# Katalyst's Contribution to Systemic Change

## – The Adopt, Adapt, Expand, Respond Cases

# Systemic Change in Maize

Case Study number 10

Dr. Jake Lomax
Dr. Ben Taylor

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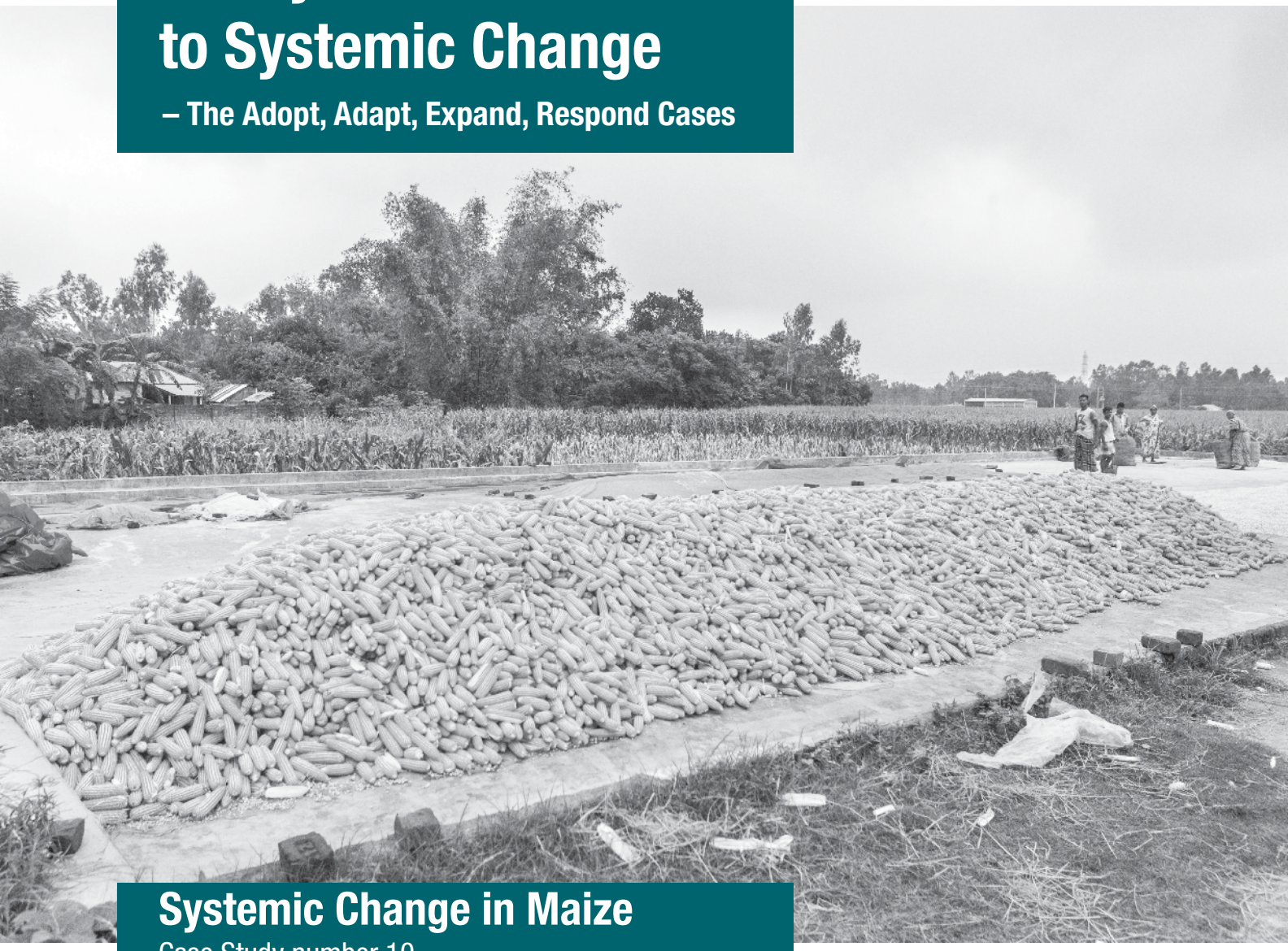

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# Katalyst's Contribution to Systemic Change

## Introduction

Development programming is temporary in nature. External entities intervene in a system and change it with the aim of benefiting poor people. Throughout the history of development there have been temporary impacts on small numbers of people as, when funding stops, so does the impact of the change in the system. Katalyst's approach is different in that it explicitly targets large scale, sustainable – or *systemic* – change. This case represents a significant milestone in the implementation of market development programmes. Katalyst, with the Springfield Centre, has played a leading role in developing thinking around what systemic change means. This case examines this concept across one sector, demonstrating how a system can be changed to create sustainable impact at scale. Before engaging in the case material, however, it is important to clarify the *Adopt*, *Adapt*, *Expand*, *Respond* (AAER) framework as a means for identifying and defining systemic change so that this can be employed to understand how it has been facilitated in this sector through the work of Katalyst.

## What systemic change means

The first key concept defining systemic change is the identification of a system. M4P provides a useful framework for understanding a system which is seen as a series of interconnected supply-demand transactions which are supported by functions and governed by formal and informal rules (see Figure 1). **The supporting functions and rules are components of a system which affect the price, level, or quality of supply, demand or exchange in the core transaction**. The target group, which in the case of Katalyst is poor people, will always play the role of either supply or demand – as producers, consumers, rights holders, or employees – in the core transaction of the principal market system, i.e. the system where the programme aims to improve outcomes for the target group.

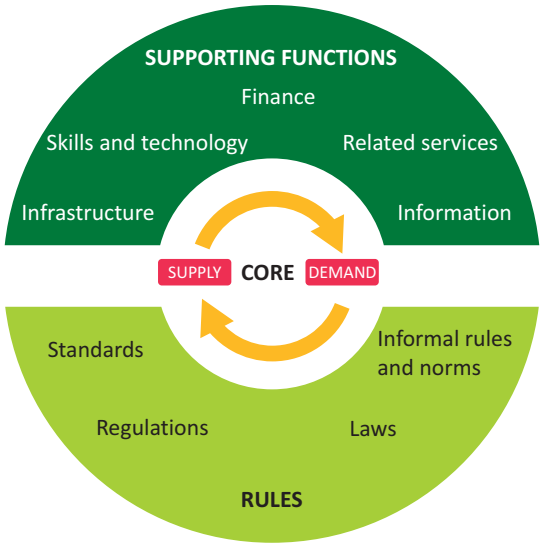


**Figure 1: Market System Diagram**

The performance of the supporting functions and rules dictates the outcomes of the transaction. In order to change the way the system works for the benefit of the poor, one must change how these supporting functions and rules work.

The performance of each of the supporting functions or rules is, in turn, dictated by its own system – the supporting market system – which has its own supporting functions and rules.

The objectives of systemic change are defined relatively consistently as sustainable, large-scale change. However, while these goals are clear, consensus and clarity on what systemic change is, how to recognise it, and when intervention might be required, is notably absent. The Merriam-

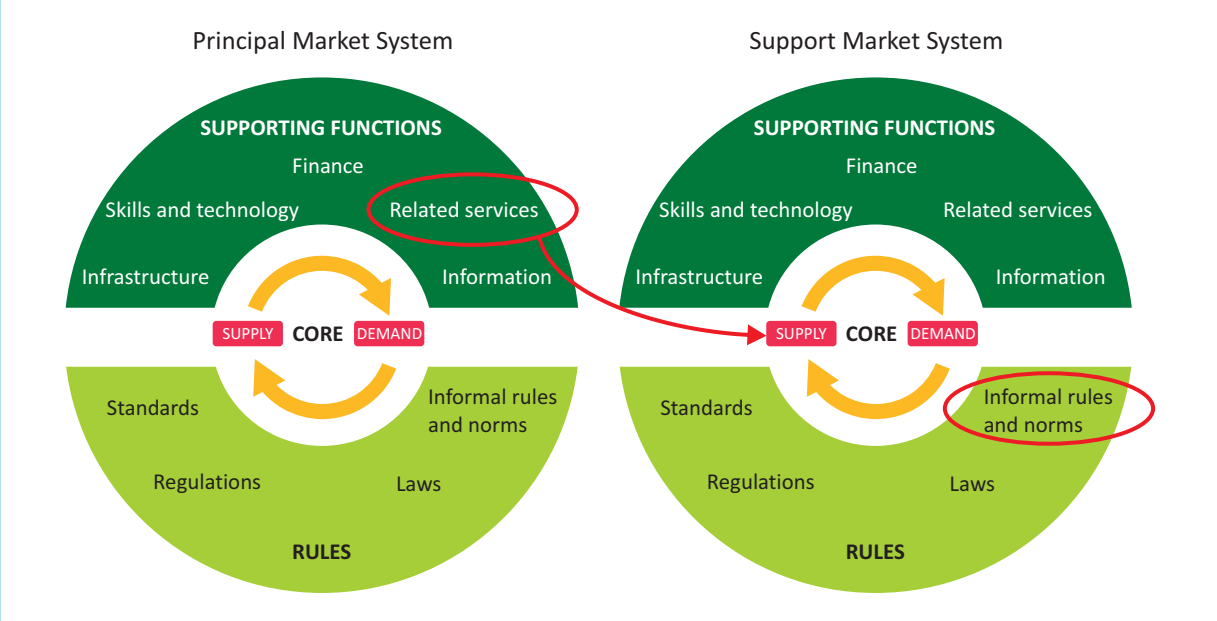


**Figure 2: Principal and supporting markets**

Webster dictionary defines 'systemic' as *of or relating to an entire system* and 'change' as to *make someone or something different*. New Philanthropy Capital's 2015 handbook introduces concepts of sustainability and the different components of a system, defining system[s] change as:

> *…an intentional process designed to alter the status quo by shifting the function or structure of an identified system with purposeful interventions…Systems change aims to bring about lasting change by altering underlying structures and supporting mechanisms which make the system operate in a particular way. These can include policies, routines, relationships, resources, power structures and values.*

The M4P Operational Guide makes this more specific to development, using the objective of the change as part of its definition:

> *A change in the way core functions, supporting functions and rules perform, that ultimately improves the poor's terms of participation within the market system.*

Definitions are inherently limited when they have to be applied in context and the real question that development programmes need to address is *what does systemic change look like and how do I know if it has happened*?

Based on the goals of sustainability and scale of impact, the changes in performance of supporting functions and rules identified above must demonstrate:

- Uptake, ownership, and investment by relevant players within the system, in the absence of external involvement; a sustainable change in behaviour.
- Increasing impact over time; more benefits to more people in the target group.
- Changes in other supporting functions and rules to stabilise or augment the impact of the initial change.

Cognisant of the concept of systemic change, the Springfield Centre and Katalyst developed a simple conceptual framework which aims to capture these different dimensions. The framework, known as the *Adopt*, *Adapt*, *Expand*, *Respond* (AAER) framework or the *Systemic Change Framework*, can be used by a programme to monitor whether systemic change has happened, is happening, or requires further programme action in order to take hold. This case study is presented through the lens of this systemic change framework, the four key components of which are explained here.

## Adopt

In the first instance, the role of a programme is to identify what change is needed – which of the supporting functions and rules within a system are underperforming, how they might perform better, and what actions should be taken to bring that change about. The system is not generating this solution of its own accord and so programme intervention to instigate an innovation is necessary.

*Adopt* is a process whereby an innovation in the operation of one or more supporting functions or rules of the market system is introduced and ownership over it is gradually institutionalised within the relevant players in the system. This will involve different roles for different actors. In this phase, a programme will be testing and refining an innovation in partnership with one or more players whose incentives are similarly aligned should the innovation be successful. It may be the case that multiple models of innovation fail at this stage – constraints may be intractable or the barriers to opportunities being realised too significant to warrant further programme investment.

For example, a programme might want to change the way that farmers receive information – changing the way the function of 'information' operates. To do this, they might need to partner with radio stations, journalism training institutions, research institutions, and private advertisers. All of these players, whether they are programme partners or not, need to change their behaviour in some way in order for the new model to work.

By the end of the *Adopt* phase, a programme will no longer be providing support to the initial partner or partners in the same way. However, as documented below, changes required to further expand or stabilise the impact of the initial innovation will require **actor level institutionalisation** among relevant players. Further programme involvement may be required and so that this transferal of ownership takes place.

## Adapt

The *Adapt* component of the systemic change framework refers to sustained behaviour change by relevant actors. The players involved in the innovation – both those that were supported by the programme and those that weren't – must have accepted the different changes in their behaviour necessary for the model to work and incorporated them into their standard operations, in the absence of programme involvement, with independent investment of time, money, or other resources.

The process of institutionalisation – moving from *Adopt* to *Adapt* – needs to happen at the system level i.e. the functions which comprise the innovation need to continue to operate in this novel way after external intervention has ended. However, in practical terms, functions are comprised of a wide range of actors adopting a wide range of behaviour changes. Whether an initial partner, or an actor involved in the expansion or response component of the change, any shift in behaviour has to be institutionalised in order for it to be sustainable.

## Expand

*Expand* is about pushing the boundaries of the innovation – more benefits for more people.

| Change | | Mechanisms |
|---|---|---|
| More People | More Benefits | |
| • New geographies<br>• New segments of target group<br>▪ Income groups<br>▪ Marginalised segments: women, minorities etc. | • Lower costs<br>• Higher incomes from produce<br>• Greater health or quality of life benefits<br>• Better protection of future incomes through disease resistance or genetic diversity | • Existing actors<br>▪ Roll-out<br>• New actors<br>▪ New geographies<br>▪ Competition<br>· Lower prices<br>· Further innovation |

The competition mechanism also has a dividend on sustainability, as an innovation becomes less dependent upon individual actors. If others are not imitating or emulating innovations that are seemingly successful and aligned with incentives to do so then it is indicative of a more fundamental problem with how the system operates including the information transmission mechanisms.

Having monitored the adoption and adaptation of a change in behaviour, a programme might need to re-engage in order to include new players or new areas in an innovation. It may be that the concept is proven and so the risk for a private sector partner is lower, or it may be that the programme initially targeted easier to reach areas and so heavier programme involvement is required in order to push impact into more marginal areas. Different partners also have different needs determined by their capacities, and so the type of programme support might also differ from that in the initial innovation.

Referring again to the earlier example of intervention in the information function, a behaviour change may have been sustainable with the programme partners – for example a radio station and a research institution – and with all of the other players who needed to change their behaviour, such as journalists, training providers, and advertisers. However, the impact from that single radio station might not be reaching as many people as it could and so it might be necessary to partner with other players – whether they are radio stations and research institutions or perhaps other relevant players – in order to expand the benefits of the model to more people.

## Respond

The *Respond* component of the systemic change matrix examines whether other supporting functions and rules are changing in response to the behaviour change that has been assessed through other components. It assesses what changes are happening and the degree to which they are supportive of or obstructive to the desired impact. If impact could be increased by responses within supporting functions and rules that are not happening organically then this represents an opportunity to increase the scale of impact. As such *Respond* is an important aspect of systemic change for both sustainability, through creating resilience of change, and scale, through realising opportunities for increasing impact.

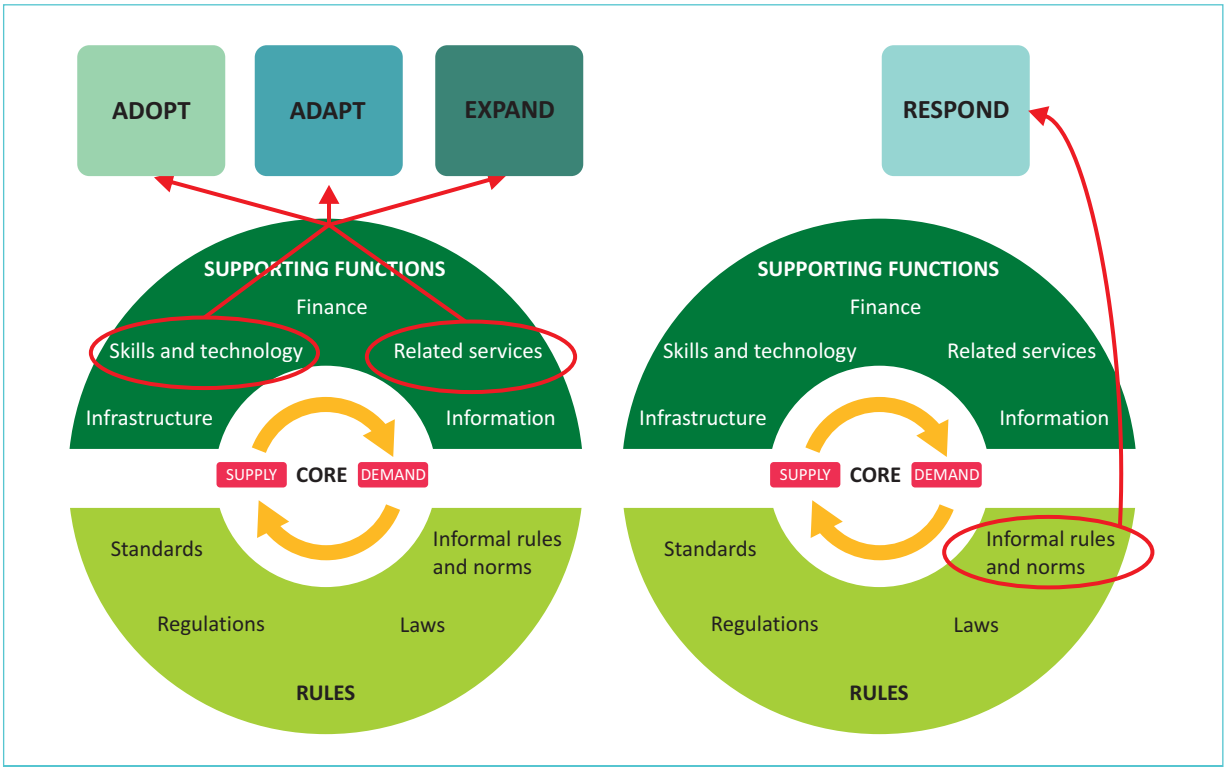


**Figure 3: Functions addressed through AAER**

*Adopt*, *Adapt*, and *Expand* represent changes in the operation of one or more initial supporting functions or rules which are part of a programme's vision for how a sector might work better to improve outcomes for the target group. *Respond* represents changes in other supporting functions or rules which reinforce or enhance the changes from the initial innovation.

In the example here, a range of players altered their behaviours and have helped to change the *skills and technology* and *related services* functions. However, if the growth in benefits to and numbers of the target group are to continue to expand from these changes, it may be that informal rules and norms need to change the way they work too.

## Employing AAER

In summary, then, there are two roles of the AAER framework. Firstly, it is an articulation of the programme's vision. If a programme aims to bring about systemic change and the AAER framework helps articulate what it looks like, then a programme should be able to articulate how they can realistically expect the system to change in each of these components, before intervening.

However, systems are dynamic and complex and plans are rarely borne out in reality. As a second and on-going use of the framework, then, the systemic change matrix is used by the programme as a tool for monitoring, reflection and guidance to action.

## Structure of the cases

The case is structured as follows. Firstly, the market system for maize is analysed, demonstrating position of the target group within the sector and the supporting functions and rules affect outcomes. The focus for the remainder of the case is then placed on four of these supporting functions and rules which were acting as systemic constraints to the better functioning of the industry in the interests of the target group. The different ways in which Katalyst attempted to address these constraints are then analysed using the lens of AAER articulated in this introductory chapter. These attempts sought to address different combinations of the systemic constraints and it is the net result on the performance of the maize market system which is the subject of the case. The learning from Katalyst's work in the sector is then analysed to assess wider relevance to the development field.

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# CHANGING THE MAIZE MARKET SYSTEM

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## Introduction

Maize has become an increasingly important cash crop for poor farmers in Bangladesh. In 2009 – 10, the maize sector contributed USD200 million to gross domestic product (GDP), and USD120 million to farm income. In 2009 – 10, an estimated 480,000 farmers participated in growing maize, 94,000 of them as paid labourers.

Despite rapid progress made up to that point and further progress in subsequent years, the potential of the maize sector, especially outside of the main production areas in the north, remains unfulfilled, and innovation in the north of Bangladesh has not spread organically to other regions. Further, and despite much progress in productivity and land under cultivation, national production of maize still does not meet national demand – demand rooted primarily in the growing poultry sector. Hence, given appropriate forward linkages, maize farmers should still find a strong domestic market for their produce, and the opportunity remains to expand production to substitute imports.

Maize is important to poor farmers primarily because of the opportunity it presents as a cash crop. Returns from growing maize are generally better than many alternatives, especially when production is in line with best practice. Katalyst's work in the maize sector has helped to drive gains in productivity and profitability. The programme has contributed through many different interventions, spanning 10 years, to the maize market's successful transformation. In this analysis, a primary focus is on their work in contract farming, not only because of the significant impact it had on poor farmers, but because of its role in drawing together other key transformative interventions into a systemic market innovation.

This case study first briefly outlines the maize market system and the constraints preventing the effective performance of that system. The role of Katalyst is then outlined in formulating the innovation that defined the vision of a transformed sector, and the four phases of systemic change by which they realised that vision: by working with partners to adopt new ways of working, through adaption and ownership of the innovation by those partners, through the expansion of the benefits brought by the innovation, and finally by supporting responses in other supporting functions.

## The overall market

Despite rapid progress, the maize sector has underperformed in Bangladesh primarily because of constraints on the supply side. The demand side has expanded over the last two decades: the story

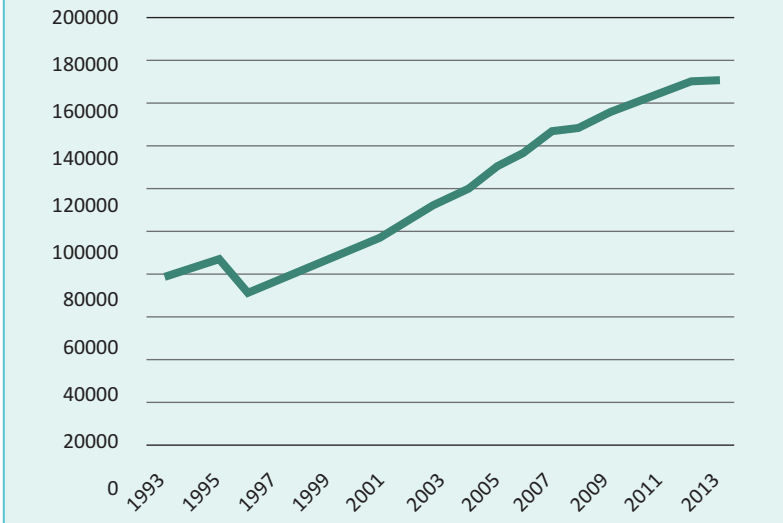


Figure 4: Chicken meat production in Bangladesh in MT

negligible imports up to 1998 saw a sudden increase to 270,000 tonnes per annum in 2000. At this point domestic production took up some of the demand, continuing to do so up until 2009, when a sudden drop in production from 1,350,000 to 730,000 tonnes corresponded with a huge increase in imports of 485,000 tonnes. The reduction in production was attributable to market disruption caused by the severe 2008 outbreak of avian influenza. Growth in production resumed the following year, and in 2012 imports were less than 200,000 tonnes and domestic production at 1,300,000 tonnes.

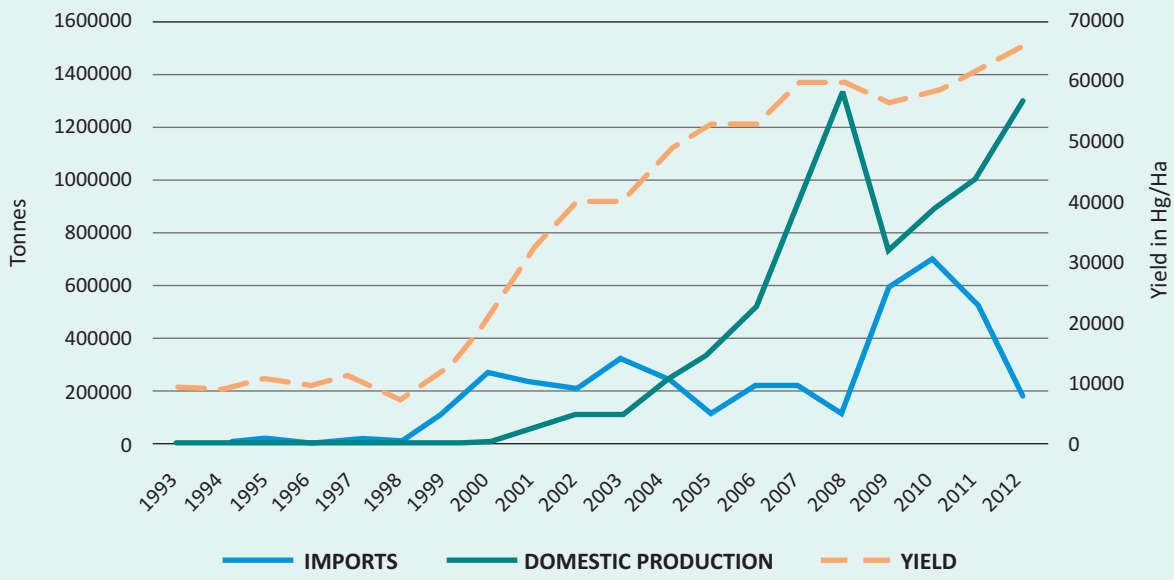


Figure 5: Maize production, imports and yield; Source: FAOSTAT

of the emergence of the maize sector in Bangladesh is intrinsically linked to the emergence of the poultry sector. From 1996 to 2013, chicken production has increased by 100,000 tonnes per annum from the 72,000 produced in 1996. This steady increase has been stimulated by increasing poultry production, which requires maize as a primary ingredient of processed feed.

The graph below shows that initially the increasing demand for chicken feed was met by imports; The maize production increases have been the result not only of increased land under cultivation but also huge gains in productivity, with yields increasing from around 1 MT/Ha in the 1990s to over 6 MT/Ha in recent years. These are some of the highest yields in south Asia, and have resulted from an increasingly effective maize system in the north where farmers use high quality inputs effectively on productive land. Katalyst commenced operations in the maize sector in 2004; their intervention was based on a diagnostic

process that sought to understand not just the superficial manifestations of market performance, but the underlying causes of this underperformance.

## Market performance

The graph above illustrates change over time in the sector, a story of production rapidly expanding to meet rising demand. It is important to emphasise that Katalyst was analysing the performance problems of the maize system prior to this change, and that these problems still persist in various forms in many areas of Bangladesh.

The overall problem was that production was not rising quickly enough to meet the escalating demand, meaning that farmers were missing out on the opportunity to profit, and the feed processing industry was rendered dependent on imports. This problem represented the symptom of poor market performance: the constraints underlying the problem lay deeper. Clearly the immediate causes were related to an absence of information at the farmer level, either about the opportunity or the knowledge of how to exploit it. But why was the market not responding to solve these problems? Katalyst began to diagnose structural issues within the maize system, issues that lay not only in the core of maize production and associated exchanges, but in the supporting functions that enable these processes to happen effectively. There are various ways these functions might be characterised, but broadly speaking they are: market information, behavioural norms, skills input supply, and forward market linkages. Each of these is a market system in its own right, and ineffective operation of each forms a constraint to the effective performance of the principal maize market.

### Market information

Put simply, supply can only meet demand if farmers know about the opportunity and benefits of growing a crop, as well as how to produce it effectively. Maize has the potential to provide profits greater than other comparable crops, but this information needs to reach farmers if the supply deficit is to be overcome. They need to know for whom they can produce, and the volumes and quality standards required. Additionally, information about cropping seasons compatibility with other crops' seasons, and intercropping is required if farmers are to optimise their income from maize.

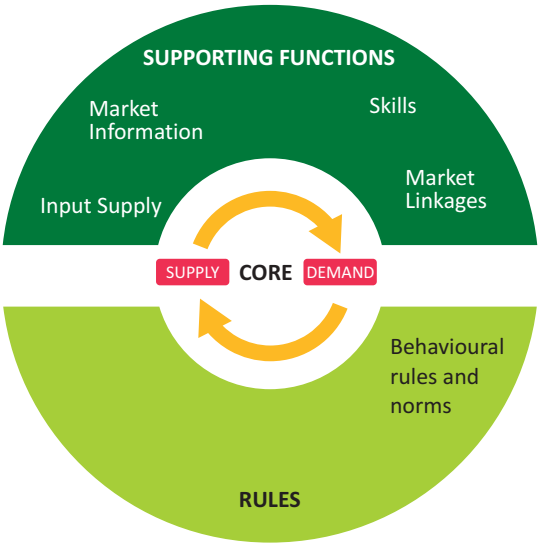


**Figure 6: Maize market system**

### Skills and behavioural norms

Farmers in Bangladesh are generally unaccustomed to growing maize, and it is not a crop that is traditionally consumed by people in most regions of the country. As above, there are low levels of knowledge on how to grow maize, and habitual preferences for growing other crops about which farmers have greater knowledge. Poor farmers tend to be highly risk-averse, and behaviour change often requires substantial evidence of the nature of costs, benefits and risks.

### Input supply

For higher productivity, the quality of inputs and their correct application are critically important factors. Seeds, fertiliser and pesticides are the main purchased inputs for maize production, and all can significantly affect productivity. Low quality inputs, incorrect inputs for the soil type, or poorly-timed application of inputs can all reduce quality and output. In addition to the supply of maize inputs, supply of inputs for other crops in the cycle can profoundly affect maize productivity. A system producing effective, convenient, and affordable supply was therefore required.

### Market linkages

The constraints above focus primarily on the supply side. Yet, while supply does not meet demand at the national level, there are also problems with finding local markets for emerging areas of maize farming: if farmers see demand nationally, but this is not met by actual local demand for their produce, conversion to maize would be damaging and short-lived. The demand for maize comes from feed mills, which process maize into chicken feed. These mills are not in all cases close to local maize supply, and with many having relied on imported maize inputs the connections with local supply are missing. A market linkage function was needed to aggregate maize supply and ensure volumes and quality were in line with local demand.

## From analysis to intervention

### Defining the innovation: Enabling the maize supply side

Having identified the supporting functions that were underperforming, and that needed to be addressed to help fix the maize system, Katalyst set about defining its vision for the maize sector. The innovation required was improvement in the performance of the following four supporting functions: information, behaviour, inputs and linkages, with associated impact on behavioural norms. Katalyst sought to help to develop a maize market in which farmers were informed of maize demand and were able to meet this demand effectively through access to high quality inputs and effective market linkages. Realising this vision, as with any improvement in supporting functions, can only be achieved systemically by working with those actors who are currently delivering the relevant services in these support markets, or else have the capacity and incentives to do so.

The extent to which these supporting functions were interconnected not just with the principal maize market, but with each other, is a distinct feature of the challenge of the sector, and shaped the way Katalyst sought to implement their innovation. For instance, the market information regarding the maize being an opportunity would mean little without information about high quality inputs and a system to provide them, but there was little incentive for market actors to provide quality inputs until demand was in place. Similar problems could be identified in the provision of forward linkages.

In 2006, after a few years of experience of maize promotion activities, and commencement of retailer training programmes (RTP) in partnership with Syngenta, Katalyst identified contract farming as a possible route to synchronise the various aspects of market innovation at the farmer level, and link up their other work in supporting markets. The next sections outline how actor-level changes were facilitated by Katalyst working in partnership with market players in order to overcome these. It is important to emphasise that this case focuses on a specific subset of Katalyst's many interventions in supporting functions of the maize system, including crop protection and crop nutrition covered in other cases in this series.

### ADOPT: Piloting

The first stages of Katalyst's innovation were maize promotion activities, and development of RTP with Syngenta. These were focused around the information, behaviour and input constraints, but did little to address forward market linkages, nor was input supply tackled in such a way that would address financial constraints to access of expensive inputs. As such, while these were important interventions in increasing knowledge of maize into northern farming communities, they were only a partial fix in terms of the overall innovation required. This case picks up the story with the commencement of contract farming, an initiative that Katalyst thought had the potential to deliver all of the requisite supporting functions sustainably and at scale, in some parts of Bangladesh.

The intervention began in 2006, with Doyel Agro, a private sector company based in north Bangladesh. Doyel contracted directly with farmers – initially with those of any size, but latterly only with farmers of more than three acres of land in order to reduce their transaction costs when managing its 1,600 contractees. The model seemed to work relatively well initially, but Katalyst

considered that further piloting of contract farming innovations was necessary in order to find a model that truly represented a systemic change and could scale up: that is one in which the contractors themselves could emerge in a sustainable and ongoing manner.

Experience with Doyel led to an attempt to strengthen the contact farming component of the overall innovation. In doing so Katalyst were particularly focused on attempting to develop a system that could reach the farmers on the char lands who suffer disproportionately from many, if not all, of the identified constraints. Katalyst partnered with two seed companies, KBP and CP Seeds, in order to pilot a contracting model whereby the seed companies would take on the main responsibility for training, developing and sustaining the contractor relationships. In doing so, Katalyst sought to move contract farming, like the retailer training programme, to be an intervention that exploited the scale potential of *change intermediaries*. The partner in this new 'super-contracting' model is the seed company, and the target beneficiary is the maize farmer, but the benefit relies on an intermediary actor (the maize contractor) to deliver the change.

In systemic change interventions that involve such intermediaries, they are too many, and too dispersed, to be the partners for the introduction of the change if substantive scale is desired. But this same characteristic makes them invaluable agents in the delivery of change to large numbers of dispersed beneficiaries, often through embedded services. The partners are usually one of a much smaller number of firms or other actors (referred to as scale agents) who can make important changes with the potential to influence a much larger number of people than would be possible through one 'lower-level' intermediary. Such a structure, then, permits greater scale at two different dimensions – it is easier for Katalyst to engage with these 'higher-level' partners, and it is easier for the change intermediaries to reach more farmers.

Unlike with retailers, these maize contractors were not already in place. Creating the actors to perform the missing market linkage function was a key ambition, but, importantly, the contractors were in a position to deliver the majority of the functions identified as missing in the diagnostic process. As such, getting it right was vital to Katalyst's efforts to transform the maize sector.

The contractors were initially selected from a pool of retailers and farmers and others who had been trained as part of an earlier intervention. As such they were individuals known to Katalyst and their intervention partners, and recognised for their potential and capacity to perform the role required. This was just one example of the complementarity between Katalyst's various interventions in maize. The contractors alone could not make a market, because putting the burden for transforming all the functions on them was unrealistic; it would take a long time for them to realise the benefits of their role, and so they would lack the incentive to continue. In the early stages of a contractor setting up in business, they would act as a key part of Katalyst's wider programme of awareness-raising through maize promotion. They would provide knowledge locally for new farmers, knowledge already available through the retailer training and maize promotion, but delivered alongside inputs and a defined sales opportunity.

## Results – Proof of concept

During the pilot, five contractors were selected in Rangpur, and three in Bogra. The contractors arranged trainings for their staff and farmer group leaders during 2009, with 280 attendees. Then, mostly in 2010, trainings for farmers were held with 895 attending. The contractors and seed companies together arranged 73 demonstration plots, and 27 field days with over 3,300 attendees.

During the pilot, the eight contractors had almost 1,700 farmers between them, producing over 7,000 MT of maize. At the end of the pilot, each of the contractors was planning to increase land under cultivation the following year, with the intervention having equipped them with the planning skills to manage the business and removed the great uncertainty regarding the business model. The pilot also seemed to have stimulated effective change at the farmer level.

For the purpose of the maize innovation, the benefits are increased incomes from either (1) more informed production decisions, e.g. in crop choice (2) improved production quality or quantity or (3) improved terms of exchange through, for instance, growing maize at more appropriate times. To illustrate the comprehensive set of changes and overall benefits at the farmer level, the table below illustrates the case of one marginal farmer who took up contract farming and almost tripled profits.

As defined in the opening section of these case studies, the components of systemic change are non-linear. The subsequent sections, therefore, do

Mosammat Bilquis was formerly a day labourer on maize fields. Following the introduction of contract farming she gained access to credit for inputs, and produces around 5,000kg per year, providing revenues of USD800 – 1,000.

Katalyst report that their impact assessments tend to suggest benefits to farmers of growing maize using effective methods is in the range of USD100 – 200 per year.

**Figure 7: Impact on one marginal farmer; Source: Katalyst**

| Parameters | 2008 – 09 (before contract farming) | 2009 – 10 (after contract farming) |
|---|---|---|
| Land cultivated (bigha[1]) | 2 | 3 |
| Sowing time | Not optimal | Optimal |
| Quality Seed used | No | Yes |
| Cost of Seed (kg) | USD2.00 | USD2.30 |
| Timing of irrigation | Not optimal | Optimal |
| Cost of Borax (fertilizer) | Nil | USD1.02/Bigha |
| Cost of Zinc (fertilizer) | Nil | USD1.15/Bigha |
| Optimal management of crop-field | No | Better |
| Cost of production per bigha | USD38.30 | USD60.00 |
| Increase in cost of production per bigha, over last year's (%) | N/A | 57% |
| Yield or production per bigha | 600 kg | 1,000 kg |
| **Increase in yield per bigha over last year's (%)** | **N/A** | **66%** |
| Certainty about the sale of crop | No | Yes |
| Pricing of produced crop | lower price because of low quality | higher price because of better quality |
| Price per kg of maize | USD0.12 | USD0.15 |
| Revenue per bigha | USD72.75 | USD153.18 |
| Profit per bigha | USD34.50 | USD93.18 |
| **Increase in profit per bigha over last year's (%)** | **N/A** | **170%** |
| Continuation of contract farming | N/A | Yes |
| Expansion of maize cultivation | N/A | Yes |
| Sharing of knowledge gained through contract farming with other farmers | N/A | Yes |

[1] One bigha is equivalent to 1335m$^2$

not necessarily follow chronologically or in isolation. In attempting to broaden the impact of a change in a sector, new partners will have to transition through adaptations of the original model and in increasing the resilience of a change by observing and facilitating the response of other supporting functions and rules.

## ADAPT: Institutionalisation of change

Katalyst involvement in the changes specified above was central to their initiation but, in the absence of partner ownership of the change, there was no evidence that this would be sustainable. Evidence of this *adaption* of change by the partner comes from their ongoing investment after the support of Katalyst has ended.

With super-contracting, CP Seeds had multiple incentives to make the system work. In common with other seed selling contractors they wanted to sell more of their premium seeds, but additionally their feed mills needed a regular supply of maize for the growing demand for poultry feed. If this could be fulfilled through national supply it would save the costs of import. Due in part to this dual incentive, and due to the strong commitment of the national director of the seed company both to the contract farming initiative and the Katalyst relationship, CP Seeds took ownership of the innovation, and continued investing after Katalyst support ended. Apart from the ongoing strong CP-contractor commercial relationships, there were several signs of real buy-in at the partner level that suggested Katalyst had found the right partner to take the innovation beyond pilot. Just two examples of this are, first, that CP paid a premium to their contractors slightly above the market price. This is despite the benefits to the contractors of having a guaranteed buyer in place, and is in contrast to, for example, Doyel Agro's practice of paying slightly below the market price to their farmers. A second example is that CP put in place an incentive scheme for their best performing contractors, including taking selected individuals on trips abroad, most recently to Thailand, to help build the relationship as well as for educational purposes.

Adaptation of the innovation occurred not only at the level of the partner, but also of the intermediaries. This is not only welcome, but necessary – if the model is not wholly owned by all change agents then sustainability at the partner level is difficult to attain. Contractors invested in at least three ways: in farmer relationships, in farm infrastructure and in sub-contractor relationships. These investments were never subsidised by the programme or directly by the partner seed companies - they arose from the initiative of the contractors themselves.

Investment in building relationships with farmers is a necessary part of the contracting role. Some contractors farm maize themselves, but the model is based on building much larger supply base with large numbers of farmers. This requires persuading farmers of the merits of maize and instructing them in best cultivation practice and requisite quality standards, as well as setting up structuring of contracts.

Further, investment in drying facilities and other such small-scale infrastructure demonstrated commitment to the model. In order to expand their supply base, some of the CP contractors then also began to subcontract to farmers who also wanted to serve as intermediaries, an adaptation on the part of the farmers that had also been seen in 100 of Doyel's 1,600 contractees. This means that there are, in some cases, two intermediary change agents between partner and beneficiary, but demonstrates further investment on the part of the initial contractor in developing new forms of transactional relationship beyond that initially envisaged.

### Results

Following the initial training of eight contractors, seven remain active as maize contractors for CP. This has been very beneficial to CP Seeds business as well as the contractors and farmers. Just one contractor (albeit one of those that has been extremely successful) bought 10 metric tonnes of seed from CP last year. The successful and lasting uptake of the innovation stems in part from loyalty to CP amongst contractors who make use of the credit provision embedded in the contracting arrangement, which extends down to farmers and restricts side-selling. Farmers also tend to maintain

their relationships with the contractor unless they decide to switch from maize to other crops.

## EXPAND: Extending the benefits

Benefits of an innovation can be expanded in two ways: more benefit to existing beneficiaries; or creating more beneficiaries. In the case of the maize innovation Katalyst promoted in Bangladesh, existing maize farmers could benefit through improved supporting functions providing them with inputs, information, skills or forward linkages that would enable to produce more, better quality maize that could more easily and profitably be sold. As well as improving the opportunity, the systemic innovation would improve awareness of the opportunity for farmers not already growing maize, and the benefits that this crop would accrue relative to other cash crops (or relative to other previous activities). As more land came under cultivation, the labour intensive nature of maize meant that there were more rural wage labour opportunities, especially for women. The provision of an additional profitable cash crop choice also improved options for crop rotation amongst, for example, tobacco farmers.

In the section above we saw how, following Katalyst intervention, CP had embedded and invested in 'super' contract farming, an effective mechanism for delivering the benefits of the systemic innovation sustainably. This section describes how the additional benefits of the innovation expanded both within the northern regions of increasingly established maize cultivation and, more recently, into southern regions where commercial production was far less established.

Systemic change programmes often expect that expansion of benefits will occur 'organically' as a result of the incentives of the partners, since these should be aligned to increasing the number of beneficiaries, and information regarding those incentives encourages competitors to crowd in. Yet in many cases this does not happen, especially where, as in this case, marked regional markets for maize meant either the capacity or the incentives of the initial implementing partners are lacking in new areas. The two sections below outline both the organic expansion and Katalyst's efforts to promote expansion, first in the North and then the South.

## Expansion of benefit in the North

In the case of the super-contracting model specifically there were several possible routes to create more beneficiaries: more seed companies; more contractors; more farmers per contractor; or more subcontractors per farmer. Katalyst's support to help CP expand the model continued for three years, during which the latter three of these grew substantially. This growth continued beyond the end of Katalyst's support and the extent of this expansion is reported in the results section below. However, no organic growth in the contracting model materialised; according to Katalyst staff, no other seed firms took on the role of super-contractor in the northern regions despite the high sales volumes CP were achieving through their contractor network.

Katalyst's staff suggest that the only other player with interests both upstream and downstream in maize value chain has been an affiliate of the NGO BRAC. Such a player does not have the same clear incentives as a private sector seed and feed company. Where commercial interests are only at the input level, there remains significant difficulty in coordinating forward linkages, whether or not the seed company has a network of contract farmers. This is illustrated through the case of Katalyst partner KBP, who recently bought land in Rangpur with the intention of building their own feed mill. What led KBP to consider such a move was the frustration of local feed mills colluding to delay purchasing maize, so as to drive prices down before they do eventually purchase. This type of collusion reduced the demand for maize inputs sold by KBP, as well as the benefits of maize production for poor farmers.

Expansion of benefit is not only about replication of a successful model. Katalyst were not content with having helped transform the maize system in the North, they sought to use this system to extend benefits still further. In Rangpur, maize productivity is now very high following the market innovation Katalyst helped to introduce. Katalyst identified that further benefits could be brought to farmers in the region by using the effective supporting functions to introduce summer maize. Most maize is grown in rabi (winter) season, but chickens demand to be fed throughout the year so some seasonal shortages for the feed mills need to be filled through import. This presents an opportunity for farmers to grow in *kharif* (summer) season and benefit from better prices in a period of low supply. These farmers may have already cultivated rabi maize, but are more likely to be rabi potato farmers and new to maize cultivation. In either case, *kharif* cultivation is a distinct challenge, and requires specific inputs. The necessary quality inputs were not readily available. This problem was identified by Katalyst who leveraged the now increasingly effective maize market system in the region. More specifically the improved input supply function was utilised to bring the benefits of maize cultivation to farmers that grew other crops during *rabi* season but who were open to trying maize in summer. The systemic changes had already been made, what remained was to demonstrate the benefits to partner seed companies so that they would exploit this improved system with appropriate new varieties of quality seed and associated information. With the greater diversity in forms and options of production comes a more resilient maize production system; the *rabi* maize intervention not only capitalised on the better-functioning system, but also strengthened it.

## Geographical expansion to the South

The lack of substantive replication of the contract farming model pioneered by CP and Katalyst is one obstacle to expansion of the benefit. A second is the interrelated failure for the improved system performance in the North to extend into other areas of the country where maize growing is much less established. These areas of the South – The Chittagong Hill Tracts (CHT), Barisal and Faridpur, and Mymensingh – shared similar systemic weaknesses that were previously witnessed in the North, albeit each with their own distinct characteristics. Katalyst conducted detailed market systems assessments of each region to establish their suitability for maize cultivation and to understand the pattern of systemic constraints within each before selecting where and how to attempt to leverage expansion of the innovation through a tailored set of interventions. In each area, the set of intervention tools on which this

case focuses are retailer training, input promotion and contract farming, all of which built on experience accumulated in the North.

So why had contract farming not expanded organically to bring improved supporting functions to the South? This was due to at least two interrelated factors: the locations of the feed mills; and the weaknesses of maize production in these areas. This means there is more to do in persuading possible maize farmers and contractors, while the rewards for investment on the part of the seed companies are much lower. In short, it is expensive, risky and difficult to build a market or initiate contract farming in such areas, so the expertise and financial backing that Katalyst could offer was key to leverage commercial forces in bringing the potential for maize to improve incomes for the poor to these new areas.

The most substantive attempt to introduce contract farming in the south has been in CHT, which had the benefit of eight feed mills located nearby for processing imported maize at the regional port. Additionally there was a culture of maize farming; maize has long been grown in CHT through the traditional jhum cultivation for human subsistence consumption. However, despite these strengths, the local supply systems have not responded to substitute for imports. The traditional supply is for domestic consumption, and productivity is low because of the lack of good quality inputs and the absence of effective irrigation, not helped by a sometimes tense political situation.

In this regard Katalyst tried to expand contract farming using partners both within and outside of combined seed and feed interests. In CHT, the intervention was trialled initially with EON and Monsanto, who, in line with these super-contracting lessons from Rangpur, found difficulties in coordinating the forward linkages required of the innovation. Monsanto did not have their own feed mill, and EON's Euro feed mill failed to buy back in sufficient quantities. Coordination was therefore required with local mills, but this failed to provide the assured market that farmers generally need to have confidence in growing a new crop, and Monsanto withdrew from the CHT pilot. The pilot had also gone ahead with CP, meanwhile, who replicated their northern success and built up to six contractors in the area. This example has encouraged Monsanto recently to re-enter CHT contract farming, and reports suggest they had built relationships with 10 contractors in partnership with EON.

Katalyst also began geographic expansion in Barisal and Faridpur where there was no tradition of maize cultivation, and so work creating the market was starting from scratch. They tied in maize promotion work as in the north of the country, investing in promotional activities such as RTP and farmer meetings in order to increase usage of high quality maize seed and proper cultivation techniques. These activities increased the number of maize farmers in these areas through enhancement in profitability and yield, setting the ground for improving the demand side connections. Working with Petrochem, they supported the establishment of relationships with 5 contractors to build forward market linkages and support the expansion of access to inputs. While the work has been challenging for Katalyst and their partner in these early stages, this has now grown to 8 contractors. Expansion in Mymensingh was again distinct. A similar approach to the maize promotion followed in Barisal and Faridpur was in this case not accompanied by contract farming. This was because Mymensingh, being less isolated geographically, had better forward market connections, and supporting financial access to expensive inputs was also seen to be less important here.

It is important to note that these maize promotion activities had two main facets. Interviews with KBP and Petrochem indicated that the benefit of partnering with Katalyst came in the support to organise links through marketing channels in new areas, as well as the financial subsidy to do the work. This means that they now worked with more farmers than they would have done, and were less selective about the areas in which to promote maize. As to whether they would continue these activities without support from Katalyst, seed

companies stated that they would do so but on a smaller scale.

This raises a question as to whether buying scale through subsidising existing activities of commercial companies can be justified as part of a systemic approach. The answer depends on why the subsidy is being introduced, and the likely prospect for sustainable growth. In the case of Katalyst's maize work, the scale subsidy is part of a wider vision of the geographic expansion of a systemic innovation where a certain minimum level of local production is required to introduce other players that will support forward linkages. For instance buyers are unlikely to visit an area until the quality and scale economies of doing so are justified. It also enables Katalyst to input their experience in how such work can be done in the best way to maximise benefit to the poor. A second issue important in evaluating the use of these direct techniques is the prospect of continued delivery at the same scale without subsidy. Here the interdependence of maize promotion with other work to build the market is key: if it is successful and the market grows, it will be financially viable for input companies to continue to scale up their promotion work without Katalyst's support.

## Results

**Northern regions**

The main success in the expansion of benefits of maize innovation has been through the mechanism of increasing incomes from maize through better information dissemination and stronger marker linkages through the contract farming system. At the contractor level, from eight contractors during the pilot, Katalyst supported CP to expand to 35 contractors. Organic growth thereafter funded entirely by CP's own investment has increased the contactor numbers to 65, according to CP's report to Katalyst in 2015.

More contractors have brought in more farmers, and each additional actor further embeds the improved supporting functions across the region. Subcontracting farmers often drive expansion into the relatively inaccessible but productive chars regions. The contract farming intervention was subject to an impact evaluation published in 2013 (de Ruyter de Wildt et al, 2013). The numbers of farmers found to have been impacted directly at that stage was 5,789, and the number impacted indirectly was 23,428, which illustrate how the benefits of the improved system expand beyond those directly involved in contract farming, simply because there are now sustainable mechanisms for information distribution. The increased income for the 5,789 contract farmers in 2011 was found to be $187 per year. For indirect farmers the calculated income increase is $78 per year. The most recent figures from ongoing partner monitoring suggests the number of direct beneficiaries has grown to 10,000 farmers in 2015, with a likely associated increase in indirect benefits.

Zakir Hossain is one of the original eight contractors. Known to Katalyst and CP through retailer training, he started contracting with 50 farmers and now works with more than 200 farmers. He reports that 25 of those farmers subcontract to other farmers. To provide inputs to this network, he buys 17MT of seeds per year, provided on credit by CP.

The early signs of impact for summer maize, a much more recent intervention not associated with contract farming, are similarly impressive. Preliminary assessments undertaken by Katalyst suggests almost 42,000 farmers had adopted *kharif* maize as a result of their activities, with a reported net average annual income increase to each farmer of USD80. The speed of uptake of this new product reflects the better performing information and

input supply functions supporting transactions in the maize system, and would certainly not last without the improved forward linkages.

**Southern regions**

Early indicators suggest that Katalyst support for expansion of maize cultivation activities in the South has made significant inroads. Based on outreach numbers through retailers and a small sample survey, the early signs of impact reports indicate around 8,000 farmers receiving increased income of around USD115 in each of Mymensingh and Barisal and Faridpur.

## RESPOND: Making change stick

The systemic changes reflected in the super-contract farming model had been embedded within CP and many of their contractor change agents. Benefits of the innovation had spread to more and more farmers. Once an innovation has taken hold in this way, there are often responses in other supporting functions that can help to secure the lasting change, and that reflect the significance of the innovation because it creates new opportunities for other actors. Signs of the innovation being embedded at the partner level are related to their investment of resources in the change. Signs of embedding at the system level are similar, but the actors involved are those performing supporting functions or rules that are outside the initial innovation. As such, and as with the initial innovation and its expansion, these new actors involved in the response may require some initial support from the programme in order to recognise, and be willing to explore, the opportunity.

Katalyst noted the 'embedded' inputs on credit within the contract farming model were not being extended through to enough farmers, so the supporting function of finance required adaptation to meet the needs of poor farmers and enable further expansion of the innovation to those without sufficient resources to purchase inputs. The improved functioning of the maize system had created opportunity for financial actors to generate profitable products to target maize farmers, but they were yet to exploit these opportunities due to internal policy restrictions and perceived risks. Chars farmers were particularly underserved: financial service providers did not see the char farmers as suitable to loan money to, due to their char lands not being considered viable collateral, and the high administration costs of providing financial services to remote communities.

Katalyst worked with Agrani Bank and National Credit and Commerce (NCC) Bank to design a new financial product, a dedicated credit line focused on potential contract farmers for whom the contractor would provide a guarantee. The partners were selected on the basis of their incentives and capacities to serve the target market: they had strong rural presence, staff capable of accessing the chars, and provision to

loan directly to farmers, as well as being motivated to develop the product.

### Results

When it came to implementing the pilot, several adaptations were made. Contractors were reluctant to take on all the risk for non-repayment, and so organised a group collateral system to reduce their risk. The system has been successful, with a repayment rate of more than 70% for the branches surveyed, especially when compared to other products in the subsidised agricultural loan category that all banks are required to make. Indeed, following the pilot, ABL allocated USD130,000 for five of its branches to scale up the product. But there are two caveats: first, the regulation-driven incentives present at the bank headquarters are not felt so strongly at the branch level, meaning the incentives to roll out the product are not always present with those tasked with doing so; and second, private banks will not be emulating the model until it has the chance to be effective at commercial rates.

As a result, expansion has been slow at the farmer level. Delays in delivery of the product relative to crop cycles have made it frustrating for farmers, and banks have been slow to operate in new areas. Despite the clear potential of the model, its delivery through the pilot has relied heavily on Katalyst support and new actors capable of supporting the connections between farmers, contractors and the banks may be necessary.

The important aspect of this financial *Respond* intervention is that it reflects Katalyst's continued monitoring and evaluation of not only interventions but also the wider system. They saw the opportunity to increase benefits through the finance supporting function. While small-scale agro-finance was a notoriously difficult area in which to intervene, the innovation did result in more than 200 loans distributed, and the project has been handed over to the partners to pursue further.

## Summary of impact and specific lessons

This case has outlined the diagnostic process and subsequent interventions undertaken by Katalyst through the AAER framework, and there is no doubt that how tens of thousands of farmers have derived substantive benefits from these interventions. Further, it is clear that much of this benefit has been realised from the sustainable improved functioning of the system in the North, while there are clear reasons for optimism the same systemic innovation will become sustainably embedded in the South. The timeline below

**Figure 8: Timeline of interventions in the maize sector**

| COMPONENT | INTERVENTION | Year | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| ADOPT | Maize promotion and RTP | | | | | | | | | | | | | |
| | Contract farming | | | | | | | | | | | | | |
| | Super contract farming | | | | | | | | | | | | | |
| EXPAND | Geographic expansion: Chittagong Hill Tracts | | | | | | | | | | | | | |
| | Geographic expansion: Barisal and Faridpur | | | | | | | | | | | | | |
| | Geographic expansion: Mymensingh | | | | | | | | | | | | | |
| | Summer maize | | | | | | | | | | | | | |
| RESPOND | Finance | | | | | | | | | | | | | |

illustrates how this AAER process used to articulate this change process is not sequential. For instance, the finance intervention in Respond was based on increased understanding of the market rooted in experience from the Adopt interventions.

Two specific lessons may be drawn from this case for the application of systemic change. First, there is sometimes a perception that systemic change is reliant on the expansion of the number of partner-level firms emulating the change. In the case of contact farming, there was only one firm with the correct incentives and capacities to provide an effective contract farming. Yet this knowledge, that became clear during the pilot, did not deter Katalyst from pursuing the intervention because scale may be achieved by intermediary scale agents without emulation at the partner level. The case also illustrates how an effective system may promote the emergence of additional levels of scale agents, though not necessarily intended by the program. These additional agents – in this case the farmers who sub-contracted – may help expand the benefits of the system down to poorer or more diverse beneficiaries.

Second, the issues in expanding maize cultivation clearly illustrates important boundaries that may exist within a wider system. Interventions are often set up at the national level, but, while there are usually important national-level supporting functions and rules, those most relevant to the required innovation may be very distinct between different regional and more localised production and exchange systems. Detailed analysis of the local characteristics of these systems is vital in understanding how the overall innovation may be expanded geographically.

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# LESSONS FOR PRACTICE AND POLICY

This case has outlined the diagnostic process and subsequent interventions undertaken by Katalyst through the AAER framework, and there is no doubt that how tens of thousands of farmers have derived substantive benefits from these interventions. Further, it is clear that much of this benefit has been realised from the sustainable improved functioning of the system in the North, while there are clear reasons for optimism the same systemic innovation will become sustainably embedded in the South.

## 1. Systemic change is not sequential

The timeline of interventions illustrates how the AAER process used to articulate this change is not sequential. For instance, the finance intervention in Respond was based on increased understanding of the market rooted in experience from the Adopt interventions. In the ideal scenario, a pilot intervention would result in spontaneous replication, emulation, and response from other supporting functions to lead to significant benefits to the whole of a target group. In reality, however, change is unpredictable and will usually require further intervention in order for the potential benefit to be realised. It is possible that response may happen at a small scale with, for example, local institutional players responding to a change in behaviour of a single firm in a pilot. However, if this change is to have the desired systemic impact, it will need to be followed by subsequent expansions and other responses which will not happen sequentially.

## 2. There are multiple dimensions to the expansion of impact

As outlined in the introductory chapter of this case, expanding the impact of interventions has multiple dimensions and, as demonstrated by Katalyst's work in maize, each provides a separate opportunity to increase impact.

There is sometimes a perception that systemic change is reliant on the expansion of the number of partner-level firms emulating the change. In the case of contact farming, there was only one firm with the correct incentives and capacities to provide an effective contract farming. Yet this knowledge, that became clear during the pilot, did not deter Katalyst from pursuing the intervention because scale may be achieved by intermediary scale agents without emulation at the partner level. The case also illustrates how an effective system may promote the emergence of additional levels of scale agents, though not necessarily intended by the program. These additional agents – in this case the farmers who sub-contracted – may help expand the benefits of the system down to poorer or more diverse beneficiaries.

An additional dimension to the expansion of impact in maize, however, was in attempting to enter new geographies. So it *expand* in this case consisted of the expansion of scale in a partner firm's operations, changing the model to introduce new types of player, and introducing new geographies. It didn't, however, adopt the normal focus of introducing competing players, as it was determined that, at this point, there was only a single player with the appropriate capacity and incentive to affect change.

## 3. The boundaries of a system are varied and defined by common supporting functions and rules

Related to the lessons around the expansion of impact, the problems encountered in expanding maize cultivation clearly illustrates important boundaries that may exist within a wider system. Interventions are often set up at the national level, but, while there are usually important national-level supporting functions and rules, those most relevant to the required innovation may be very distinct between different regional and more localised production and exchange systems. Detailed analysis of the local characteristics of these systems is vital in understanding how the overall innovation may be expanded geographically.

Bangladesh consists of several different systems and so there was scope for increasing impact by working with the same supporting functions and rules in different parts of the country, with contextually specific modifications to the model. One of these included some direct intervention in the supporting function of maize promotion in order to create a market, which was not a universal issue in the country. This highlights that time is also a crucial factor in the decision as to how a programme engages. The direct promotion of the seed was seen as necessary to create a critical mass of supply and demand in order to generate impact in a relatively short timeframe.

## 4. Feedback loops can help to refine business models

Monitoring can sometimes be interpreted as delivering a verdict on whether a given intervention 'works'. The inference from this being that if an intervention isn't delivering then the intervention is wrong. Programmes are set up in different ways with some grouped around sectors, some around functions, and some around outputs. Had Katalyst's model been based, as many are, around interventions, it is likely that contract farming would've been seen as a failure.

However, the sensitivities of Katalyst's monitoring meant that the monitoring process itself could adapt to consider wider sectoral dynamics. This allowed for some assessment of causal pathways showing why a given intervention wasn't working. In concrete terms, this meant that the initial contract farming model was shown to have limited potential for scale up, and so the super-contracting model was developed.

## 5. Understanding systemic change

Finally, this case study has demonstrated the utility of AAER in understanding systemic change. Programmes are organised in different ways and even within Katalyst, the definition of an *intervention* is not always equivalent between sectors or across phases. Nevertheless, AAER shows how a range of different supporting functions and rules are changing, the sustainability of that change and whether it is impacting on sufficient numbers of the target group. AAER should not be used, then, for the assessment of whether a product, a service, or a pre-determined behaviour is changing and being replicated. It's about understanding what change needs to happen for your target group and changing the functions and rules in different ways so that it can have a greater impact on more of them. These functions and rules may change independently but observing these changes and the impact they have on the system is a key role of a market development programme.

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