

## **Scale, Complexity and the Representation of Theories of Change**

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International aid agencies face major problems when attempting to evaluate their achievements. Activities, intended beneficiaries, partner institutions and social contexts are diverse because of their global scale. How can agencies' 'theories of change' be adequately represented in summary forms that respect the complexity and diversity? This article, the first of two, looks at a range of types of change processes and how they can be represented. It starts with linear processes, traditionally represented via the Logical Framework, and ends with network processes. The solutions proposed are informed by three related cross-disciplinary theoretical perspectives: evolutionary theory; complex adaptive systems; and social network analysis. Examples draw on the author's consultancy experience with international development aid programmes in Vietnam, Bangladesh, Cameroon and Burkina Faso.

**KEYWORDS:** complexity; logical framework; representation; scale; theories of change

In my own thinking they have never been separate. Motivation for the purer theory came almost exclusively from preoccupation (and fascination with) 'applied' problems; and the clarification of theoretical ideas was absolutely dependent on an identification of live examples. (Schelling, 1980: vi)

### **The Problem of Scale and Complexity**

How can large aid organizations operating in dozens of countries make global-level assessment of their performance? How can the necessary diversity of practice on the ground be reconciled with the need for a single coherent analysis within global headquarters? Problems of scale are faced by all organizations, but they are especially acute in international aid organizations. Even the most basic common measures of performance like profitability in the private sector (disputed as that measurement might be) are not available. These difficulties can have consequences. Internally it will be more difficult to influence decisions about the allocations of resources on the basis of past evidence of effectiveness.

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Externally reports of the inability of the aid organization to 'know what it is doing' may hinder the ability to make effective claims for additional public funding.

These difficulties are real and present. The UK Government's Department for International Development's (DFID) recently commissioned Development Effectiveness Report, concluded that it was not possible to make any sound global statements regarding DFID's impact (Flint et al., 2002). Over the last two years the largest international non-governmental organizations (NGOs) in the UK have been negotiating with DFID's Information and Civil Society Department about the contents of their new Programme Partnership Agreements, which are global in scale and involve substantial funding. These agreements not only require specific goals, but also documentation stating how each NGO will assess its performance in relation to these goals over the lifetime of the agreement. Their inability to do so could have a significant effect on their future funding by DFID when the agreements are due for review and renewal.

Economies of scale, in managing transaction costs, are an incentive to scale up levels of funding per aid organization. But what should happen if increasing scale is associated with increasing uncertainty about the results of those investments? In the longer term, the ability to measure effectiveness on a large scale is relevant to wider discussions about the limitations of aid agencies as a form of organization, and the relative merits of those that are operating on different scales (global, regional, national and local).

### **The Response**

This article will argue that problems of *representation* are at the base of the scale problems outlined above. How can aid organizations represent the complex processes of change that they are engaged with, at local, national and international levels, along with a host of other actors, many of whom do not share the same objectives? Without adequate representation it is much more difficult for an organization to propose, test and improve its 'theory of change', and to communicate this refined knowledge to others, enabling its wider use and impact.

There are two theoretical constraints on the type of representations. In 1956, Ashby proposed his Law of Requisite Variety, which stated that a model (i.e. a representation) can only represent some aspect of reality if it has sufficient internal variety to capture the complexity of that reality. The question then is 'are the ways in which aid organizations seek to represent change sophisticated enough given the nature of the change processes in which they are involved?' Alternatively, consider 'Ockham's razor': the law of parsimony. This emphasizes the need for economy of description: there should be no more complexity than is minimally necessary. Scalability helps address this requirement. One needs to ask if there are some ways of representing change that can only work up to a certain scale, in the same way that central planning within firms and states has its limitations. Or are there some ways of representing change that are scalable, from the village to global level?

In this article an attempt is made to address both constraints. First by opening up a wider range of options in addition to the use of Logical Framework, the

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single most widely used device for presenting a summary description of what aid programmes are trying to achieve (Gasper, 1997, 2000). The theoretical justification for doing so comes from an ecological perspective on learning (Johnston and Pietrewicz, 1985). In the biosphere as a whole there is no one way of learning about the environment. Different sensory capacities have developed in different contexts, and these are associated with different neurological structures. It would be useful to think about how we can adapt our representational devices to the different environments in which they are being used, and not insist on one standard model. The second article will look at the potential for network models to provide a scalable perspective without losing the capacity to adapt representations to particular circumstances.

### **Types of Change Processes**

If we want to develop improved ‘theories of change’ then we should think about change processes at a generic level. Typologies are a good starting point. Typologies are not theories, but they are often the basis of theories. Darwin’s theory of evolution was built upon the vast prior effort of others spent classifying types of animals (into species, genera, etc.) and classifying periods of geological time.

Different types of change processes can be tentatively located on a continuum of structure. At one end there are relatively simple linear processes; at the other end, complex networks.

The types of change processes that will be discussed are:

- linear processes with varying numbers of stages;
- linear processes with branching structures;
- simple parallel processes;
- interacting parallel processes;
- reiterated processes.

A sixth type, networks of reciprocal influence, will be discussed in the second article.

#### ***Linear Processes with Varying Numbers of Stages***

The most well known device for representing linear processes is the Logical Framework. The use of the Logical Framework has been well explained (in how-to-do-it form) by Coleman (1987), and well analysed (in terms of how it has been used) by Gasper (1997, 2000). The use of the Logical Framework amongst development agencies is so widespread it can be treated as a practice benchmark, against which alternatives can be assessed. The Logical Framework is one of a larger class of similar tools called ‘program logic models’ (see the bibliography by den Heyer, 2001).

The Logical Framework describes a process of change having four stages; the Kellogg Foundation’s Logic Model has five stages (W. K. Kellogg Foundation, 2000); and Bennett’s hierarchy has seven stages (Bennett, 1975).

In all three models the stages are described as abstract categories. They are:

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- ‘activities’, ‘outputs’, ‘purpose’ and ‘goal’, in the Logical Framework;
- ‘resources/inputs’, ‘activities’, ‘outputs’, ‘outcomes’, and ‘impact’ in the Logic Model;
- ‘inputs’, ‘activities’, ‘people involvement’, ‘reactions’, ‘KASA changes’, ‘practice change’, and ‘end results’ in Bennett’s Hierarchy.

There have already been numerous criticisms of the Logical Framework, with many arguing for its abandonment (Earle, 2003), and others arguing for adapting and improving it as a tool, or simply more skilful use (Kothari, 2000; Gasper, 2000). Arguments for its rejection typically stress how the world is not linear, mechanistic and predictable; but rather chaotic, complex and unpredictable. However, our world does include some fairly ordered environments where a relatively simple and linear view of expected changes is appropriate. The world is indeed complex, so much so that it includes areas of chaos *and* order, and complexity in between (Kauffman, 1995).

The challenge therefore is to be able to recognize those environments, where the Logical Framework is an appropriate tool. The use of the Logical Framework is uncommon, even within organizations that make wide use of it, in descriptions of country programmes and of global strategies. Examples I am most familiar with are the DFID country strategies in Vietnam and Bangladesh. The most plausible explanation of this non-use is the diversity of interests within aid organizations at the country (and higher) level arising from the scale of those aid programmes. Instead of log-frames, lists of objectives are often found, with relatively modest attention paid to how to monitor their achievement.

At the other end of the scale Logical Frameworks are still being used quite widely in contractual relationships between aid agencies and their partners, and also with consulting companies providing project management services and the like. These environments have relatively small numbers of actors, the relationships between them are expected to be relatively stable and predictable, and the period of time involved is relatively short and well defined. The typical pattern of Logical Framework use is also bounded. When DFID makes use of Logical Frameworks in its ‘Output to Purpose’ reviews of projects the focus is on the outputs the partner has produced and how they have been used or responded to by the intended client or beneficiary, defined at the Purpose level. Attention to Goal-level changes is relatively uncommon, and often left until the end of the project period.

There are nevertheless problems with the use of the Logical Framework. Arguably the most significant of these is the difficulty of communicating what the Logical Framework is about: how all the columns and rows are meant to be used, and how they are supposed to relate to each other. This limits the settings in which the Logical Framework can be used effectively.

The primary cause is the use of abstract stage definitions. The distinctions between these can be very difficult to clearly communicate to people who are becoming newly acquainted with the Logical Framework as a tool. This is especially so, when the tool is being communicated across cultures and is exacerbated when those people have been exposed to varied use of the terms ‘impact’, ‘outcome’, ‘output’, ‘results’, etc.

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There is a second and related problem that becomes obvious after the framework has been used to capture a projects 'theory of change', and when the time comes to plan, monitor and evaluate progress. This is the problem of poor understandability or 'readability'. This is evident in three forms.

First, the story line from activity to goal is disjointed. This is inherent in the structure of the Logical Framework where the reader is expected to go from the narrative column, jump across two other columns, to the assumptions column, then jump back to the narrative column at the next highest level, and so on, four times.

Second, long compound sentences are used to summarize what is expected to take place at each stage of the narrative. This usage can reflect:

- poor understanding of the tool (by including both an event and the cause of the event – the latter of which should be at the level below);
- lack of clarity regarding the objective of that stage; and
- the result of compromises made between different stakeholders when developing the Logical Framework.

Third, abbreviated sentences are used, frequently without a subject and sometimes even without an object. For example 'Rice productivity improved' and 'Increased access to, and efficiency and effectiveness of, farm power systems in Bangladesh' were stated as Purpose and Goal statements, in two separate projects.

The short-term solution is to emphasize the need to use simple language and sentences with clear subjects and objects. The sequence of narrative statements (from output to goal) should be coherent and require minimal explanation to a non-expert reader. At present many Logical Frameworks would probably fail this test.

Improving the use of language is one means of making the actors in the processes more evident. A longer-term solution would be to abandon the abstract definition of stages altogether. Instead, stages could be defined in terms of types of people as actors, in the sequence they were effected by and affecting others. Biggs and Matsuert (1999) support a move in this direction through their argument for a more 'actor-oriented approach to strengthening research and development capabilities in natural resource systems'.

Clearly identifying the groups of people who are the actors in each stage of the Logical Framework can make the story line more evident and plausible (or not). An example of a re-interpretation of the Logical Framework that places actors more visibly within the processes is shown in Figure 1, relating to the DFID-funded Mt Cameroon Project (MCP). Project staff were responsible for activities, which effected outputs produced by Cameroonian institutions, which effected purpose-level changes taking place in local communities around Mt Cameroon, which effected goal-level changes in the biodiversity of Mt Cameroon.

One possible consequence of this proposal is that linear stage 'theories of change' would require more stages than are currently used by the models and tools referred to above. In most cases the number of people involved in chains of events from offices in capital cities to poor rural households will be much

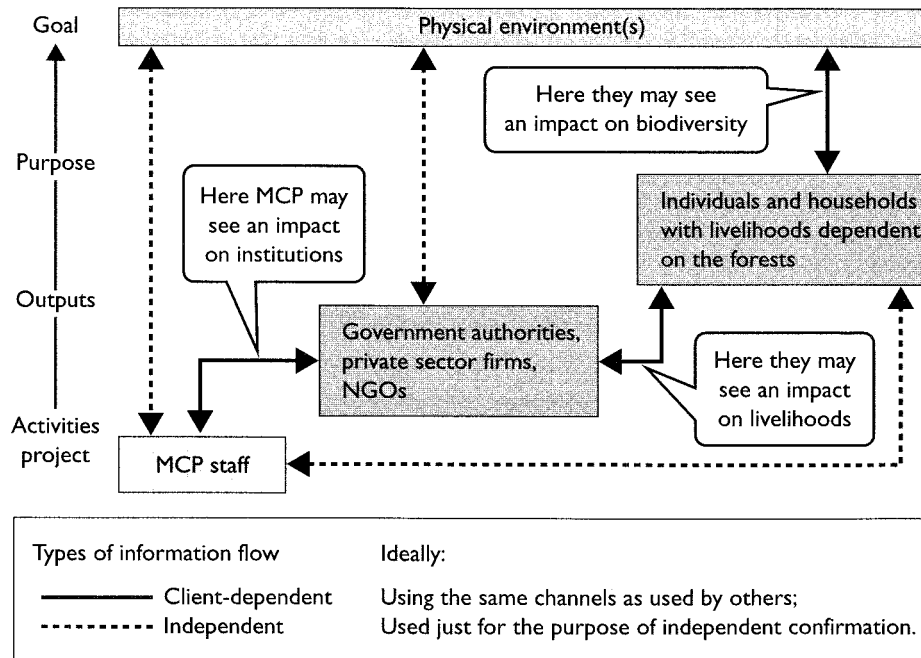


Figure 1. Information Exchanges between MCP and Other Parties

longer. This is likely to be a net positive, in two respects. First, the more identifiable stages in a 'theory of change', the more likely the theory will be described in tangible and observable terms – thus making such theories more falsifiable. Second, this change would help re-direct attention away from the validity of individual indicators of a specific change, to the validity of the 'theory of change' as a whole, as expressed through the predicted sequence of events. The former is typically over-emphasized, relative to the latter (i.e. the horizontal versus the vertical logic of the Logical Framework). Third, the more steps there are in a 'theory of change', the more precisely that progress can be measured along the path of change.

In the short term many planners may still be required to use the Logical Framework to summarize their 'theory of change'. The option of using a more open-ended number of stages may not be available. However, a more articulated 'theory of change' can still be developed by revisiting how the components within each stage (such as the various outputs) are listed. Practice varies widely. Some times they are listed randomly, sometimes they are in a prioritized order, and sometimes they are in a temporal sequence. However, in almost all cases the type of order is not explicitly stated. It would be most consistent with the temporal logic of the Logical Framework if the component activities, outputs and purpose-level events were also listed in an explicit temporal order.

### **Linear Processes with Branching Structures**

If 'theories of change' with many stages are to be preferred over those with few, one consequence of improved falsifiability must be that some 'theories of change' documented in this form will be disproved or sometimes identified in advance as not achievable. In this case the 'theory of change' would need to be reformulated. Reformulating the theory is already a common experience with the use of the Logical Framework, especially during review processes, where both narrative statements and indicators can be changed. In practice most changes are made at the output and purpose level: activities need to change. On the other hand, goal statements are rarely revised because they are more distant in time, and can be seen as sacrosanct. The main problem with such revision processes is the lack of a recognized procedure for documenting and assessing the changes made. In some cases this acts as a disincentive to formally revise the 'theory of change'. Alternatively, where changes have been made but the rationale was not well documented, accountability is weakened. Revisions to a linear 'theory of change' can be graphically represented as a story line with a branching structure, as in Figure 2. It is then possible to measure achievement as represented in such a structure. The ideal achievement would be reflected in a combination of two measures:

- the total number of steps in the 'theory of change' (more = better);
- the percentage of those steps that were actually achieved (more = better).

This sort of approach to documenting 'theories of change' would reinforce a change in the focus of attention (proposed above) from the validity of specific indicators for specific events, to the coherence and validity of the overall 'theory of change'. Having more steps in the story line increases the probability that the 'theory of change', once proved to work, will also be potentially more replicable. Few would claim that the 'theory of change' embodied in most Logical Frameworks provides any practical help regarding replication of the results elsewhere. The issue of replicable processes of change will be returned to below.

### **Simple Parallel Processes**

Almost all development aid projects seem to involve parallel processes of change. In the Ha Tinh Poverty Alleviation Project in Vietnam, three different NGOs were working in different districts of the same province. One NGO was

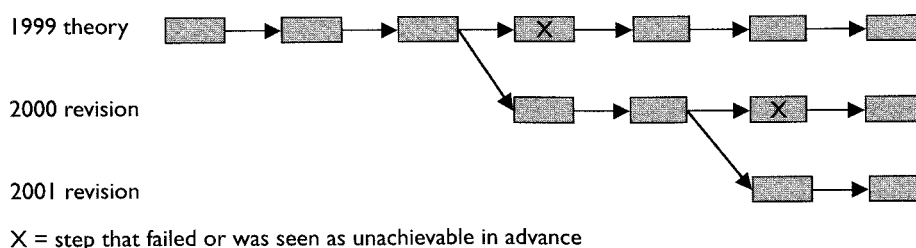


Figure 2. Linear Theories with Branching Structures

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developing savings and credit services in 20 different communes. In some cases the scale of the parallel processes involved can be huge. In the ESTEEM primary education project in Bangladesh there are ongoing training activities involving teachers in 9000 schools (Sibbons, pers. comm.).

The Logical Framework is not well designed as a tool for representing such processes. At best it is suited to listing parallel processes whose implementation is assumed to be identical from one location to another, e.g. 300 schools will be provided with teacher training by 2003. However, variations within parallel processes are an important potential source of creativity. This was recognized in some NGO efforts to identify important development innovations by looking for cases of 'positive deviance' (Sternin et al., 1997).

The official way of representing a diversity of parallel activities in a Logical Framework is to use a series of *nested* Logical Frameworks. Here the output of a programme's Logical Framework can be represented as the 'purposes' in component projects' Logical Frameworks. Differences in approach are then documented in each project, at their output level. There remain problems however. First, it is cumbersome. If many Logical Frameworks are needed, each will have considerable redundant content (the goal and purpose level). Second, in order to represent a diversity of events at a particular level, these events are effectively displaced back a stage in time (the project output is one step before the programme output). Third, there is potential for terminological confusion among those reading project and programme Logical Frameworks. It is perhaps not surprising that nested Logical Frameworks are used infrequently and that official guidelines on the use of Logical Frameworks make little or no reference to their use (e.g. AusAid, 2003).

There is one simpler way of representing parallel but different developments within the Logical Framework: list multiple indicators for a given output or purpose statement, as *different possible routes* to that output or purpose. Such a solution was proposed to the Information and Civil Society Department of DFID, with respect to their global purpose-level aim of helping develop civil society internationally. This was proposed because it was not practical to come up with one indicator of civil-society development that was globally applicable and which fitted well with all the NGOs funded by DFID, each with their own strategies.

Behind this problem of representing diversity is a problem of how to represent two dimensions on a one-dimensional framework, i.e. a variety of events in different locations and a variety of outcomes over different points in time

**Other types of hierarchies** There are other ways of representing hierarchies that include parallel processes. In their analysis of the 'evolutionary dynamics of organisations', Baum and Singh (1994) make a distinction between 'genealogical' and 'ecological' hierarchies. The 'tree of life' showing the emergence and relationships of different genera, family and species over geological time is one well-known example of genealogical hierarchy. Similar genealogical analyses have been made of the development of British industries, using an analytical method known as cladistics (Leask, 2002).

The main difference between the temporal hierarchy found in the Logical



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Framework is that the genealogical hierarchy is divergent whereas the Logical Framework hierarchy is convergent. Many activities converge to the achievement of one goal. As such they tend to stress coherence and fit between parallel activities, rather than diversity.

An ecological hierarchy is a hierarchy of inclusion, rather than a hierarchy of origin and duration. Many development projects have ecological hierarchies built into their organograms. In Bangladesh large NGOs such as Proshika have offices at the national, regional, district and lower level. Those structures are used to aggregate data on activities and outcomes, into progressively larger units of analysis. Despite their prevalence, in my own experience, few NGOs use these units of analysis when making summary statements about their organization's achievements. Reports are more often structured around distinctions to do with types of interventions. The explanation may be one of 'local rationality': projects and project staff are more immediately responsible for activities than for longer-term outcomes evident in people's lives. One consequence is a less holistic perspective on the types of change taking place in people's lives.

Figure 3 below shows another type of ecological hierarchy, not yet reflected in any formal organizational structure. It describes 12 different NGOs in Burkina Faso funded by Christian Aid in 1992. It is in the form of a tree structure, whereby all the NGOs belong to a series of progressively larger and more inclusive categories of types of partners. The structure was developed through a card-sorting exercise with a UK NGO worker, and it represents his view of the most important static differences between the NGO partners with whom he was working. Once constructed it was used by the author as an interviewing tool, to identify which Christian Aid partners had been most-to-least successful, and for which partners Christian Aid wanted to provide more or less funding in future. Success judgements were made using pair comparisons of adjacent branches. These can be made by moving from the 'trunk' to the 'leaves' or from the 'leaves' up to the 'trunk'.

It is possible to integrate temporal and ecological hierarchies into a single useful matrix, as shown in Figure 4. Each row refers to a specific location where change has taken place. These locations are classified using the nested hierarchy to the left. Each column refers to a different goal, expected to be achieved at different points in time (T1 or later).

Figure 5 shows a simpler version of such a matrix, which has been used in practice. Here the parallel processes are the work being undertaken by different project staff in the different communities in the vicinity of Mt Cameroon. The communities were ranked in order of priority, in terms of where improvements in responses to biodiversity threats were most-to-least needed. Across the top of the table there is the ranking of Output, Purpose and Goal types of outcomes.

The existence of priorities on both dimensions of the matrix helps generate expectations about the ideal distribution of achievements within the matrix. The actual distribution can then be compared to the ideal. The totals in Figure 5 referring to numbers of outcomes achieved at each level of the Logical Framework, in each village, are broadly consistent with expectations. In the case of Debenscha, the numbers there highlighted a misunderstanding amongst staff of

<p>Clients are grassroots people. These organizations mobilize funds from external donors. They are involved in project implementation.</p>	<p>Organized within the context of church outreach programmes.</p>	<p>Small uni-sectoral programmes</p>	<p>Has health components, targeted to specific groups, disabled people.</p>	<p>NGO 1</p>
<p>Beneficiaries are other people. They do things for others. They are managers.</p>	<p>Lay organizations.</p>	<p>They only implement their own projects.</p>	<p>Only agricultural activities, with ordinary people.</p>	<p>NGO 2</p>
<p>All NGOs in Burkina Faso funded by Christian Aid in 1993.</p>	<p>These NGOs work with structured organizations. They provide technical services rather than funding.</p>	<p>Large, covers all provinces, multi-sectoral. It receives requests from village groups promoted by member churches.</p>	<p>They will execute projects conceived by others as well as their own.</p>	<p>NGO 3</p>
<p>The members of these organizations are producers. Hopefully they are run by themselves and for themselves.</p>	<p>It has registered members who are organizations. It should live off their contributions. It provides services to them – training, workshops, representation of their views, negotiations with government and promotion of member interests.</p>	<p>They only implement their own projects.</p>	<p>A consultancy service, makes profits, wants to be more rigorous in its work. Set up as an NGO. Not supposed to do consultancy work but they do.</p>	<p>NGO 4</p>
<p>In principle they are producer groups, run by members and expected to live off their own resources. They are not registered as NGOs</p>	<p>A credit union, free from government influence</p>	<p>A producers' union. There is a lot of government interference in them because they are big. They have an umbrella structure of co-operatives.</p>	<p>NGO 5</p>	<p>NGO 6</p>
<p>These have registered as NGOs. The top structure behaves like an NGO</p>	<p>This organization is older and gives more subsidies to its members.</p>	<p>This organization is younger and extends more credit.</p>	<p>NGO 7</p>	<p>NGO 8</p>

Figure 3. Hierarchical Classification of Burkinabe NGOs funded by Christian Aid in 1993, by Abiy Hailu

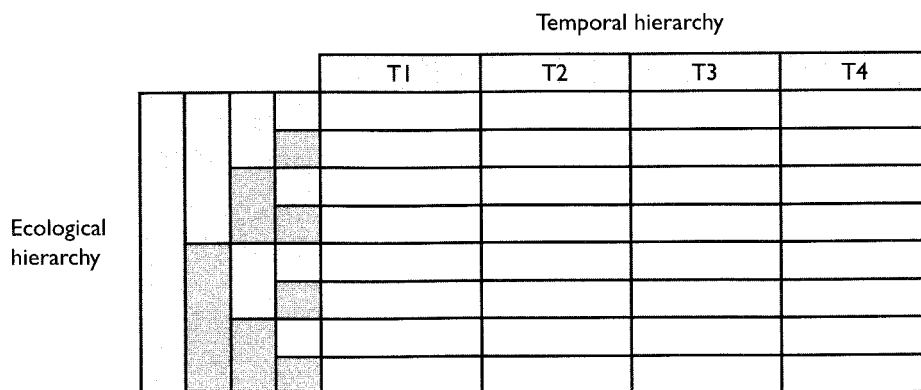


Figure 4. Temporal and Ecological Hierarchies Combined

Ranking	Villages	Outcome type		
		Output	Purpose	Goal
1	Batoke	4	1	0
2	Bakingili	3	1	0
3	Debenschä	1	4	0
4	Idenau	2	1	0
5	Etome	1	0	0

Figure 5. Total Number of Outcomes Achieved at Each Level of the Logical Framework in Each Village

the nature of the purpose-level changes. In the longer term all cells might be expected to have the maximum possible scores. In development projects this is rarely the case. A matrix like Figure 5 provides a means of describing partial achievements in a more accountable and useful manner. The greater the number of distinctions on both the top and left sides of the matrix, the finer the distinctions that can be made during planning exercises and tested during the evaluations.

### **Interacting Parallel Processes**

The pictures described above are still simplifications, even though they are more complex than the linear structure typically found in the Logical Framework.

In development practice there is not always a neat hierarchical or one-to-one correspondence between specific activities and specific objectives. Often a complex *heterarchy* is found, rather than a simple hierarchy. A heterarchy exists where there are overlapping hierarchies. For example, one project may address more than one country-strategy objective and individual projects may overlap in the types of country-strategy objectives they are serving (see Figure 6). At the community

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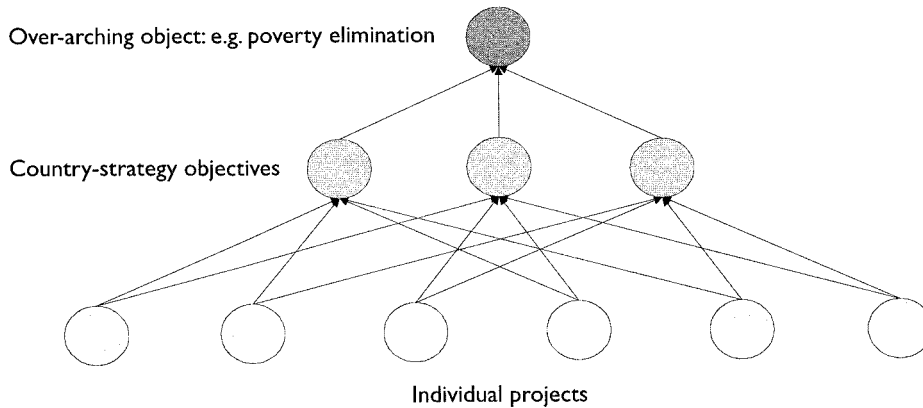


Figure 6. Heterarchy Model (Overlapping Hierarchies)

level, poor households may be participants in project activities operated by two or three different NGOs. In this setting comparing the achievements of two projects within the same country programme becomes more difficult because they are expected to address different combinations of objectives.

As with the matrix above, the way forward here is to theorize about the ideal relationship between goals at different levels in the heterarchical structure (projects and objectives). Ideally the whole portfolio of projects within a country would address the whole range of country-strategy objectives, with the same degree of relative emphasis, as intended at the country-strategy level. Note that this does not mean each project would have to become generic, serving all country-level sub-objectives. Specialization within individual projects could take place so long as the whole set of projects, when taken together, still had a good fit with the country-strategy objectives. In fact, in heterarchies and many newly formed teams, the trend over time is for roles to develop from generic to specialized, for each sub-unit.

The degree of fit between two adjacent levels of a heterarchy can be described as *alignment*. Much time is spent in aid organizations trying to 'align' objectives and activities at different levels of the organization. This is a task that requires regular attention because international, regional, national and sectoral strategies (and the projects and activities beneath them) are typically updated at different points in time. Aligning these strategies is not a major problem if the process is in an organized sequence, from the top down. The problem with this approach is their likely fit with local realities. Aligning them from the bottom up will address this problem, but at the expense of overall coherence. 'In a purely bottom up system, the integration of strategy across units is achieved with a stapler' (Eigerman, 1988: 41). In practice, a mix of both bottom-up and top-down processes are utilized, where differences in content are resolved by periodic local adjustments between adjacent levels.

Alignment can be measured through the use of ranking. The author tested this method in collaboration with Action Aid staff in Vietnam, by looking at the

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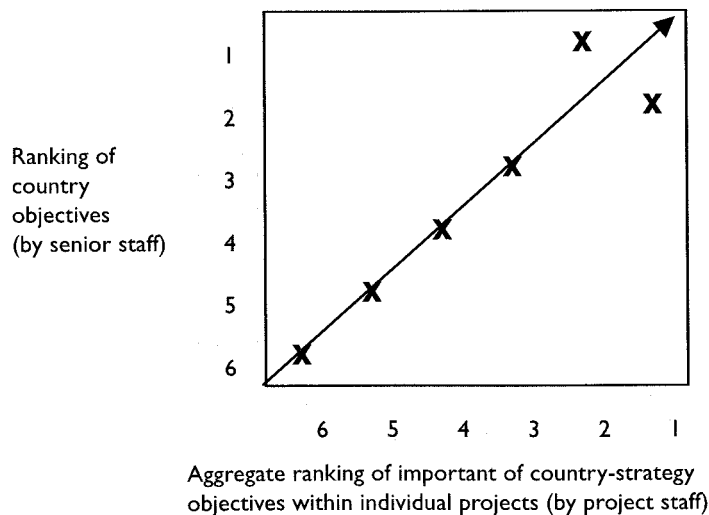
relationship between their country strategy and the individual 'Development Areas' (i.e. projects) within the country. This involved the following four steps.

1. Senior country staff ranked their country programme objectives, in order of priority; then . . .
2. the staff responsible for individual projects were asked to rank the country project objectives in terms of which were most-to-least important in their own project; then . . .
3. project staff rankings were added together to produce a combined ranking; then . . .
4. the combined ranking was compared to the initial ranking by senior country staff, in the form of a graph.

The ideal relationship between the two sets of rankings was a straight line, as shown in Figure 7. Objectives that are under- or over-emphasized within the projects are visible as the outliers from the expected straight line. There was a strong degree of alignment in the data collected from Action Aid staff, between project and senior country-level staff, with the exception of two high-ranking objectives.

The results above assumed all six projects were of equal size. However, some projects had much bigger budgets than others, so while staff might have given the same priority ranking to a country objective, in practice the emphasis was greater. One solution, identified, but not put into practice at that time, was to weight each project's rankings by percentage of the country budget being spent via that project.

Each project's rankings of the relative importance of the country-strategy objectives also fulfil a second purpose. They set expectations about the types of



*Figure 7.* Alignment of Country-strategy Objective Rankings Made Separately by Senior Country Staff and Project Staff

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information that should become available from each project over time: from implementation and then as the project begins to have some impact. First, a project that ranked objective X as more important than objective Y should be able to produce better information about the achievement of X than Y. Second, a project that ranked X as more important than another project ranked the same objective should be able to produce better information about this objective. The first judgement could best be made by the project manager, whereas the second would be better made by a person responsible for country project objectives, with access to information from all projects. Performance here is being measured in terms of the extent to which the ranked value of expected information is matched by the ranked value of actual information. This information could be in the form of text and/or numbers; whichever best conveyed the achievement of the relevant objective.

In Action Aid a step was taken in this direction; this involved asking the project staff which of the country objectives they felt they already had the most information about, in relation to achievement. The results showed that with some objectives there was less information available than expected, given the reported degree of alignment. This suggested that it may be necessary for project staff to review their initial ranking of country-strategy objectives. Alternatively, if they really felt they were addressing the country-strategy objectives as initially ranked then they would have to invest more time within their projects to obtain information about their progress in these areas.

There is a parallel here with processes that occur in other types of heterarchies. In rural Bangladesh some families have membership in more than one NGO savings and credit scheme (Davies, 1998). In these circumstances they can vary the amount and timing of their deposits and loans taken from those different schemes. In doing so they reconcile objectives at two different levels, those of the NGO (with its various policy conditions) and those of their household members. The local managers of those NGO schemes then have to reconcile the consequences of households' decisions with the higher-level objectives imposed by their managers, by changing how they relate either to households or managers (or to both). The same options are probably available to households in villages where there are competing hierarchies of patronage.

For these processes of local adjustment to work, the actors involved must have clear information about the differences in the priority of objectives they have to address. This is not always the case. The review of DFID's 1998–2002 Country Strategy for Bangladesh noted that 'Although the CSP [Country Strategy Paper] provides a useful statement of DFID's objectives and intended method of operation, the DFID team has not found it helpful in setting priorities' (DFID, 2002). Another requirement is an adequate time frame within which the actors can adjust their responses to a changing set of objectives, or even priorities amongst those objectives. Portfolios of projects take much longer to adjust than household decisions about savings and credit. In the same DFID review (DFID, 2002) it was noted that 'New initiatives have often taken years to develop. The impact of many new initiatives is as yet unclear and therefore difficult to evaluate at this stage' (in the fifth and final year of the 1998–2002 Country Strategy Paper).

### **Reiterated Processes**

Many development activities are iterative, rather than one-off. In the Ha Tinh Poverty Alleviation Programme, Oxfam has been involved in the construction of four sea dykes; Save the Children Fund (SCF) has introduced savings and credit systems into more than 20 communes; Action Aid has developed a number of water-users associations. On each occasion, planning and implementation procedures used in the past were repeated, sometimes with significant changes, sometimes with few. In their evolutionary analysis of economic change, Nelson and Winter (1982) argued that organizational routines embody organizational learning. They retain past experience but can be informed by current experience and expectations of experience each time they are reiterated. In aid organizations those routines are also the potential means by which accumulated knowledge can be shared with other development organizations.

The Logical Framework appears to be particularly poor at representing such changes. It typically describes a one-way trajectory, from activities to outputs to purpose to goal. There is no place for feedback loops back to processes that are reiterated. Although Project Cycle Management (European Commission, 2001) is built around the concept of a feedback loop, the completion of the feedback loop happens as part of larger-scale planning, where one project begins and another is about to be planned. This link is usually outside the scope of a Logical Framework describing a single project. Furthermore, in organizations there is not one learning cycle, but many (Nelson and Winter, 1982). Each reiterated routine has a feedback loop present, either explicitly or implicitly. These routines are themselves usually located in nested hierarchies, with feedback links between routines taking place at different levels (e.g. annual board meetings revising staffing policy, and weekly staff meetings setting schedules for board meetings).

Despite the Logical Framework's limitations, there are ways of incorporating iterative processes, and these have been proposed in Vietnam. In the outputs row the narrative column refers to different stages in the partner institution's planning, implementation, monitoring and evaluation processes, rather than directly focusing on specific outputs they will be delivering on the ground. The associated indicators of these management processes then focus on the performance of the processes, by asking:

- Have the plans been implemented?
- Were they on time?
- Were they within expected costs?
- Have the results been documented and disseminated?
- Have results led to improvements in the processes that will be reiterated again in the future?

If these processes are implemented properly then information about outputs delivered (and their impact) should be available. Again, as above, available information about activities, outputs and impact can be seen as a *symptom* of the working of a system rather than something that has to be directly engineered.

Beyond the Logical Framework there are other bodies of experience and practice that are available from which to learn. In the private sector a large

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amount of time has been invested by many companies in what has been called *process mapping* (among other terms). Some companies are now seeking to patent their business processes, to protect access and use of this knowledge (Surowiecki, 2003).

On the Internet there are many web sites which explain how business processes can be captured by flow charts, either using basic drawing programmes, or customized software, either in-house, or using specialist firms. Conventions for representing processes vary, but there are some broad areas of agreement. Software applications can now help development agencies document their work processes, and improve them over time (Lavrijsen, 2002).

In Bangladesh the DFID-funded PETRRA project has now started to document all its main work processes into flow-chart form, with an accompanying guidelines document. Associated with each are a series of developing process performance measures. These will be used to assess and improve current processes, and to make comparisons with a number of other projects identifiable as comparable benchmarks. They will also be made available to any other organizations wishing to replicate the PETRRA model. Figure 8 shows an overview of PETRRA's research funding process, and Figure 9 shows a more detailed view of one module: research selection. The process starts at the top left and moves down to the bottom right. Feed-forward links are on the top right side, and feedback links are on the bottom-left side. Supporting guidelines are listed under each step at the base of the diagram and the people responsible for each step are listed on the far right. The two figures suggest that process maps are scalable; even the individual steps in Figure 9 can be expanded into separate more detailed flow charts. On a much larger scale, the whole process within Figure 1 will be one small component of a flow chart showing the management of DFID's 13 projects in the rural livelihood programme in Bangladesh.

An increasing amount of effort is being expended by development programmes in attempts to identify and document 'lessons learned' to date. Much of what has been produced is disappointing and restates what one would have expected to have learned many years ago (Thin, 1998). This includes the initial results of our own efforts to identify the lessons learned by SCF, Oxfam and Action Aid in Vietnam. They were of little practical use, despite the fact that each NGO had done valuable work in their respective areas. In contrast, the experience with PETRRA in Bangladesh indicates that process mapping offers the possibility of capturing accumulated knowledge of how to do things in a more practical and replicable form.

### **Interim Summary**

In this first of two articles I have argued that organizational scale brings complexity and it is not possible or appropriate to attempt to represent all types of change processes using one standard form of representation, i.e. the Logical Framework. The Logical Framework offers a very simplified view of the processes of change that most aid organizations nonetheless use. In reality, efforts to bring about



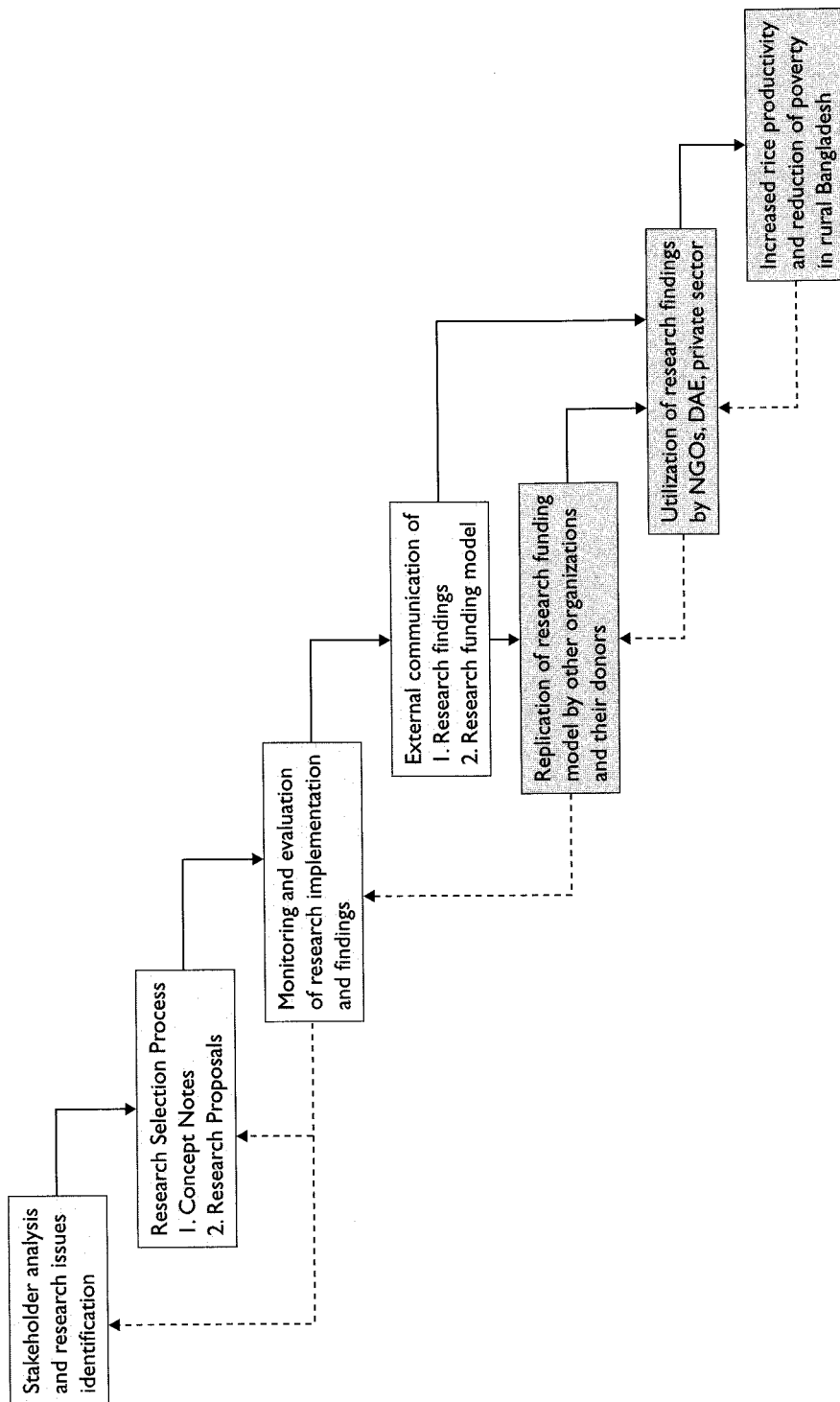


Figure 8. PETTRA's Decentralized Competitive Research Funding Process: the Four Main Modules



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change often involve many more steps. Change usually involves many actors working in parallel, not one main actor and a relatively passive audience of other stakeholders. These actors are not working in isolation, but often interact with each other. Attempts at change involve many iterations of activities, on different scales, informed by previous experiences.

The article has argued for the development of a range of methods, each of which is suitable for representing a particular type of change process in a particular type of setting. Some of these involve adaptations of the traditional Logical Framework, others extend the idea of a hierarchical, structured representation more radically. The relationships of these methods to their context, and to each other, have been tentatively summarized in Figure 10.

All of the types of change processes described above involve some form of *directional* change. Removing the one directional nature of change from the figures shown above shifts the emphasis from a chain of events to a network of events, and from a chain of actors to a network of actors. Networks are found on all scales, within and between organizations, and can vary in visibility. Different network structures also vary in the degree of order, complexity and chaos that they exhibit (Kauffman, 1995)

The next article will argue for the relevance of a network perspective on change, as a means of developing, representing and evaluating 'theories of change'. There are three main arguments for doing so. First, there is an extensive literature on the nature of networks that spans many disciplines, which is available to help inform development agencies' 'theories of change'. Second, there is a substantial body of experience relating to the visual representation and measurement of networks, which is relevant to the evaluation of 'theories of

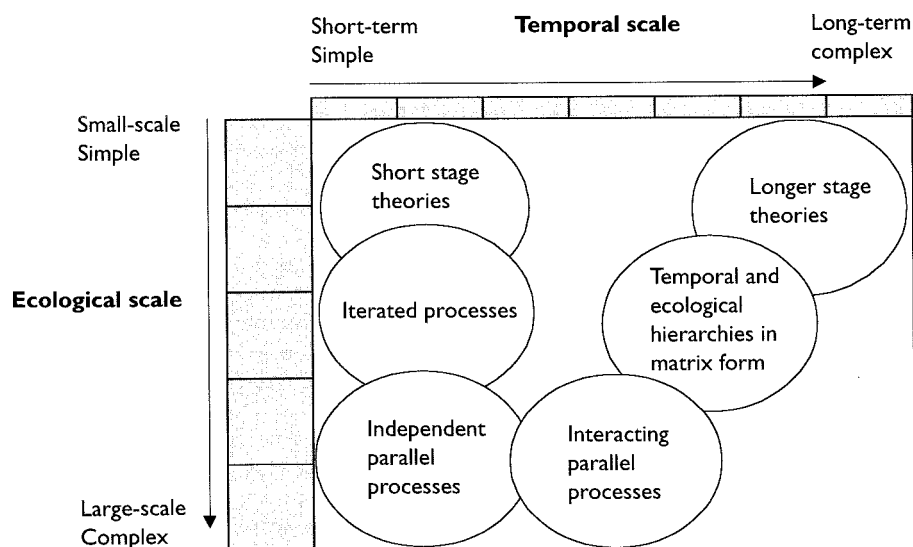


Figure 10. Representations and Their Environments

change'. Finally, the various types of change processes discussed in this article can themselves be seen as specific types of network processes. The possibility of a unifying framework that nevertheless allows for local flexibility will be discussed. It may be possible to satisfy both Ashby and Ockham.

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