# What is systemic change? Three components of a measurable definition

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# 1. INTRODUCTION AND RATIONALE

We have seen more than a decade of implementation of market systems development (MSD) programmes with the explicit goal of 'systemic change'. Yet there remains no precise definition as to what systemic change actually is. This paper contends that part of the reason for this absence is the nature of the concepts at our disposal for understanding systems. Using Mechanisms of Social Change (MOSC) as a conceptual framework for defining systems, the paper sets out both the nature of systems and the characteristics of system change that must be considered in defining systemic change.[3] This solves only part of the problem: defining what changes will be considered 'systemic' requires a subjective exercise of drawing lines in the sand. This paper goes only so far as to provide a conceptual sandpit.

The market systems field is well endowed with concepts expressed at the 'system' level. These have been useful in building the field of systems approaches to development, defining what these approaches entail, and providing general guidance as to how to go about doing MSD. This paper seeks to contribute to a definition of systemic change through use of systems concepts that readily translate to the actor level. This is pragmatic because it is actors who perform the actions that comprise a system, and it is actors whose behaviour change will contribute to purposeful change of the system, and it is actors from whom we will gather data when we seek to measure whether, how and why a system has changed.

Building on this actor-level framework, the paper sets out the components of systemic change that need to be defined in order that it may be more effectively measured. There are three components. The first two components relate to the nature of the system itself, as measured at various time periods. Component 1 incorporates how the system has changed, and Component 2 incorporates how the system responds to ongoing changes. Component 3 incorporates to how changes to the system relate to programme intervention. Section 4 of this paper is structured around these three components of a definition of systemic change. Prior to that, sections 2 and 3 briefly set out for the understanding of systems and system change used in the paper.

# 2. NATURE OF THE SYSTEM

There are several definitions of systems in the MSD literature. The Springfield Centre describes a (market) system as a *'multi-function, multi-player arrangement comprising the core function of exchange by which goods and services are delivered and the supporting functions and rules which are performed and shaped by a variety of market players.'*[4] MarketShare Associates suggest, citing from the complex adaptive systems literature, *'A system is a group of agents that interact with each other, producing emergent patterns of collective behaviour.'*[5]

A key element of these definitions is that systems incorporate change processes. They 'deliver goods and services', and 'produce emergent patterns of behaviour'. This conception of the system as a

[3] Lomax, J. (2018). *Mechanisms of Social Change: an actor-level framework for representing and understanding system dynamics.* 3sd Research Briefing Paper 1.
[4] Springfield Centre (2014) Operational Guide 2nd Edition.
[5] Miller and Page (2007) Complex Adaptive Systems. Cited in USAID (2016) Disrupting system dynamics: a framework for understanding systemic changes. LEO report no. 47

process, rather than as a network of actors, will be emphasized here. The system definition set out here does comprise actors, but only because of what they do. Actions come first.

A system may, then, be seen as an aggregation of actions taken by people – whether as individuals, or as part of firms, households or other organisations – or by nature. Actions here are transfers (changing ownership) or transformations of economic resources.[6] Each action is done 'to' a resource: for instance, growing maize, educating people, inoculating cattle, eating food, mining coal, burning firewood, sharing information, paying taxes, punishing criminals, and so on.

For the purpose of this paper a system will be defined as *a change process, comprised of a set of actors*[7] *performing actions that are directly or indirectly connected to one or more specified actions of interest*. The system is delimited subjectively through the selection of sets of actions and actors. The starting point is usually one or more 'focal' actions (and actors) in which we seek improvement as an end-goal. The system will be defined to include some or all of those actions deemed to have importance to the focal action, and including the focal action itself. Actions have importance usually because they are linked to the focal action – either producing resources required as inputs for the focal action, or making use of outputs from the focal action. It is often analytically useful to describe sets of actions as 'functions' to encompass the range of actions taken by a specific actor or set of actors. For instance, buying inputs, producing maize and selling maize may be aggregated into the 'maize farming' function performed by farmers.

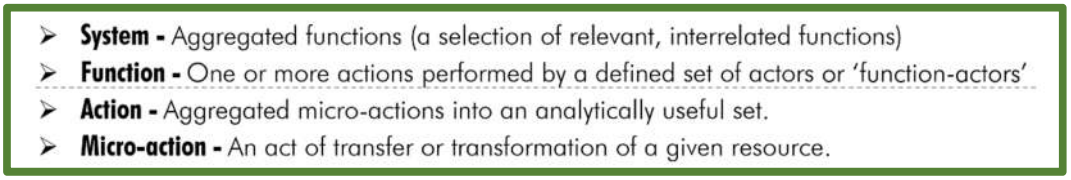


*Figure 1: Levels of aggregation within a system – extract from Lomax (2018)*

The system can then be represented as a set of interconnected actions, each of which has one or more associated actors. The actors in each function may be disaggregated according to their business model, gender, poverty status, location, or any other feature of relevance.[8] For each actor involved in a given action, there is a pre-action resource state, a pre-action decision, and a post-action resource state.

Take the stylised system represented in Figure 2 below for example. Actors in the maize seed distribution function sell seeds to retailers, who in turn sell them to farmers. Farmers produce maize, which they sell to aggregators, who in turn sell to mills.

[6] Resources are defined as including human, physical, natural, informational or financial resources. See the MOSC framework (Lomax 2018) for more information on these and for a breakdown of types of transfer and transformation, and for more detail on the diagram structure used on p4.
[7] Nature may be included as an 'actor'
[8] The disaggregation of functions by types of function-actor should be conducted according to one or both of the interests of those analysing or seeking to improve the system, and the functioning of the system.

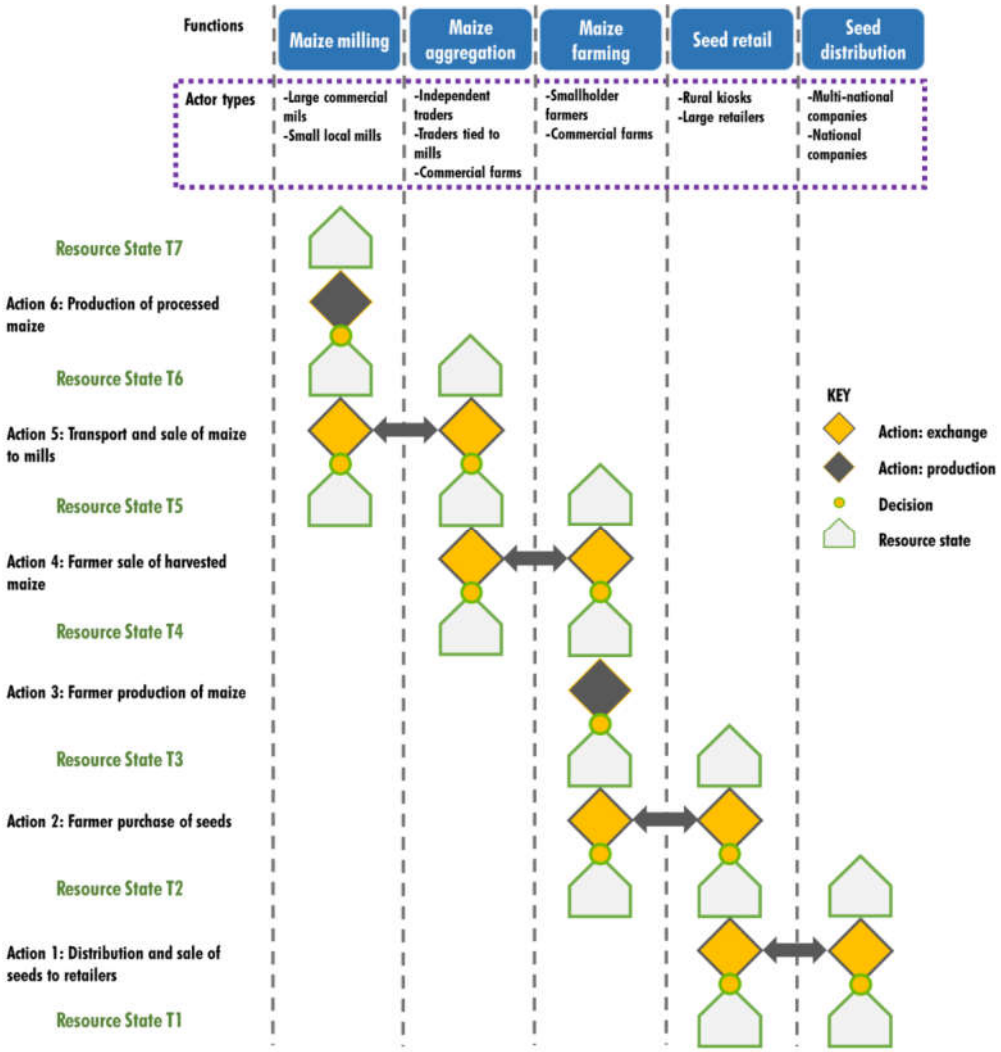


*Figure 2: MOSC system diagram – extract from Lomax (2018). The diagram reads from the bottom to the top.*

Using this framework, the nature of the system at any point in time (which will be referred to as the 'system state') can be described in consistent, measurable terms. Some of the most important elements are encompassed in the performance of the system and the nature of actors and actions within the system.[9]

*Performance measures include:*

- Resource outcomes of one or more specified action that comprise a function. This is measured in quality, quantity, rate or timing.[10] Performance may refer to specific actor types within a

[9] We may also, in principle, consider the nature of decisions to be a component of systems and therefore also of systemic change. For instance, if there is a perception that greater benefit or fewer losses would be derived from behaviour change, this might be considered proof of systemic change. This is how a change in norms would be manifest in system functions. Analysis of decisions will of course be key to identification of system constraints, but according to the framing presented here a change in perceptions of likely outcomes would not be considered systemic change here unless it actually ends up in behaviour change.

[10] See section 4.1 for more discussion on these. Further explanation is available in Lomax (2018).

function or overall. For exchange actions we may be interested in outcomes for both function-actors.
- Resource inputs for one or more specified actions that comprise a function. This is measured in quality, quantity, rate or timing. And it may be for specific actor types or overall.

*Composition (actors & actions) includes:*

- Function composition: the functions that are present in the system, the functions that we might wish to see as part of the system that are absent, and the actions that comprise these functions.
- Business models: analysis of micro-actions that comprise important actions, alongside analysis of actor types reveals how things are done within the system (i.e. the business models)
- Actor composition: independent of business model, we may be interested in how much of a given action is performed by a particular actor type – for instance how much maize production is done by women.

# 3. NATURE OF CHANGE IN A SYSTEM

The system definition section above has suggested that performance and composition of systems are the key observable elements of system states. This section provides a basic framing, at the actor level, of changes that underlie change in performance and composition of the system.

## 3.1 CHANGE OF EXISTING FUNCTIONS

When change happens, it will be in *whether* and *how* actors perform actions at $t_1$ relative to $t_0$. This is interesting at the system level if it comprises an important alteration in *whether* and *how* a function is performed at $t_1$ relative to $t_0$. There are four ways in which actions within a function may change.

1. Actors who are part of function start performing function (differently).
2. Actors who are part of function stop performing function.
3. Actors who are not part of function start performing function (similarly to existing actors).
4. Actors who are not part of function start performing function (differently to existing actors).

The first and last of these involve both *whether* and *how* the function has changed. The second and third only involve *whether* behaviour has changed. This is explained further in the following table. Because *how* actors perform a function relates to 'three whats' (*what they do, to what, using what*), it is a reflection of inputs as well as process.

| Ways actors change existing functions | Δ *what they do* | Δ *to what* | Δ *using what* |
|---|---|---|---|
| Actors who are part of function start performing function (differently). | Behaviour change | Primary resource input change | Other resource input change |
| Actors who are part of function stop performing function. | Behaviour change | n/a | n/a |
| Actors who are not part of function start performing function (similarly to existing actors). | Behaviour change | n/a | n/a |
| Actors who are not part of function start performing function (differently to existing actors). | Behaviour change | Primary resource input change | Other resource input change |

*Table 1: Types of change to existing functions*

The 'primary resource' here is the resource or resources being transferred or transformed. 'Other resources' are those used in that process. A change in how a function is performed can involve one or more of these. For instance, change in the 'production of maize' function might involve using different seeds (primary), using different fertilizer (other) and/or doing something different with how seeds are planted (behaviour change).

Sometimes using a different input will necessarily imply a change of behaviour by the same actor. If I start using a tractor instead of an ox, this affects 'what I do' as well as 'using what' for two reasons. The act of ploughing is materially different with a tractor, and the action of sourcing a tractor is also a required prior behaviour change in the exchange function preceding ploughing.

Importantly, sometimes change in a function can occur without any change in behaviour within that function. If the brand of seeds a farmer buys this season have improved and have better germination rates than the same brand's batch of last season, performance may improve without the farmer having done anything meaningfully different.

## 3.2 EMERGENCE OF NEW FUNCTIONS

System change may be more than just function change, however, and may also include new functions that emerge as part of the system. For example, there may be a lack of co-ordination between fruit producers and fruit processors leading to market gluts and insufficient supply. Once this is identified, a new production co-ordination function may emerge as actors within or outside the system take on this role.

In practice, whether a function is considered to be 'new' is likely to be subjective. Most actions will be being done at some level within a system, and defining whether such actions performed infrequently or inadequately comprise a meaningful function will be a matter for the analysts involved. Often the definition of a 'new' function corresponds to new or specialised actors beginning to perform that function, and doing so with a different business model. While this is reasonable, care should be taken not to overlook existing actors performing that function, especially those doing so informally.

As illustrated in the table below, new functions emerge by definition only if actors who are not part of the function start performing that function. This will likely entail a change to what they do as well as to primary and other inputs.

| Ways actors create emergent functions | Δ *what they do* | Δ *to what* | Δ *using what* |
|---|---|---|---|
| Actors who are not part of function start performing function (differently to existing actors). | Behaviour change | Primary resource input change | Other resource input change |

*Table 2: Types of change in emergent functions*

System changes – whether emergence of new functions or change of existing functions – are driven by what we will refer to as 'change resources'. These are a specific type of resource that drives change in a system: they may be new or different primary or other input resources, or resources that drive behaviour change. The latter will often be in the form of information – for instance driving expectations about outcomes from a particular behaviour change. The production and exchange of change resources may be represented as a system in a similar manner to that described in Section 2. Such a system, where a development programme's change resources were the focus, would be similar in content and purpose to a results chain or theory of change.

# 4. COMPONENTS OF A DEFINITION OF SYSTEMIC CHANGE

Building on this conception of system states and system change, this section sets out three components we may wish to consider in any measurable definition of systemic change. This section will build on a basic model of two system states: a baseline pre-intervention system state (*A*) and a 'vision' system state (*B*) of how we want the system to be in the future. It will also consider the nature of the system change that gets us from *A* to *B*.

The three components that are outlined here are: (1) the manifest changes in system state at *B* relative to *A*; (2) the ability of those manifest changes to last; and (3) the connections between those changes and the intervention. Together these changes reflect central aspects of the aim of systemic change programmes to 'bring about lasting and large scale change', which points to the twin goals of sustainability and scale of impact.[11] Broadly speaking, Component 1 is more related to scale and Components 2 and 3 more related to sustainability.

## 4.1 COMPONENT 1: CHANGE IN SYSTEM STATE

Component 1 of a definition of systemic change is a straightforward change in system state measures between *A* and *B*. That is to say, the change in performance of functions (measured in change in quality, quantity, rate or timing of resource states), or in composition of functions (measured in change of the characteristics of actors and actions).

The performance of a function can be broken down into the various resource states that intercede the actions comprising that function. For an example, we may refer back to the simple maize system presented in the diagram earlier. If we wanted to analyse the performance of the maize farming function from that system (see Figure 3) we would be interested in maize farmers' resource states at T2, T3, T4 and T5. For each of these resource states that have prior actions of interest [T3, T4, T5] we are interested in benefits derived as outputs from those prior actions. For each resource state that has subsequent actions of interest [T2, T3, T4] we are interested in resource input constraints to those subsequent actions.

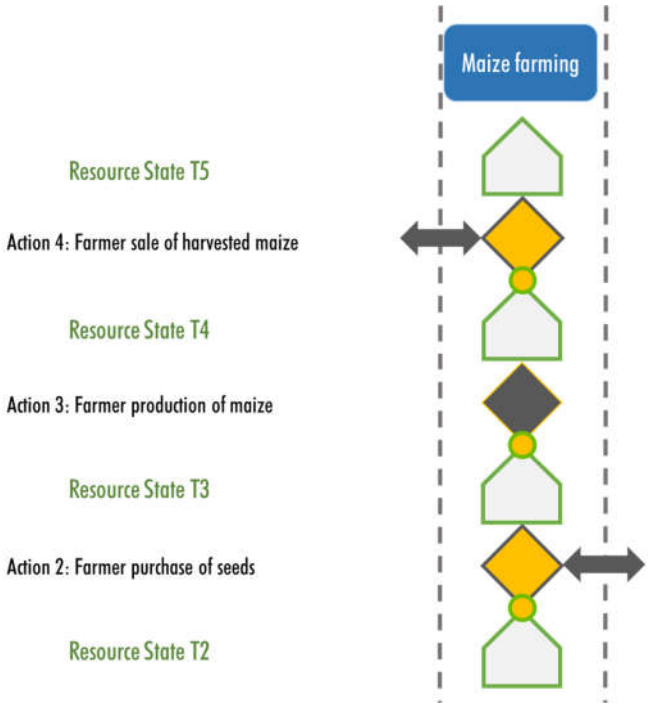


*Figure 3: The maize farming function from Figure 2*

Input constraints and output benefits are measured in the same way. Both may be measured in terms of one or more of quality, quantity, rate or timing of a given resource. Rate is equivalent to price in exchange transfers, and yield or productivity in transformations.

Changes in system performance can be positive or negative. A development

[11] Springfield Centre (2014) Operational Guide 2nd Edition.

programme will anticipate having largely positive influence on performance measures in the functions it is targeting, except with respect to functions we wish to reduce (for instance, destruction of crops by disease, malarial infection, and so on).

As well as in measures of performance, changes in system state will be reflected in observed system composition, which includes the nature of actions and who it is that performs them. For instance, in Action 3 in our example this could include change in the number or proportion of maize producers who consistently space their seeds when planting, or in the number or proportion of maize producers who are female. For Action 4 it could include a change in the proportion of harvested maize that is sold, or a change in the number of farmers who sell directly to exporters.[12]

For the purpose of MSD practice, it is likely not to be necessary or desirable (or indeed feasible) to comprehensively measure or describe all elements of the system. Rather, the focus should be on those areas where there is underperformance or otherwise a desire to deliver change. Where the intended vision system state B differs from present system state A, it would be useful to measure the relevant indicators at baseline and as they change through time.

## 4.2 COMPONENT 2: ADAPTATIVE CAPACITY AND RESILIENCE

The second component of a definition of systemic change incorporates two specific properties of system states that are related to system change. The *adaptive capacity* and *resilience* of a system determine the propensity of that system to change over time.

Resilience in this paper will generally refer to the ability to avoid reduction or loss, while adaptative capacity will refer to the ability to take action to improve or change. Both resilience and adaptation may be defined in terms of actions or in terms of resources.[13] More details and examples are provided in Table 3 below.

MSD practitioners may be interested in adaptive capacity and resilience of the baseline system state *A*, and may particularly consider how these properties of system state *A* relate to changes introduced through intervention. For the definition of systemic change, however, it is the adaptive capacity and resilience of the post-intervention system state *B* that is most important. A definition of systemic change may seek to specify, for instance, that the system left in place post-intervention should be resilient to shocks, or should be able to continue to adapt to overcome emerging threats, or take advantage of emerging opportunities.

But how will we know if this is the case? How can we measure whether a system is resilient or has adaptive capacity? In principle this can be seen as an extension of measurement principles of Component 1: resilience and adaptive capacity are properties of system states, and may be defined and measured as such. But there are additional challenges that must be faced. First, we may have to look at functions and actions external to the delimited system that we are trying to change. We need to understand resilience and adaptive capacity *to* something, and this will often be many and various external influences. Second, we are interested not only in those factors that have influenced the system to date, but also those that will do so in the future. This entails understanding how changes within the

[12] It is useful to distinguish between *changed behaviours* that may be specified in the vision state and *transformative behaviour changes* that shift the system towards that vision state.

[13] These are obviously intertwined: actions determine resource states which determine actions, and so on. This is particularly the case for adaptation which always entails behaviour change.

system will affect how it is influenced, and also how changes in external influences will affect how they influence the system. Third, many of the functions and actions whose influence we must understand will not have occurred in the system in the time elapsed between system state *A* and system state *B*, so we will have no direct way of measuring changes in these aspects of system performance.

| *Property of the system, function or actor*[14] [15] | | *Examples from training and crop protection* |
|---|---|---|
| *RESILIENCE* | **Actions** are in place that avoid loss or deterioration of input resources | As information delivered through training is forgotten, refresher training is delivered.<br>Actions are taken to protect crops from disease |
| | **Resources** are in place to maintain existing levels of action | As trainers retire, move career, etc., there are new actors who can take their place.<br>If crops are lost to disease, the actor maintains consumption levels. |
| *ADAPTATIVE CAPACITY* | **Actions** are in place that can attain more or new input resources | As new training information (for instance about agricultural practice) becomes available, the training content is updated.<br>As crop protection products become ineffective, new products are developed. |
| | **Resources** are in place to allow actors to perform actions differently, or performs new actions, or stops performing actions. | As the number of people in the system needing training increases, the training function has capacity to meet this demand.<br>If new crop diseases emerge, agricultural input importers have connections to producers of required new crop protection products. |

*Table 3: Resilience and adaptive capacity – detail and examples*

As a result, practical application of this second component to definition and measurement will not be straightforward. Understanding the many and various actors and actions within a defined system and how these change over time is already a challenge. It is harder still to go beyond that to understand what other important factors will impact the system in the future, and to estimate the likely extent of any impact.

And yet this is a key question for the strategy of MSD programmes, and fundamental to sustainability of impact, and it is necessary to address these difficult questions. It is not an abstract issue confined to definitions and measurement. There are several concrete steps that may be undertaken that will support the strategy of system change as well as aiding progress towards measurement.

The first is to delimit secondary systems that relate to the primary system we are trying to change:

- The *resilience system* that relates to selected actions in the existing or future system – focusing on actions that there is reason to think will not last, and on destructive functions that may impact significantly on system performance but have not been included in the primary system.
- The *adaptation system* that relates to important actions in the existing or future system – focusing on actions that will need to change to support resilience or to take advantage of new opportunities. Adaptation systems focus largely on the production and exchange of *change resources*.

[14] These properties of the system may be disaggregated down to the actor level in the same manner described in Section 2 above.

[15] The definitions provided here are rather generic in order to accommodate system, function and actor resilience and adaptation. It would be instructive to produce specific and separate definitions for each, but such detail is beyond the scope of this paper. For instance, adaptation at the actor level (unemployed people entering training to become agricultural practice training) contributes to resilience at the function level (sufficient trainers are in place)

Just as the primary system cannot include all actions and functions, the same is true of these secondary systems. We will only examine the resilience and adaptation systems that we define subjectively ourselves.

The second step is to estimate the performance and composition of these systems at the vision state. This may be done through analysis of performance of these systems at baseline and during system transition, combined with a theory-based approach to understanding how they will change.

Any definition of systemic change should, then, incorporate a specified set of actions and functions that determine resilience, and a set of actions and functions that determine adaptive capacity. Any attempt to measure these is likely to be partial and illustrative; it is more important that these are taken seriously for intervention strategy.

## 4.3 COMPONENT 3: CONNECTION TO THE INTERVENTION

The third component of a definition of systemic change is how that change came to be effected, especially with relation to development programme efforts to engender change. This may be an important component of a definition because we are likely to want to know if it was our interventions that caused these changes. And we will want to know whether the changes will last once we stop our interventions.

There are two broad parameters for the connection between change and programme intervention. First is the connection with programme *action*, and second is connection with programme *logic*. The basic principle is that programmes can stimulate change in behaviour of actors within the system, which in turn may stimulate further change on the part of other actors. These changes may be in line with those anticipated by the programme, but other changes are also likely to emerge, some of which may be positive and some negative. Likewise, changes in the system may occur that are in line with programme logic but completely unrelated to programme intervention. If, with regard to any particular change, we might have a language to express important types of connection with programme logic and programme intervention, this will provide a framework for analysing systemic change and the role of a programme in inducing that change.

Table 4 below categorises behaviour changes according to links to intervention. Eight relevant categories are proposed, based on four different types of connection to intervention resources, and three different types of connection to intervention logic.

The four types of connection to programme intervention are **performed, induced, reaction,** and **unrelated**. The first and last of these are quite straightforward. In the first case (**performed**) the changed behaviour is performed by the programme itself or by contracted agents of the programme.[16] In the last case (**unrelated**) the changed behaviour came about for reasons unconnected to the programme.

The other two categories are less easily distinguished. **Induced** refers to behaviour change realised due to changes in capacity provided by the programme, information incentives received from the programme, or actual incentives provided by the programme. Behaviour change in **reaction** refers to situations where no resources have been received from the programme, and changes in incentives

[16] It is interesting to consider where the programme ends and the system begins. One possible definition is where all costs of an action are born by the programme, it is in effect the programme outsourcing action and so directly performing that action.

that drive the behaviour change in question are *structural changes* – that is new opportunities or threats in the actor's operating environment that are indirectly linked to the programme. For behaviour change to be considered a reaction there needs to be at least two 'degrees of separation' from the programme.[17][18]

| Relationship of change with programme action | | | Relationship of change with programme logic | | |
|---|---|---|---|---|---|
| Type | Description | Degrees of separation from the programme | Follows intervention logic | Does not follow intervention logic (within system) | Does not follow intervention logic (outside system) |
| **Performed** by programme | Action performed by the programme [no behaviour change] | 0 degrees | Performed intended | N/A – illogical actions by programme. | N/A – very unlikely. |
| **Induced** by programme actions | Actor changes behaviour because of resources (i.e. capacity, 'informational incentives', or programme-provided incentives) provided to that actor directly or indirectly, due to actions of the programme | 1 or more degrees | Induced intended | Induced unintended | Induced outside |
| **Reaction** to programme actions | Actor changes behaviour because of structural incentive changes that follow indirectly from programme action | 2 or more degrees | Reaction intended | Reaction unintended | Reaction outside |
| **Unrelated** to programme actions | Actor changes behaviour for reasons unrelated to the programme [definition of 'unrelated' in terms of degrees TBC] | Unrelated to programme | Unrelated, relevant | N/A – this is all other behaviour change that impacts on the system | N/A – this is all other behaviour change by any actor in any system |

*Table 4: Relationships between change and programme intervention*

Changes to the system may be in line with the logic of the intervention – and are for the most part intended changes. It is also important to consider *unintended* changes to the system, positive or negative, that result from the programme's actions. Finally, the programme may cause behaviour changes beyond the system of interest, which may nevertheless be important.

For the purpose of definition of systemic change, the main consideration is deliberate changes in the system, and unrelated changes to that system. We will want to know which of the 'Component 1' changes in the system happened as a result of the intervention. One approach would be to define

[17] The 'six degrees of separation' idea first expressed by a character of Karinthy is a useful analogy for connections of any behaviour change to the instigating causal action by a development programme. For Karinthy, it was merely the act of being acquainted with another individual that formed each link in the chain. Here, three actions - provision of resources, informational incentives, or direct incentives - provide the links in the causal chain between actors in shaping behaviour change. These are the actions that 'induce' change as outlined above.

[18] It will not always be straightforward to differentiate between 'induced' and 'reaction' behaviour changes. If the programme persuades partners to adopt a new business model through provision of information about possible benefits, that is induced (1 degree). If their competitors copy the business model because of information about possible benefits attained indirectly, from programme partners, that is induced (2 degrees). If the competitors copy the same business model, but are motivated instead by fear of a loss of profitability, this would include both a 'reaction' (2 degrees) motivation and also 'induced' (2 degrees) behaviour change because of the indirect information about the business model that came originally from the programme. If those same fearful competitors adopted a different, new business model, motivated by the threat of loss of business this would be reaction (3 degrees).

sub-groups in each function according to the nature of the connection of those actors to the intervention, based on the typology set out above.

There are also implications beyond the attribution question. If important behaviour changes that will need to be maintained in the vision system state are performed by the programme, or are otherwise reliant on programme-provided resources, this is likely to have implications for sustainability. It will also be more challenging for many interventions to reach scale without the 'reaction' changes that do not rely on programme-provided resources.

# 5. CONCLUSION

This paper has sought to contribute to efforts to measure the impact of market systems development programming through setting out the components of a detailed definition of systemic change: the nature of the system change; the nature of how the system responds to change; and the relationship between change and external intervention. Because the underpinning MOSC framework sets out explicitly the connections between the actor level and the system level, it is hoped that this will improve the ability of those implementing system change programmes to better define, articulate and measure the 'systemic' aspects of their impact. Further, specificity as to the composition of a definition may add substance to debates as to what is different about systemic change programming, and support learning efforts between such programmes as to what works in what contexts.

While this paper doesn't seek to go so far as to define systemic change, it is possible, using the components specified, to set out what any definition would look like:

- First, there ought to be some measurable change in the performance and/or composition of one or more of the functions that comprise a system. A definition may articulate some minimum proportion or absolute amount of change to specify that 'systemic change' is non-trivial, and perhaps also a number of functions in which we ought to see change.[19] A definition for application to MSD programming might also specify that positive change should occur in functions performed by poor or disadvantaged groups.
- Second, important actions in a 'systemically changed' system ought themselves to have supporting systems in place that ensure they are resilient and adaptive to important sources of ongoing change. This should include resilience to cessation of the intervention, but beyond that these may be most readily defined in application to a given context. For a general definition more work is needed in this area. For instance, it would be useful to articulate what constitutes an 'important' action or ongoing source of change.
- Third, the changes introduced to the system and measured in Component 1 ought not to be performed by the programme and should to be attributable to the programme's intervention.[20] Further work is needed to be able to articulate what criteria and methods should be used in establishing attribution.

[19] This paper has also assumed that functions and actions to be included in systems are selected subjectively. Proscriptive definitions of systemic change may need to set out criteria as to what would justify this selection.

[20] In principle this is not necessary to say that a system has 'changed systemically'. However, in practice most of those interested in defining whether or not change is systemic are those involved in funding or implementing interventions to achieve this.

This conception of systemic change points to several practical implications. Existing measurement systems that focus on tracking a narrow intervention-centric logic of change are unlikely to be up to the task of measuring change in function or system performance, except in the case of entirely new functions. The methods currently in place for understanding pre-intervention system performance are also often inadequate if we want to understand whether systems have changed. Market system diagnostics are often conducted in an ad-hoc manner with little in the way of articulated research methodology. The data that is collected and analysed for the market system diagnostic is rarely integrated into any kind of baseline measure of system performance.

This paper has sought to express systemic change concepts in real-world, tangible, actor-level terms as a contribution to efforts to conceptualise systems such that they may be better understood and measured. The risks if we do not improve our ability to clearly understand systems and systemic change go beyond definitional issues related to measurement of impact. Failure to correctly assess the system and function underperformance will lead to failure in strategy. Failure to correctly assess actor level constraints to behaviour change will lead to failure of intervention. The ability to transparently assess the components of systemic change is important not only for effective measurement of whether it has happened, but for the whole exercise of designing interventions that achieve sustainable impact at scale.