and advice given by retailers about products was actually minimal: farmers shopped for the lowest price, not for information. Katalyst wanted to change this. It wanted to enhance information exchange between farmers and retailers, do that at scale and in a sustainable manner.

3. Activities

Analysing the supply chain of retailers, Katalyst realised that input companies had the latest knowledge about inputs. Moreover, they had something to gain: if retailers would give better information about inputs to farmers, retailers' and hence the input company's sales were likely to increase.

In 2004, Katalyst developed a 3-day training programme for retailers together with Syngenta, a multinational company that was big on pesticides at the time. Despite active lobbying, Syngenta was the only company that was willing to co-invest in this idea. The class-room

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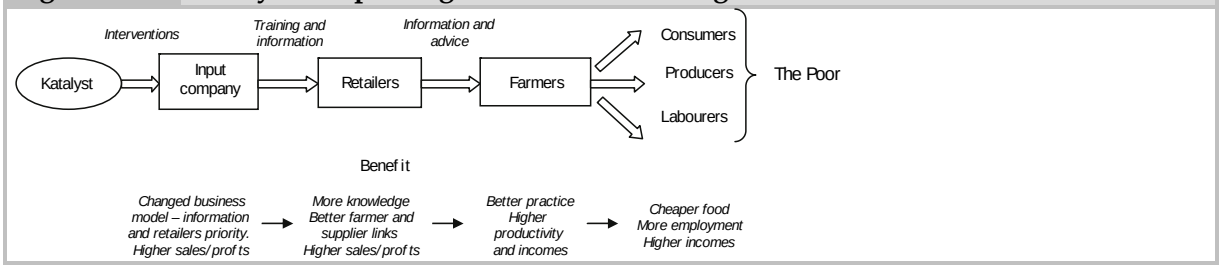
[4] Weinberger and Genova (2005). *Vegetable production in Bangladesh: Commercialization and rural livelihoods*. Technical bulletin nr 33. The World Vegetable Centre

[5] Jointly funded by the Swiss Agency for Development and Cooperation (SDC), the UK Department for International Development (DFID), the Canadian International Development Agency (CIDA) and the Embassy of the Kingdom of the Netherlands (EKN)

training was delivered by Syngenta staff and an external trainer. While retailers were stimulated to interact with farmers, it dealt with good agricultural inputs, how to apply them and taught about health and safety issues and business management. Figure 1 shows how this was expected to improve performance throughout the chain and reduce poverty.

Figure 1 Katalyst's impact logic for retailer training



A year later, almost 500 retailers were trained and both Syngenta and Katalyst considered this a real success. Syngenta's sales had tripled. Although training events about products was business as usual, Syngenta had learned to train interactively, using various teaching methods, and saw how other, broader subjects motivated their retailers. More so, it was new for the company to relate to its retailers as their sales relation was traditionally with dealers, the bigger guys who sell to retailers. The retailers in turn were charmed by the full-fletched class room training. Anecdotal evidence indicated that retailers indeed changed their attitudes towards farmers and even, that farmers experienced higher yields.

Confronted with the challenge, Katalyst was to scale-up this success. Despite the strong positive signs at all levels (see figure above) - and against Katalyst's expectations - none of the other input companies had started to train retailers. Katalyst did not want to do more work with Syngenta but realised it needed to do more to develop the market.

Katalyst decided to scale up by working with seed and fertiliser companies; by including more regions; by covering other sectors such as maize, poultry and fisheries; and by working with other types of companies. Katalyst initially worked with big market leaders but had started to work with small, national companies. Also, the type of trainee changed. Though the majority of trainees were retailers, government officials, lead farmers, individual seed vendors and even school teachers and imams were included. Over a time span of 4-5 years, Katalyst worked with 16 companies, accounting for more than half the national supply of agricultural inputs, and 1 association in 7 different sectors.

The negotiating rationale with the different companies was the same: to design a classroom retailer training that stimulated a more meaningful relation with farmers. Yet, Katalyst struck different deals with each company: some companies wanted a 3-day training, others 2; some were purely classroom based, others had field schools; sometimes Katalyst assisted just in curriculum development though in other occasions support included planning, training skills and follow-up activities; most companies approached Katalyst but sometimes it was the other way round; and in some cases Katalyst financed 50%, in others 80%.

Katalyst's total investment, including staff time, has been USD64,000. In collaboration with Katalyst, a total of 4,000 retailers, 3,000 farmers, 210 government officials, 152 'sprayermen' (men on bicycles that spray pesticides), 96 opinion leaders such as teachers and imams, 60 traders and 55 seed vendors were trained. Now, lets look at the effect of these training activities.

4. Results to date

The impact assessment, done over a time period of 9 months between 2008 and 2009, included:

- More than 50 in-depth interviews with Katalyst's staff, government officials, related NGOs, agricultural experts, input companies, retailers and farmers. The last three groups all included some interviewees that hadn't worked with Katalyst.
- Two large surveys, one among 120 retailers (trained and untrained) and the other among 62 farmers (clients of trained and untrained retailers).

Cause and effect relations in open systems such as value chains are complex. A myriad of methodological challenges were confronted when determining what, when and how to measure. Various error-minimising measures were therefore applied such as mixing qualitative and quantitative methods, triangulation and random checks in each survey respondents group after the survey was completed. However, conclusions have been drawn with great caution.

To start at *farmer* level, it is very likely that close to 1 million[6] farmers received better advice from trained retailers, at a cost of USD0,28 per farmer. The survey pointed out that the use of inputs improved and that yields increased on average one-third more, relative to the control group. Almost one third of the trained retailers mentioned that their buying behaviour, to buy from Husain or Mukul, was based on the quality of advice. Farmers that bought from trained retailers received more information, were more (information) demanding customers and had generally a stronger relationship with their retailers. The in-depth interviews substantiated this significant positive change (see for example Box 1).

A poor farmer gaining productivity, income and confidence

Afzal Hossain lives in Jaforpur, a village in the Northern province of Rangpur. Together with his wife and two children he works hard to make ends meet everyday. He was cultivating an acre of land with vegetables when his neighbour told him about Kamrul Hasan, a Syngenta-trained retailer. This retailer, so said his neighbour, was different from the others as he was very knowledgeble about the application of inputs. Hossain became a regular costumer of Kamrul Hasan. Since then the performance of his farm has improved and he ascribes to Kamrul Hasan's advice.

Hossain used to visit retailers only to buy what he thought he needed, he never received advice and when he asked specific questions the answers were of little help. Kamrul Hasan was a clear and welcome break from that. Kamrul Hasan proved able to answer his questions and moreover, started to think with him about how he could grow his farm.

[6] Based on an estimated 200-250 regular farmer-clients per retailer

Supported by Kamrul Hasan, Hossain is now able to face his pest problems, he uses inputs better, started to use micro nutrients - not a common practice in Bangladesh - and ventured into growing cauliflower, a new crop for Hossain that although profitable seemed risky.
The productivity of his farmer has grown because of these changes. His profits from bitter gourd grew by 20% from 2007 to 2008 and his profits from potato, a crop previously suffering from various diseases, grew even more in the same period. Hossain has bought more land with the savings and send his children to school. He stressed that his experience with Kamrul Hasan has made him more critical and demanding towards other retailers too and, overall, boosted his self-confidence.

Retailers confirmed the improved advice and information exchange. The 4,000 trained retailers (10-15% of the retailer stock in the country), at a total cost of USD50 per retailer, showed considerable change in their attitude towards farmers. The recall of the training was exceptionally strong, many retailers could list the taught subjects with detail and vividly remembered the place and duration of the event (Box 2). Another interesting result from the training is that relations with fellow-retailers improved. Some mentioned for example that they contacted trainee retailers from other regions for input supplies when they were difficult to get in their own area. When asked about the single main benefit of the training, more than half of the surveyed trained retailers responded that their client relationship had improved. Even more so, the number of clients had grown. Trained retailers also mentioned a closer relationship with their input companies, having more interaction and receiving more information.

Better advice leads to better business for 'Dr Vegetable'
Having previously been a farmer and paddy and wheat trader, Ispahan established his retailing business in 1995 in Ranipulur. He was always recognised as a 'good farmer', one who people sought out for advice, and he'd always had an interest in finding out about new seeds and techniques. Becoming a retailer seemed a logical next step and he saw good prospects in this new business. He quickly developed a reputation as a reliable adviser to farmers. At some point the nickname 'Dr Vegetable' was given to him - and it stuck.

Even for a knowledgeable person such as Ispahan, the 3-day training that he received was a completely new experience. He'd had many product briefings from companies before but nothing like this. The technical information contained on the course was useful - for example, he's learned about checking product expiry dates and how to test new products. But for Ispahan the main learning was in relation to what he called 'marketing strategy' and to the importance of being an 'active business'.

His approach to business has changed in a number of ways since the training. He's more organised about visits to farmers' fields to view and advise on crops. At busy times he urges farmers to bring their samples to him. He doesn't turn down farmers who seek advice but don't buy anything from him. He now realises that it is important to have relationships with farmers that are broader than a narrow 'buy-sell/commercial' basis. The

number of farmers 'hanging around' in his shop has increased after the training; he spends up to Taka 200 per day on tea (50 cups!) for them.

Being one of the more established retailers in Ranipulur, Ispahan can reflect on the ups and downs of the retailing business over the years. In 1998 there had been 11 shops but several went out of business. Now numbers have increased to 6 and there is competition from neighbouring market places. The new arrivals at first take custom from Ispahan but farmers return. Since the training he has more clients than ever before. His business has prospered and some of this additional income he has used to increase the size of his farm business (which he still continues) from 3 to 5 acres. The prognosis for Dr Vegetable is good.

For all 16 *input companies*, the formal way of training retailers, as promoted by Katalyst, was something new. Not least since retailers had no role in their direct distribution channel, mainly trading with dealers. Most companies were surprised to see retailers so eager for information. Companies claimed they learned about retailers' roles and importance during the planning and delivery of the trainings. Various companies mentioned that they realised only during the training that retailers have a lot of knowledge about farmers practices, needs and demands. More so, it is the retailer who receives daily feedback on the use of their products.

Many companies invested in training activities after the collaboration with Katalyst's. Syngenta built a 4-storey training facility, aiming to train about 2,000 people per year:

> 'Katalyst has really been a catalyst for these investments. About half of retailers clients come with serious questions and we now realise that bad advice can do a lot of damage.'

Another company developed a 'training cell', a new structure in the business that is responsible for training to retailers, distributors and their own staff. Although not all changes were similarly robust, most companies changed their business model in some respect to accommodate a better information flow to retailers.

And what can be said about the *poor*? Obviously not all vegetable farmers are poor. However, productivity gains were equally observed among large and small holders that bought from trained retailers.[7] There is even anecdotal evidence that productivity gains are greater for poor farmers, as their initial productivity level are often very low. As Box 1 illustrates, good advice appropriately delivered, that not requires too high of an investment, can lift people out of poverty.

A number of other extrapolations can be made concerning poverty effects. Evidence, from both the survey and in-depth interviews, indicate that better, more intense use of inputs has a positive effect on labour creation (see Box 3). As rural land labourers are 'the poor', the impact on poverty, although not measured, of a better use of inputs is expected to be significant and positive. Concerning the poor as consumers, a considerable increase (one

[7] Farmers with less than an acre of land (an area of 40 by 100 meters)

third) in output is likely to reduce prices and benefit the poor. However, no data were collected to quantify this.

Changing labour patterns include women
Mr. Bul Bul Ahmed is a farmer who buys his inputs from a Syngenta-trained retailer. Higher productivity and incomes in agriculture have created a number of changes in his work practices. He himself is more directly involved in the cultivation process. As important, five of his regular labourers, seeing opportunities for themselves, have accessed land to grow their own crops. In doing so, their availability to work for Ahmed has reduced.

Looking for a new workforce, Ahmed started to hire women. He was reluctant at first as he thought women would be slow workers and used them for weeding only. However, he soon noticed that they were actually more precise and attentive than his male labourers. He now uses them for seed sowing, a more skilled and important task. He is confident that his female labourers will do a better job here as well.

In summary, with a relatively small budget, large-scale tangible change has been realised at the level of farmers, retailers, input companies and the poor. The dominant business models of input companies has been changed, giving a new value to information provision to retailers. Retailers too show stronger up and down stream linkages, with a more meaningful exchange of information. Farmers, likely about 1 million, witnessed real changes in their production systems and saw productivity levels rise. Poor people benefitted from improved agriculture performance as producers (from higher yields), labourers (more employment) and likely as consumers (from cheaper food). Katalyst, hence, managed to bring about significant change in the input market system in Bangladesh.

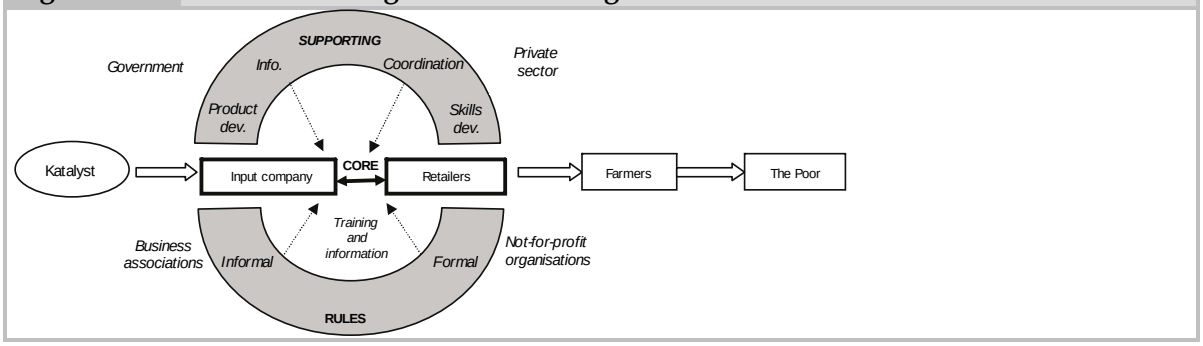
'Clearly, this is an innovative and good experience from which many lessons can be drawn. However, the remainder of this chapter discusses one single aspect: how sustainable is this new model of retailer training? As expressed by the Dutch Ministry of Foreign Affairs: 'structural measures are needed to strengthen the position of the poor'.[8] To what extent is this experience 'structural'[9], and what are mechanisms that focus value chain interventions on structural change processes?

5. How structural are these results?

For change to be structural, activity and players beyond the direct impact flow - input companies to retailers to farmers - will have to change correspondingly. Figure 2 depicts the wider market system around retailer training. The core of the market is the relationship between input company and retailer, related to training and information exchange. The extent to which this core function innovates and grows, in a dynamic and inclusive manner, is determined by the environment around it.

[8] Ministry of Agriculture, Nature and Food Quality, and Ministry of Development Cooperation of the Netherlands (2008). *Agriculture, rural economic development and food security.*
[9] Also referred to as 'systemic'

Figure 2 **Retailer training and its 'enabling environment'**



For a retailer training to survive and adapt to future market trends, a number of things are needed from the environment which were previously facilitated by Katalyst. Think of training skills, curricula development or new and perhaps very different information that can interest farmers and spur productivity. The table below summarises the level of change that was achieved per retailer training market function (see different features of Figure 2). More so, the right column discusses to what extent this change is actually structural.

The core of the retailer market, the relationship between input companies and retailers, has been changed in a structural way: the current dominant business model of input companies includes information provision to retailers, in order to reach farmers. The environment of services and rules around this changed to some extent, but changes here are not very structural yet. The offer of retailer training, in terms of content and format, varies from one company to the other. Companies are developing different training products, i.e. training centre versus training cell. However, its unclear where more radical innovation will come from in the future as for example universities or consultancy firms are by and large isolated from this experience. Similar observations can be made for training skills or the supply of new information.[10] Signs of wider change, beyond the core markets, are still weak.

[10] For a more thorough discussion of this, please see '*Bringing knowledge to farmers: from large-scale impact to systemic change*?', de Ruyter de Wildt, M and Alan Gibson, forthcoming

Table 1	Level of structural change in retailer training[11]	
Market function	**Achieved change**	**Structural change?**
Core retailer training market		
Retailer training	Major, additional investments among supported firms. Now also signs of copying by other, non-supported firms.	Yes. Valid, market-based momentum of change.
Supporting services		
Product development	Major innovations to original retailer training programme - usually with agency support.	Limited - product development connected to 'development world'. No specialist provider developing retailer training ideas.
Skills development	Signs of companies developing new capacity for own staff. Skill transfer through labour mobility.	Not yet. Gained training skills appreciated and used. No specialist providers of training skills and methods.
Coordination	Companies in competition with each other but the nature of competition has changed.	Not yet. Limited collaboration or sector-wide actions. No means for considering wider 'good' of the sector.
Information	Development-world promotes retailer training but little market research or media interest. Extent of informally-provided information not clear.	Limited. Informal growth in information. No formal information services about retailer training.
Rules		
Informal rules	Retailer training well-known and largely accepted as a key strategy by input companies and expected by retailers.	Yes. Prevailing view of business model has changed. Still questions over ownership.

6. Conclusions

Overall, the change provoked by Katalyst is considered partially structural. Katalyst had a good understanding of the 'structure' related to low productivity (Figure 1). Impressive results have been achieved in strengthening the environment around farmers as its focus shifted from low farm productivity, to scarcity of information about input usage, to restricted relations between farmers and retailers, to input companies training retailers how to advice farmers. However, it stopped here. Katalyst had become so successful in promoting 'retailer training' that one input company even claimed that 'almost all retailers in the country have been trained by now'.

[11] Adapted from '*Bringing knowledge to farmers: from large-scale impact to systemic change?*", de Ruyter de Wildt, M and Alan Gibson, forthcoming

Strengthening that environment in a structural way, however, requires a consistent and continuous move from success (retailer training) to future problems: who is going to deliver the future inputs to maintain an active development of that success?

7. Recommendations

We have seen here how well-informed interventions can trigger large-scale change. With relatively little resources, policies can broaden the benefits of exiting innovations. Two recommendations are put forward to focus policies towards more structural change.

1. *Understand the structure around an innovation that you want to scale-up.* Structural change can only be defined, delivered or measured if that 'structure' is understood. The example given here is strong on this understanding. Katalyst had allocated resources (budget, staff and importantly, also time) for a detailed understanding of the structure, providing space for failure and learning. Retailers for example, the notorious 'middle-men', were part of this structure and played a key role in this success.
2. To enable structural change, interventions and policies need to *move in accordance with newly acquired knowledge and understanding*. It seems an open-door, but there are often more incentives to build upon and scale success than to move towards new problems. Katalyst is currently looking at the wider training market, for example at how universities can play a role in this. It only moved here after the assessment showed that retailer training was working but needed new inputs in future. Feedback loops, such as monitoring and evaluation tools, are important here. When development agencies become 'good' at something, its time to withdraw and crowd-in other, more structural players.

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