

Rethinking Monitoring for Collective Learning in Rural Resource Management¹

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Abstract

[To be completed]

1 INTRODUCTION

Monitoring for improved information and decision-making has captured the attention of scientists, activists and policy analysts active in rural development and resource management. Its central role is evident in several influential discourses: sustainable rural livelihoods (Carney 1998; Scoones 1998; Ashley and Hussein 2000), collaborative resource management (Borrini-Feyerabend, Pimbert et al. 2004), adaptive management (Gunderson, Holling et al. 1995; Stringer, Dougill et al. 2006), participatory development (Abbot and Guijt 1998; Estrella, Blauert et al. 2000), natural resource policy (Leach and Mearns 1996; Roe, Eeten et al. 1999), and reflexive modernisation (Beck 1992). It is referred to in terms of a core design principle of common-pool resource systems (Ostrom 1990), the basis of countless recommendations of Agenda 21 and other global forums (UNCED 1992), the engine of collaborative resource management due to its assumed capacity to fuel 'sustained participation' (Borrini-Feyerabend, Pimbert et al. 2004), the lynchpin of sustainable rural livelihoods thinking (Carney 1998), and a frontier of innovation for sympathetic critics of adaptive management (Dovers and Mobbs 1997; Allen, Bosch et al. 2001).

Commonsense says that monitoring systems should be able to provide feedback that can help correct ineffective actions. But practice shows that when dealing with complex rural development issues that involve collaborative action by a changing configuration of stakeholders, monitoring practice often falls short of its potential. In the context of 'farmer first' discussions, much reference has been made to the potential of 'participatory monitoring and evaluation' (PM&E) to foster collective learning. However, undertaking participatory monitoring that supports rural resource management continues to be oversimplified by many proponents (cf Abbot and Guijt 1998; Estrella, Blauert et al. 2000; Probst 2002) – yet suffers similar and additional limitations. This is due to a range of erroneous assumptions.

This paper describes how to understand and design monitoring processes that foster learning in concerted action that seeks more equitable and sustainable forms of development. I first introduce several concepts that are forcing the rethinking of monitoring. I then present an espoused theory of mainstream monitoring and of participatory monitoring and evaluation (PM&E). Next I share key insights from action research in Brazil on participatory monitoring. I round off the paper with a short foray into cognitive and organisational learning studies, and propose a set of eight design principles for monitoring that may engender more of the collective learning sought after in rural resource management.

2 INSTITUTIONAL TRANSFORMATION, MESSY PARTNERSHIPS, MONITORING, LEARNING

Institutional Transformation

Two concepts are important triggers for rethinking monitoring for collective learning: institutional transformation and messy partnerships.

The type of rural resource management concerns that lies at the heart of this paper is the unabated levels of poverty and environmental degradation and their mutual reinforcement. The empirical work from Brazil on which the ideas in this paper are based revolves around addressing such concerns and

¹ This paper is based on Guijt 2008.

is driven by a vision of transforming the institutions and practices that hinder sustainability and equitability. I will refer to this type of development effort as 'institutional transformation'.

By institutions, I mean the formal and informal 'rules', regular patterns of behaviour and various forms of organisation across the state, business and civil society (Parto 2005; Woodhill forthcoming). This includes the languages, beliefs and values and theories about how 'social and natural life works' (ibid). Some institutions are formalized, such as laws, while others, such as social customs, are informal.

Institutional transformation as a development strategy involves deliberate interventions seeking systemic reforms of institutions to favour the poor and the environment. Such transformation can occur either by creating the (dis)incentives for individuals and groups to behave in specific ways or by undertaking activities that aim to shift the norm and that are based on divergent goals and intentions from the institutional norm. It requires facilitating changes in vulnerable constituencies and among those who decide on resource allocation. Challenging and redressing power inequities and dominant discriminatory norms in favour of the marginalised is the focus of such development.

Transformation can occur in behavioural, cognitive, associative, regulative and constitutive institutions (Parto 2005). In Minas Gerais and Paraíba, *behavioural* changes are pursued, for example, through farmer-farmer extension on agroecological alternatives. *Cognitive* transformations are sought by participatory research on, for example, organic coffee production and silage alternatives. *Associative* changes include the development of farmer associations and the community school based on agroecology and social change principles in Zona da Mata. *Regulative and constitutive* changes include the emergence of municipal rural development plans and the formalised Municipal Councils for Rural Development. Changes occur both intentionally and unintentionally. For example, socio-economic monitoring, while seeking to understand the assumption of agroecology as 'better' has led to behavioural and cognitive changes among participating farmers.

Due to the interaction of diverse change processes, institutional transformation has features that have implications for monitoring. Non-linearity and unpredictability of change means that objectives change en route, as contexts change, alliances shift, and understanding is enhanced. The intertwined efforts on multiple fronts that are needed to achieve such changes cannot be fragmented into actor-specific achievements. Tangible changes are only part of the process – to explain the transformation requires capturing incremental steps rather than the visible result at the end. The long timeframe for institutional change to occur makes it difficult to anticipate what changes can be achieved within the common three to six year timeframe that funding agencies use. These features mean that adaptive behaviour, responding to signals of progress or stagnation, by the actors involved in the change process is critical.

Messy Partnerships

'Messy partnerships' is one form of coordination through which institutional transformation efforts are channelled. This type of social network has distinct features with implications for collective learning and monitoring. The Brazilian case studies on which this paper is based are examples of such partnerships. They consist of: *local NGOs*, officially mandated and guided by a council composed of small-scale farmers and scientists but conceptually and practically driven by technical professionals; *small-scale farmers unions* with three-yearly elections and leadership changes and nested in federated structures; *municipal governments* with elected officials and non-elected bureaucrats that sit uneasily side-by-side; and *research institutions* with more focused and time-bound engagement. The motivation of this mix of stakeholders to participate in collaborative learning and action is highly personal and dynamic, needing to be fed by continual efforts to maintain and strengthen trust (Duran 2002).

The members of the messy partnerships in Brazil are distinct organisations, yet bound together in a common vision for their region, based on shared values of agroecology and community as the basis of development. Poor farmers, their needs, relationships and capacities are the prime concern of the partnerships. The organisations have unique communication styles, decision making processes and capacities that affect their (potential) contribution to collective monitoring. They have varying degrees of influence on decisions about the concerted action, which varies over time. And they have different legal responsibilities vis-à-vis those who fund activities in the concerted action.

The partners hold different degrees of allegiance to the partnerships. Their interdependency is not time bound and has no central driver. In the words of Kurtz and Snowden (2006, citing Juarrero 2002), such dynamical systems look like 'bramble bushes in a thicket'. Clusters can be identified in complex networks, and messy partnerships do 'projectise' activities and form temporary clusters of concerted action. However, in terms of the totality of activities of the partnership, such partnerships cannot be assumed to have some stable identity that can be held to account externally for the totality of its actions.

These features make mainstream monitoring that assumes a hierarchical, single authority context of contractually binding activities that is stable for a certain time period less than ideal. New actors (organisations and individuals) will need to be integrated, in terms of visions for and understanding of development, roles in monitoring, needs and capacities to undertake monitoring. Also important is multi-level and multi-noded monitoring: per farmer group, per organisation, per joint action. If institutional transformation is recognised as happening through a convergence of planned and ad-hoc efforts from a range of stakeholders who come and go in 'messy partnerships', then these and other consequences must be considered carefully.

Levels of Collective Learning and the Problem with Monitoring

How can a diverse and fluid configuration of groups, not necessarily accustomed to concerted action, work well together around a 'wicked problem' in rural resource management? If societal adaptation and innovative change through deliberate efforts is part of the trajectory of change in rural resource management, then learning becomes essential. Learning is needed for several purposes: practical improvements, strategic adjustments and changes, and improving the learning processes themselves (Argyris and Schön 1978; Flood and Romm 1996)².

In Brazil, different 'collectives' can be discerned around which learning takes place. At the simplest level (small) group-based learning takes place, such as farmers working together on a similar interest in agro-forestry, silage alternatives or honey production. A different collective is that of organisations, organisational learning, which occurs within the farmer trade unions or the NGOs that support the farmers. A third level is that of 'societal learning' which involves the different organisations and groups in the two Brazil research sites, each with their constituencies, staff or members, and which required the convergence of information, sense-making and decision-making. Societal learning can occur when different groups, communities, and multi-stakeholder constituencies in society engage actively in a communicative process of understanding problematic situations, conflicts and social dilemmas and paradoxes, creating strategies for improvement, and working through the implementation.

The overarching concept of 'social learning'³ offers a way to understand the assessment and reflection processes needed for collective learning in general but will not be elaborated on here. It has been described by various authors (Holling 1995; Parson and Clark 1995; Röling and Wagemakers 1998; Waddell 2005; Gurstein and Angeles 2007; Wals 2007) in broad terms as a framework and process for knowledge generation and concerted action that underlies societal adaptation and innovative change. Despite variations in interpretation, the common process is one in which group efforts, iterative cycles of action and sense-making, and consensus seeking are critical.

The past 15 years has seen increasing recognition that the dynamics of social, environmental and economic conditions require rural resource management approaches that are adaptive and negotiated. The emergence of discourses such as adaptive management, collaborative resource management and sustainable rural livelihoods are part of this recognition. Such discourses refer to monitoring as a key building stone, yet do not define it, thus potentially jeopardising the hope they offer of resolving the 'wicked problems' (Rittel and Webber 1973) being tackled.

By and large, the reality is that mainstream approaches to M&E do not serve rural development and resource management that seeks institutional transformation through messy partnerships. And it is the mainstream of M&E that drives most monitoring practice in development. The core problem with mainstream M&E practice is its emergence from a theory of change that is based on assumptions which are not universally valid. Assumptions about the universal validity of 'projectable' change or 'tame problems' to development continue to shape the mainstream.

² Also commonly referred to single-loop and double-loop learning (Argyris and Schön 1978).

³ A different definition of social learning refers to 'behaviour modelling' or 'imitation' (Bandura 1962).

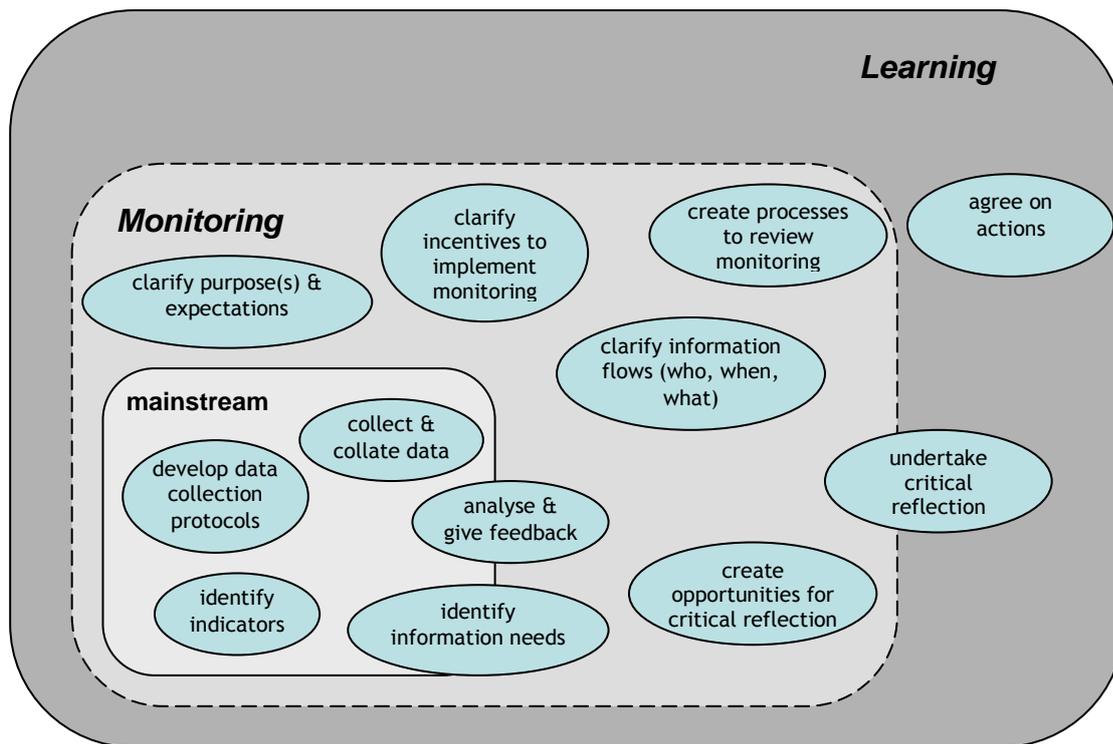
For 'projectable' changes, mainstream monitoring is adequate. But when it concerns the other types of change processes, then other assumptions and features of change need to inform the monitoring process.

Linking Monitoring and Learning

In the development sector, expectations have grown over recent years about the potential of monitoring to contribute to learning as the now widely used phrase 'accountability and learning' illustrates. Monitoring becomes a sub-system of learning. But what distinguishes the two concepts in practice? Are they indeed different? Figure 1 illustrates the fluid definitional membrane of monitoring. The smallest box 'Mainstream' contains the activities usually associated with monitoring. If monitoring is, indeed, to make a contribution to 'learning' then a wide range of other activities are needed to fulfil that expectation. These activities are found in the intermediate box 'Monitoring'. The more of these activities that are undertaken, the more the definitional membrane of monitoring stretches towards that of learning, the largest box.

Defining learning is, therefore, crucial. Kolb (1984) describes experiential learning as a cyclical process that involves reflecting on experience, conceptualising meanings that arise from reflection, deciding how new conceptual understanding can be used to improve future practice, and then taking action which leads to new experience. Hence 'action' is integrated in this definition of learning. This inclusion echoes Maturana and Varela's definition of knowledge as being 'effective action in the domain of existence' (1987). All learning depends on feedback (Sterman 1994), hence the iteration between theory and practice, or 'praxis' is important in experiential learning (Bos 1974; Bawden and Packham 1993).

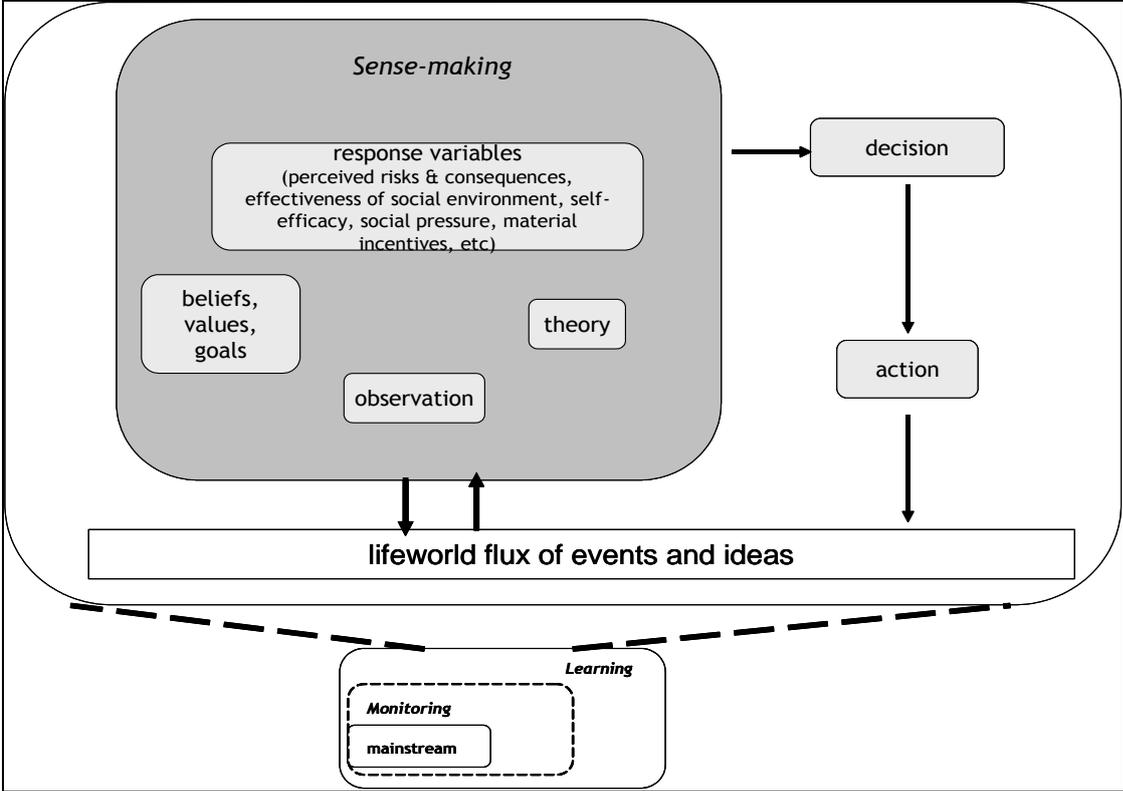
Figure 1. The sliding scale from (mainstream) monitoring to learning



But there is more at play when it comes to learning. Figure 1 is simply a checklist of activities needed to contribute to learning. It portrays mainstream monitoring, for example, as a simple feedback loop model – define indicators, then collect and collate data. What the figure does not show is what happens behind the scenes. As Sterman argues "A simple feedback loop model of learning obscures the role that mental models and strategy, structure, decision rules play in our decision-making process" (1994:26).

Figure 2 shows a schematic process that illustrates the interplay of factors involved in sense-making and responding to change. Sense-making becomes a process of inner dialogue if it occurs at the level of an individual and lies at the heart of formal and informal debates when it involves more than one individual. In both cases, sense-making can be unconscious or more deliberate. Monitoring can make learning – and sense-making – more conscious and systematic through the deliberate implementation of the activities outlined in Figure 1.

Figure 2. Behind the scenes of monitoring (after Woodhill 1999; Leeuwis 2002; Röling 2002)



3 QUESTIONING RURAL RESOURCE MANAGEMENT DISCOURSES

Three discourses relevant for ‘farmer first’ type development offer insights about monitoring for sustainability and equity: adaptive management, collaborative resource management, and sustainable rural livelihoods. These discourses are all concerned with adaptive behaviour, collective learning and interactive decision-making. They are value-driven, focusing on environmental conservation, equitable resource use, and poverty alleviation. They have a practical orientation and thus are actively implemented in rural resource management initiatives with multi-stakeholder negotiated actions at the centre. Each discourse appears to view monitoring as a critical contributing factor to the types of collective learning needed to guide resource management decisions within a multi-stakeholder perspective.

The *adaptive management discourse* highlights four features in monitoring for resource management: the hypothesis-refining effect of models by using simulated monitoring data; the role of indicators to make tangible the visions, targets and resource states; the importance of investing in long-term data collection and deliberative processes on that data; and the focus on scientific experimentation and surprise. However, in practice problems occur relating to its time-consuming nature; the ample scope for scientific error; the fact that monitoring via models remains hypothetical and precludes surprise; the expense of the information required; stakeholders’ resistance to ensure open access to information; the poor state of ecological monitoring; the difficulty of achieving agreement on what merits experimentation and therefore needs to be monitored; and the widespread naivety about the real challenges and potential of joint design of monitoring systems and information analysis.

For *collaborative resource management (CRM)*, monitoring efforts should combine a logic model perspective and hypothesis testing. The programme logic model (in the sense of 'logical framework analysis') perspective is used for planning initiatives and for structuring monitoring of said initiatives (or of the process of coming to a co-management plan). Logic models focus on monitoring indicators related to specific pre-determined results to prove progress and ensure accountability. The joint articulation and continual assessment of indicators is central to monitoring CRM. The hypothesis testing form of monitoring is the same as in 'adaptive management', where assumptions are formulated and matching indicators are found around which to collect data that can confirm or refute the hypothesis. Criticism of CRM includes the naivety with which 'community' and consensus is approached and the simplification of the complexity of collective monitoring.

The *sustainable rural livelihoods approach (SLA)*, or framework, calls for an M&E system, with accompanying indicators, that enables assessing progress towards livelihood sustainability. Livelihood approaches rely on existing M&E practice, which, in the case of externally-driven/initiated development interventions, will be based on programme logic models. While adaptiveness and social learning are not explicit in SLA, the principle of dynamism highlights the importance of a learning attitude. The role of monitoring is couched in general terms, such as using the livelihoods framework to structure M&E processes. The livelihoods literature does not offer detailed steps but rather a set of desirable practices, which constitutes an idealised, overly simplified and arguably unrealistic perspective on monitoring. Other critique of the livelihoods approach with implications for monitoring includes: (1) its analytical complexity with several levels and interlocking components of analysis can lead to information overload and the identification of too many intervention options; (2) the construction of the framework around many generic ideas and large categories without being clear in operational terms what is needed and possible; and (3) an unquestioning adoption of existing methods and approaches that perpetuate the problems inherent in these approaches and do not clarify how they are to be used in a coherent and integrated manner. The sustainable rural livelihoods approach is an idea in search of a method.

'Learning' with and by stakeholders is an important principle in all three approaches and is expected to help identify actions that, in turn, are expected to be more effective for goal achievement. Such learning is based on the systematic seeking and sharing of information, thus making the creation of feedback loops of fundamental importance. However, none of the discourses articulates the practicalities of how these feedback loops need to be constructed and all remain vague about how learning occurs. The discourses all appear to rely on an unclear mix of monitoring as a research process and monitoring of set objectives based on a programme-logic perspective. Programme-logic based monitoring is, by default, considered adequate.

4 UNDERSTANDING THE ESPOUSED THEORY OF MAINSTREAM MONITORING

The Paucity of the Monitoring Concept

Monitoring has received far less attention conceptually than has evaluation, which has been the subject of considerable study, bringing forth several systems of classification and theory during more than three decades of debate (cf Weiss 1972; Scriven 1987; Lincoln and Guba 1989; Patton 1997; Whitmore 1998; Alkin 2004; Fetterman 2005; Shaw, Greene et al. 2006).

Monitoring is marked by considerable variation in understanding (Casley and Kumar 1987:2; Spellerberg 1991:xi; Gosling and Edwards 1995:12; Kolkma 1998:20; HMCO 2000; ActionAid International 2001; DAC Working Party on Evaluation 2002; IFAD 2002). Various definitional features are noteworthy and relevant in order to understand the term 'monitoring'.

Recurring features include the focus on a standardised and systematic, rather than an ad hoc effort. Regularity is a second feature, as in a continuous or regularly conducted process, rather than one-off or discrete efforts. Data collection is another prominent feature, which is generally performance related. While monitoring practice is overwhelmingly indicator-focused, this is not specified in any definition but that of the OECD.

Variation occurs in the degree to which the purpose(s) of monitoring are specified. Many definitions remain quite generic, sometimes stating simply 'servicing basic information needs'. Some definitions of monitoring identify different topics, such as 'financial administration, 'process monitoring', 'activity tracking', 'programme monitoring' (Gosling and Edwards 1995) but the use to which this is to be put is generally not specified other than 'decision-making'.

Therefore, definitional variation also occurs in the type and level of information that is considered necessary. Some say that monitoring must consider progress, others include context, some refer to inputs and activities only. An exception is formed by ecological monitoring that looks at ecosystem changes.

A critical point of debate is the extent to which 'analysis', or the process of sense-making, is considered part of monitoring. Some refer to this or imply it, while others equate analysis with 'evaluation'. This leads to variation on whether monitoring includes assessing merit or value, and therefore how it relates to decision-making.

The ambiguity, variation and generality of definitions of monitoring highlight the importance of developing more accuracy on what it encompasses. This makes it difficult to undertake a detailed critical review of monitoring for rural resource management, either conceptually or practically.

Beginnings of an Espoused Theory of Monitoring

Given the paucity of the concept, I suggest a few building blocks towards an espoused theory (Argyris and Schön 1978) of monitoring derived from practical M&E guidelines. Argyris (1980) suggests the more congruence there is between the 'espoused theory' and the messy reality or 'theory-in-use', the more effectiveness there is. In other words, the better aligned the theory and practice of monitoring are, the more likelihood that expectations of monitoring can be met. Hence if the espoused theory of monitoring says 'this will lead to learning', yet the actions taken (the theory-in-use) do not enable learning to happen, then it should come as no surprise that monitoring does not lead to learning.

The espoused theory of monitoring is articulated in official policies and formalised procedures, of which I have analysed three guidelines: Casley and Kumar's 1987 classic – "Project Monitoring and Evaluation in Agriculture"; AusAid's guidelines for project cycle management (AusAid 2000); and IFAD's M&E Guide (IFAD 2002).

Box 1 summarises the espoused theory of monitoring in terms of three defining aspects and their related presuppositions⁴:

- definitional boundaries of monitoring (Presuppositions 1, 2, and 3);
- focus on information and its use (Presuppositions 4 to 8); and
- constructing and implementing monitoring processes (Presuppositions 9 to 13).

⁴ Presuppositions are implicit, unconscious, and not articulated or the tacit component of knowledge (Polanyi 1958:170-173; Nonaka and Takeuchi 1995).

Box 1. Presuppositions of mainstream M&E

1. It is necessary and/or useful to define 'monitoring' as distinct from 'evaluation' and this can be made on the basis of a range of different aspects (the people involved, information used, validity of findings, information and feedback systems needed, etc.)
2. That because monitoring is intended principally to serve management, this will automatically happen, i.e. those involved will know how to make monitoring serve management.
3. That strategic analysis and sense-making do not need to be explicitly designed for in monitoring.
4. That absence of sufficient information is critical and requires most of the investment, rather than developing appropriate processes to make sense of and use the information.
5. That it is possible for stakeholders to anticipate their information needs adequately, at the onset, in terms of a comprehensive and fairly stable set of indicators (with related data collection methods and processes), irrespective of the diversity or development of actors or issues at stake.
6. That certain processes (notably analysis, critical reflection, interpretation, communication), needed to transform information into learning to fulfill different purposes, do not need to be described in monitoring methodology as they are too obvious or simple, and/or will occur automatically.
7. That indicators are an appropriate form in which to express and convey all key information and which enables learning that supports management decisions.
8. That a balanced picture of information is produced from the chosen set of indicators.
9. That stakeholders have sufficient time, expertise, clarity and willingness to follow the basic steps in sufficient detail for effective results (in quality of information and/or in learning impact).
10. That the steps have a generic validity, irrespective of the context, notably with varying degrees of participation, cultural difference, and/or different combinations of stakeholders.
11. That power relations between those involved in monitoring (and the context of these relations) are not noteworthy or do not influence the quality of the design or implementation process or its outcome sufficiently to merit special methodological attention – or that power is too difficult to deal with or outside the remit of M&E methodology.
12. That people will know how to deal with and effectively use informal monitoring outside the prescribed formal processes and channels.
13. That it is either not necessary for monitoring processes to learn from, and adapt to, the environment in which they are being implemented – or that this happens automatically.

Mainstream monitoring based on these presuppositions is expected to provide the feedback or information that is supposed to trigger learning in development initiatives. No distinction is made in terms of the validity of this model of monitoring for different types of development processes or for different types of organisational configurations (projects, programmes, organisations, alliances, networks or 'messy partnerships').

Billions of dollars of investment in rural development and resource management⁵ rely on these or similar guidelines to enable strategic readjustment and operational improvement. Unfortunately, evidence from rural development projects (Gujt 2008, see Chapter 4) indicates that the presuppositions of mainstream M&E guidelines do not necessarily fit well with operational realities. Gaps can be identified between monitoring theory and the surrounding realities in which the theory is put to work, and between theory and its practice.

5 PARTICIPATORY M&E AS AN ALTERNATIVE?

Given that mainstream M&E approaches appear to provide limited guidance on what is needed for monitoring to contribute to learning, can more be expected from approaches to monitoring and evaluation that are participatory? The answer is 'in part, yes'. However, PM&E leans considerably on the conceptual ideas of mainstream M&E, critical problems remain.

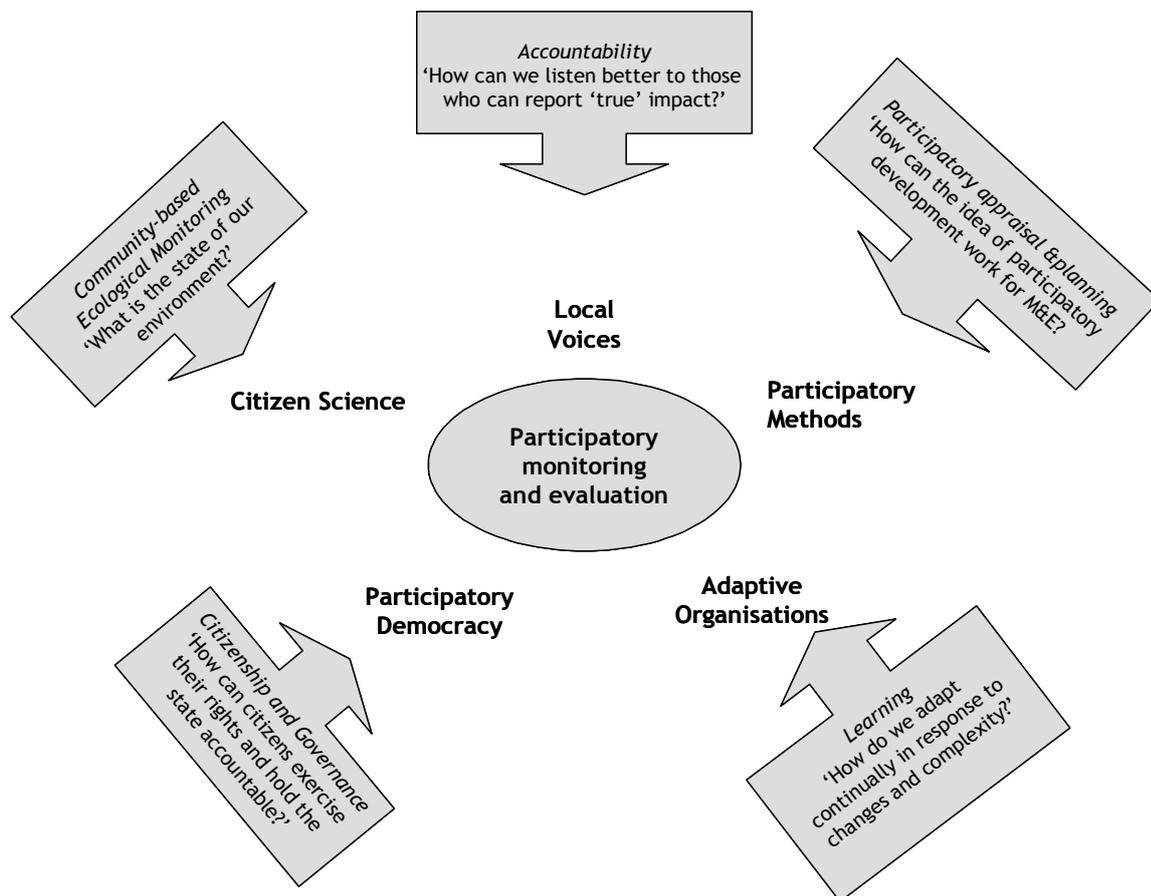
In the early 1990s, discussions emerged about how to take on board the potential benefits of participatory development into the realm of M&E. Practical experiences also grew. Four trends in rural development and resource management appear to have stimulated this interest in PM&E since about 1990, with a fifth trend gaining ground in the development sector in general (see Figure 3). This has spawned diverse expectations about what participation in M&E can deliver. This leads, as well, to

⁵ Recent new player is the Bill and Melinda Gates Foundation that will be spending \$3 billion each year (three times the GNP of Burundi, 1998 statistics), and who have just established a new Impact Planning and Improvement Unit.

differences in how PM&E is expected to operate differently than mainstream M&E. The most recent trend relates to work over the past decade on participatory democracy, strengthening citizenship, new societal 'spaces' for debate between and among civil society, the state and business. Critical ideas in this debate include the need for civil society to learn how to hold the state accountable (Cornwall and Schatten P. Coelho 2007), for the state itself to innovate with knowing citizens' needs are being met (Waglé 2003; Ackerman 2005), participatory budgeting (Booth and Lucas 2002; Schneider and Goldfrank 2002; Salmen, Bela et al. 2006), and in general making government more effective and relevant (Hilhorst and Guijt 2006).

The core intention of PM&E is, as the name implies, to increase the involvement of primary stakeholders – those who are to be affected by the intervention being examined – in the process of M&E. In general, the focus of PM&E has been on increasing participation of community members as a critical stakeholder group, rather than other types of stakeholders. Increasing local community involvement in M&E is assumed to bring advantages (Abbot and Guijt 1998) such as 'more local action', 'cost-effectiveness', 'more accuracy', and 'more relevant information'. These promises are similar to expectations of participatory appraisal and planning in its early days. They are now proving to require adjustment in the face of a reality of slow and difficult social change (White 1996; Guijt and Kaul Shah 1998; Cornwall 2000; Cooke and Kothari 2001; Cornwall and Pratt 2002; Hickey and Mohan 2004).

Figure 3. Convergence of trends around interest in participatory M&E



While the generic steps of PM&E (see e.g. Parks 2005) do not differ from mainstream M&E, the guiding principles ostensibly do 'participation', 'negotiation', 'learning' and 'flexibility' (Guijt and Gaventa 1998). The main differences relate to the main audience and active stakeholders in designing and implementing the process, with other issues resulting from this core shift.

In theory, PM&E differs in several respects from several Presuppositions that underpin programme logic-based M&E (see Box 1): it is about engaging stakeholders, flexibility, recognising the need to negotiate, and local information needs. In practice, however, there is no sharp divide between mainstream M&E and PM&E, as both practices are marked by much diversity. They take on elements from the other discourse and practice depending on how those designing the process perceive what is needed. The IFAD Guide (2002), for example, lists many methods that are associated with the participatory 'toolkit' and yet whose use is being encouraged within IFAD's mainstream programme logic based M&E framework. PM&E itself is not a homogenous practice, with much diversity particularly in relation to how different actors are involved in the process.

Striking is the relative standstill in the debate on PM&E since early 2000, with few debates and innovations emerging despite the spread and growth of applications. Chambers, in a recent review of participatory development (2007), refers to an experience with 'Internal Learning Systems', which are essentially pictorial diaries of change. This method was pioneered in 1997 (Nojonen 1997) and, while being applied more widely, has neither altered in practice nor shifted the debate. Probst (2002) and Vernooij and colleagues ((2003) discuss experiences in Central America and China with PM&E in the context of participatory research but do not add new dimensions. Another recent addition to the PM&E literature 'Who Measures Change?' (Parks 2005) is a useful summary of past thinking and several different applications. While providing some thoughts on how to look at PM&E as a social communication process, it does not detail this perspective. Only slowly is the received wisdoms of M&E being challenged in more fundamental ways based on an understanding of development as complex, emergent, and transformative (Guijt 2007).

The PM&E Players in Brazil

PM&E was the core concern of the fieldwork in Brazil, which was first conceived in 1994. Two NGO's were keen to get involved: AS-PTA (*Assessoria e Serviços a Projetos em Agricultura Alternativa*) and its recently started Projeto Paraíba⁶ and CTA-ZM (Centro de Tecnologias Alternativas of Zona da Mata). Neither of these NGOs had an in-depth M&E system but both were keen to develop this with their partners.

Both NGOs focus on the realities of poor smallholders, albeit in diverse environmental contexts. The Paraíba work must deal with great micro-diversity under generally dry conditions and attempts to stimulate some cash crop production again, while CTA-ZM deals with the eroded hills on which coffee is grown and dairy cattle are kept, two enterprises that imply heavier market incorporation than in Paraíba. Projeto Paraíba has invested heavily in developing understanding and innovations via farmer participatory research as a vital precursor to scaling up impact via farmer-to-farmer dissemination and policy advocacy efforts. CTA-ZM has had more time to play the role of regional catalyst, pioneer and advocate for smallholder agro-ecological development. For both NGOs, agro-ecological principles are central, and natural resource management within that, in addition to prioritising a strategy based on strengthening smallholder organisations and pro-poor political processes. Both organisations have devoted much time to their partnerships with the farmers' unions, as these represent the most permanent of local farmer institutions, thus potentially enhancing local relevance of their work and providing easier access to a larger group of rural households.

At the onset of the research, the partnerships seemed quite straightforward. The main drivers were – and remained throughout – the local NGOs, working with community-based organisations and individuals. Thus we were dealing with a higher order of organisational complexity than just one group. Over time, the partnership was challenged and changed, with implications for the joint monitoring work.

In both cases, rural trade unions were the main partner. STRs are membership organisations, operate at the municipal level (and are federated at state/national levels), and are the most local, democratically elected body that represents smallholder agriculture and thus, the poor(er) farming households. Traditionally, the STRs are not involved in practical aspects of smallholder production, focusing instead on legal rights, health issues and political struggles. Table 1 lists those involved in the 'messy partnerships'.

⁶ Projeto Geração Participativa de Tecnologia para o Desenvolvimento Local Sustentável do Agreste Paraibano (Project for Participatory Technology Generation for Sustainable Local Development in the Agreste of Paraíba)

Table 1. Members of the messy partnerships in Brazil

The actors in Paraíba	The actors in Minas Gerais
<ul style="list-style-type: none"> • Projeto Paraíba, staff of a local NGO • STRs (two municipalities) – with ‘animadores’ (community workers) • Farmer groups (thematic/research) • Community associations 	<ul style="list-style-type: none"> • CTA-ZM, a local NGO • STRs of Araponga • Federal University of Viçosa (UFV), Department of Soils • Farmer groups (thematic/research)

Overview of the Participatory Monitoring Processes

Over the course of about four years, Projeto Paraíba and CTA-ZM held a series of local workshops to clarify concepts, design the process, build capacity, and review experiences and data. These workshops were interspersed with periods of group-based work to fill in the details of the monitoring approach(es) identified and undertake data collection. Each site had its own pace and timeline of events. The workshops were attended by the partners involved (see Table 1). The workshops were critical for our continual learning about participatory monitoring. We reviewed progress with constructing the learning system, identified new obstacles with each round of reflection, incorporated new developments in the partnerships and individual partners, and finally drew some conclusions (Guijt 2000:7).

In the first year, the local stakeholders clarified their expectations of the process, potential benefits, and started constructing and implementing the monitoring approach. The initial process of establishing up a monitoring system involved six basic steps, with implementation and review following:

1. clarify expectations of the different parties regarding the joint monitoring work;
2. prioritise key activities to be monitored;
3. develop clearer objectives for each activity;
4. prioritise, per activity, which of the many objectives would be monitored;
5. identify indicators for these prioritised objectives;
6. develop a calendar that outlined: the method for collecting and registering information; frequency/month; place; roles of different stakeholders.

Of these steps, the most standard within PM&E practice are steps 5 and 6. PM&E methodology, in general, does not refer to steps as precisely formulated as those above. It does not recommend clarifying expectations, prioritisation of activities, redefining of objectives or prioritising of objectives per activity – steps 1 to 4 above. Instead it assumes that all activities will be monitored and that during the planning phase, objectives are clearly formulated enough to be monitorable.

In total, five experiences of collective monitoring were undertaken in Minas Gerais (agroforestry experiments, biodigital work, traditional maize variety experiments, mineral livestock salt production, and apiculture). Four experiences in collective monitoring were undertaken in Paraíba (banana weevil control, contour planting, community seed banks, fodder experimentation), with a tenth being a parallel experience with the Most Significant Change (MSC) method in both locations. Each of these experiences offers insights about participatory monitoring in practice.

In Year 3 at both sites, we further refined implementation by discussing the problems that kept emerging. The problems were both practical (e.g. logistics) and in terms of motivation. We rounded off the work by evaluating the process (AS-PTA and IIED 1998; CTA-ZM and IIED 1999). Five lessons stood out.

1. Learning from Process and Data. Distinguishing between the contribution that monitoring can make to learning via the design process and the information is important in the context of ‘messy partnerships’, which requires continual articulation, refining and (re)aligning of understandings and priorities. In both mainstream M&E and PM&E, an assumption exists that use of the data is what will trigger the learning. However, the STRs, although expressing interest in the data, did not use it for their own purposes between 1996 and 1999. This caveat is related to how participation was perceived by the partners in the ‘messy partnerships’.

2. Participation and Messy Partnerships. Messy partnerships require finding an interpretation of ‘participation’ that fosters concerted action, yet respects the uniqueness of partners and their own

cultures and rhythms of reflection. The dynamics within each stakeholder group and the strength of commitment to concerted action influenced the extent to which a shared appreciation and pursuit of monitoring emerged. Finding the balance between giving space for differences and seeking synergy from joint activities saw us initially assuming that all stakeholders were equally committed to the partnership above individual mandates and priorities. We overvalued consensus as the basis for concerted action and the monitoring work. The generic call for 'stakeholder participation' that differentiates PM&E from M&E is an inadequate distinction to help in operational terms. To develop a more balanced mix than we had achieved requires understanding organisation-specific reflection learning processes and strengthening these – and only then considering where overlap exists and concerted monitoring action is potentially beneficial.

3. Valuing Data and Dialogue. If we need to appreciate 'messy partnerships' more as dictated by the individuality of the actors with a certain (but variable) degree of overlapping interest in monitoring, then dialogue between partners is critically important if data is to be useful. The data alone will not necessarily indicate the direction that improvements need to take – it will require debate to reach conclusions on which the different actors can act. Indicators allowed us to see 'what' was happening, but did not provide insights about 'why' this was the case nor about 'so what' could be done next. To enable that shift, participatory monitoring requires a better balance between investing in data (indicators, methods, collection) and dialogue (analysis, interpretation, planning). Dialogue about the monitoring process itself is also important.

4. Differentiated Learning Events, Mechanisms and Needs. We unquestioningly pre-supposed that monitoring had to be developed as a single system around indicators and an objective hierarchy. Our experiences showed the need to differentiate between technical and organisational monitoring of the development activities, and monitoring the social processes underlying the partnership. Our final analysis focused on differentiating participatory monitoring in terms of the uniqueness of each development activity as determined by its organisational mechanisms and dynamics, clarity, planning and evaluation cycle, and participants. We identified three distinct types of activities, each requiring its own monitoring approach: technical innovation, innovation dissemination and organisational themes. Thus the notion of approaching all monitoring through one type of data process (i.e. indicator-based) and one version of partnership was acknowledged as a crude and inappropriate way to view information needs.

5. (Un)Sustainability of the Process. The process did not prove sustainable, as most of the monitoring work stopped soon after the action research process stopped. Various issues affected continuity: my role as facilitator fell away, most farmer groups dissolved for diverse reasons, and the nature of the partnerships changed, e.g with CTA-ZM shifting to a more strategic contribution in Araponga and distancing itself from hands-on involvement in all field activities except the agroforestry work. Unless information is useful for the individual members of a 'messy partnership' and embedded in their structures and processes, alternative monitoring is unlikely to continue.

Sustaining Presuppositions and Surfacing New Ones

With hindsight, several of the presuppositions on which programme-logic based M&E is based were inadvertently sustained in our approach to participatory monitoring. Table 2 refers to each of the 13 presuppositions, whether or not they were sustained and implications for our work.

What surprised myself (and some of the NGO staff) during the analysis of the participatory monitoring work in Brazil, that a new set of presuppositions emerged related to 'participation' in monitoring. For example, that consensus was a solid basis for concerted action, that involving stakeholders in designing the process would ensure their interest in and commitment to it, and that a partnership implies a considerable degree of shared vision and commitment on the part of the partner organisations. We failed to value the importance of sorting out logistics – simply getting data collection to happen, in this context where voluntary efforts were all important yet the civil society organisations were operating on a shoestring. We also failed to recognise the importance of understanding and building on the existing governance structures and processes in the individual partners – and from that identifying where shared monitoring made sense.

Evaluation of our monitoring process at the two sites led to a more detailed perspective on PM&E than the generic and simplistic set of steps commonly found in guidelines. In particular, the experiences illustrate the tensions between our implicit and explicit expectations of participatory monitoring and the

dynamic realities of the partners within their political contexts and embedded in their own learning pathways. They show the importance of viewing monitoring as a context-specific information and communication system that needs to serve a range of learning purposes. These issues, when related to the peculiarities of a messy partnership engaged in concerted action, require considerably more than the simple suggestions for 'using participatory methods' and 'more stakeholder involvement' that mark the PM&E discourse. In particular, more thought is needed about existing organisational conditions (Guijt 2000:5) and the unique identities of the organisations involved in the 'messy partnership'.

Table 2. Presence of M&E Presuppositions in Participatory Monitoring in Brazil (refer to Box1)

<i>Presupposition</i>	<i>Degree of Sustaining and Adaptations/Limitations</i>
1.	Sustained but with a twist. – we focused on monitoring as distinct from evaluation. But we built in analysis, i.e. an evaluative process, as part of monitoring. Our monitoring calendar was dovetailed so that data should, in theory, be able to be used during annual evaluations.
2.	Partially sustained – we assumed that simply clarifying who would use what information in which manner would ensure that this would happen. In our context, a messy partnership, responsibility allocation becomes more difficult and needs more focused attention that we gave it.
3.	Not sustained – we planned for analysis but in practice this proved difficult to structure and allocate time for this due to problematic presuppositions we had about 'participation' in monitoring.
4.	See under 3 above
5.	Not sustained – we recognised the need for stakeholders to learn how to undertake monitoring and accommodated changing information needs and methods.
6.	Partially sustained – we understood the importance of analysis but did not detail how this should happen. We underestimated the importance for farmers and STRs to be supported in analysis by the NGOs and did not structure analysis moments sufficiently within the existing evaluation and planning moments of the individual partners.
7.	Sustained temporarily – we started with this assumption but included the MSC method halfway through to incorporate change processes not suited for summarising through indicators.
8.	Not sustained – we regularly adapted indicators and methods if the emerging information was not deemed useful or balance. We also took on an alternative approach, the MSC method, to fill the perceived information gap, with only partial success.
9.	Not sustained – We supported building capacity of designated monitors by involving them hands on in designing the detailed monitoring process. But simply attending and helping to design the monitoring process was insufficient for them to be able to implement their tasks.
10.	Not sustained – we used a generic set of steps in both locations but allowed for local rhythms, capacities and issues to dictate the pace and direction of implementation. But we failed to accommodate organisational differences sufficiently between the partners.
11.	Partially sustained – we thought we had created sufficiently open space for partners to define responsibilities, regularly revising these as soon as problems arise. However, seeking consensus as the basis for agreed actions proved problematic as it swept power differences under the carpet.
12.	Partially sustained – we did not take stock of existing informal monitoring processes and build on these. Instead we came in with an indicator-focused approach and only later recognised the importance of the informal exchanges through the meetings and field visits.
13.	Not sustained – built in ongoing reviews and revised information needs, processes and methods.

6 INSIGHTS FROM STUDIES ON COGNITION AND ORGANISATIONAL LEARNING

Monitoring constitutes a deliberate and collective attempt to shape our understanding by seeking and processing information. Hence the process of knowing, or cognition, is central to the topic of this paper. Yet, cognitive studies appear to have had little, if any, (direct) influence on the discourse and practice of M&E in general, and monitoring in specific. Cognitive science has many schools of thought of which the Santiago School of Cognition (Maturana and Varela 1987) and the ‘embodied, embedded’ tradition (Clark 2001) are particularly interesting. Organisational learning is a second area that has potential to inform the discourse and practice of monitoring. This field examines how a group of people communicate and deal with information as an essential component of organisational survival. Organisational learning is also a vast body of literature with diverse perspectives: management science, sociology and organisation theory, strategic perspectives, production management, cultural perspectives, and ‘the learning organisation’ (Easterby-Smith 1997). The influence of this body of work on the M&E discourse and practice has been, although greater, largely restricted to a recognition that development organisations need to become learning organisations. Shifts in organisational practice based on an in-depth understanding of innovation from this field are more difficult to find in the development sector.

Combining insights from these two fields brings me to four observations.

Messy Partnerships as a Collective Cognitive Agent. Learning can be understood as ‘cognition’ and a messy partnership can be redefined as a collective cognitive agent (see Box 2). Note that it is a reflexive process. A messy partnership engages in collective cognition but collective cognition is also the result of interactions. Hence, a cognitive system is a “co-evolving *duality* of the perceiving organism and its environment” (Röling and Jiggins 2001: original emphasis). Monitoring enables the ‘collective agent’, i.e. the messy partnership, to know if it is managing to purposefully develop and maintain its cognition. In their definition, Röling and Jiggins (2001) relate monitoring to the ‘perception’ element – monitoring as the window on the domain of existence. However, the messy partnership must be managed as a collective cognitive agent, hence monitoring occurs in relation to all elements⁷ (see Figure 4). Each partner individually and as a partnership is monitoring if and how well the actions are taking place and how the context is changing as a result, which is the focus of formal and explicit monitoring. Furthermore, there is often also tacit and informal monitoring to see if goals and understandings are still shared. Such monitoring happens in daily interactions and during collective planning. When monitoring is collective, it requires agreement on focus and standards (per level).

By monitoring for coherence and correspondence (Gigerenzer and Todd 1999), a messy partnership is in essence undertaking quality checks. It enables identifying if the different constituent parts are able to tackle problems effectively, and if not, what needs to happen. Too much emphasis on ensuring coherence and the agent’s adaptation to the context suffers, too much emphasis on correspondence and internal disorganisation takes hold and affects effectiveness.

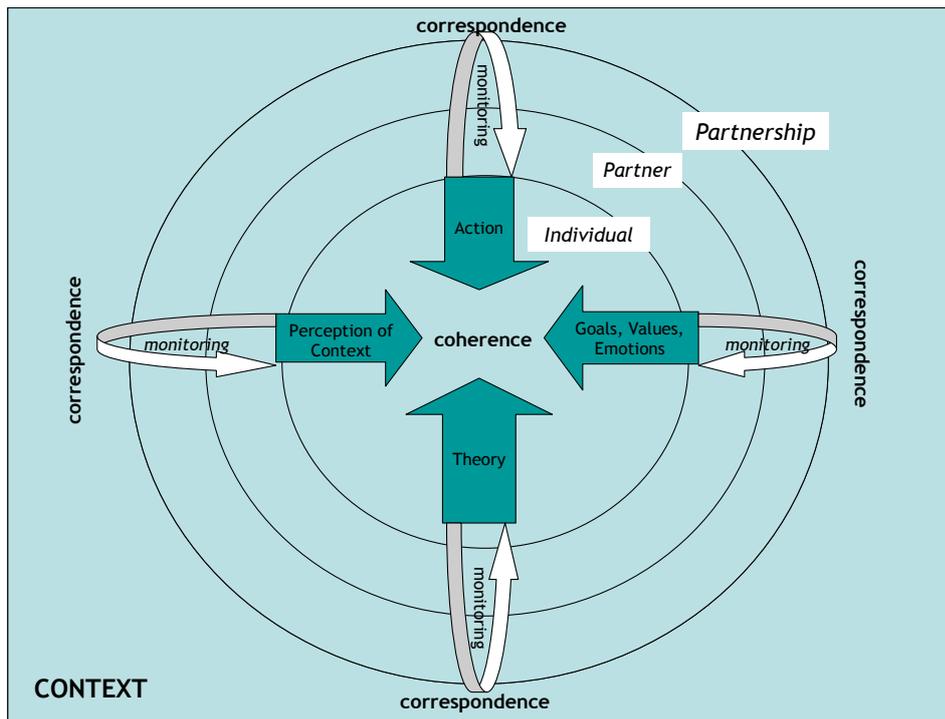
Box 2. Collective Cognitive Agency

Röling and Jiggins (2001:157) speak of “a collective cognitive agent when people:

1. *perceive* their domain of existence in a similar way, perhaps because they share a monitoring system;
2. have similar *emotioning* in that they have negotiated shared goals or subscribe to the same goals because they are part of a community;
3. engage in concerted *action*, based on
4. a shared *knowledge* about what is expected to be effective action in the domain of existence; and
5. construct the *domain of existence* according to a shared design. In the sense defined here, a collective cognitive agent acts as if it were one cognitive agent.”

⁷ Also see distributed cognition, 7.2.2, which is critical in this type of setting.

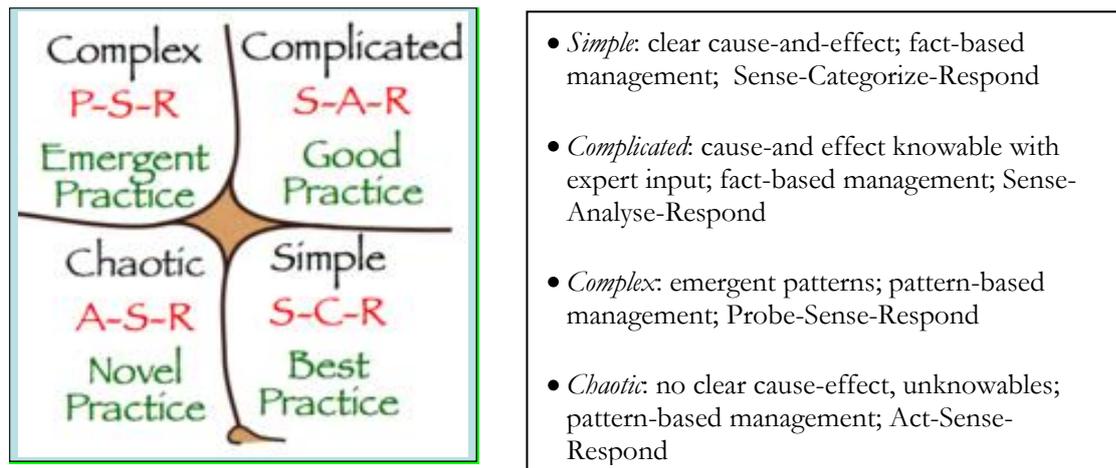
Figure 4. The Four Elements of Cognition (based on Röling 2002)



Distributed Cognition. Distributed cognition (Hutchins 1995) upends a long held notion in cognitive studies that saw cognition as a process internal to the individual mind but now situates human cognition in a complex socio-cultural world and affected by that world. Distribution can be viewed in two ways: (1) the distribution of perceptions about the system among different agents and (2) the distribution of different cognitive elements among agents. This notion has two implications for monitoring processes. First monitoring systems must cater for the social spaces and interactions needed to enable information sharing and interpretation that lead to collective insights about action. These interactions also need to be designed based on the need for diversity of cognitive perspectives and skills. Second, monitoring systems can explicitly consider allocating different tasks to different partners depending on where cognitive strengths lie. For example, the STRs with their daily interactions with farmers were responsible for data collection, the NGOs helped with data compilation, everyone helped interpret and decide on collective action.

Sense-making. Considering monitoring in messy partnerships as distributed cognition in action begs the question of how information is interpreted or made sense of. I define sense-making as: “a motivated continuous effort to understand connections (which can be among people, places, and events) in order to anticipate their trajectories and act effectively” (Klein, Moon et al. 2006:71). Without this, monitoring will only result in piles of data that clog the arteries of organisations or ‘datafication’ (Brown and Duguid 2000). The Cynefin framework (see Figure 5) is an insightful heuristic that Snowden (2005) has developed to understand diverse approaches to multi-ontological sense-making. Snowden argues that “different ontologies (defined as the nature of systems based on the relationship between cause and effect) require different approaches to evidence, analysis and action”. Determining in what context one is operating – simple, complicated, complex, chaotic or disorder – enables appropriate choices.

Figure 5. The Cynefin Framework (Snowden and Boone 2007)



Cognitive Dissonance. In sense-making process, surprise or cognitive dissonance (Festinger 1957) requires attention: “look for evidence that disconfirms [the organisation’s] cherished expectations, and see beyond its simplifications (Weick and Sutcliffe 2001:155). In their notion of ‘organisational mindfulness’, surprise figures in one of the five principles that enables a highly reliable organisation to perform. To be mindful is to have a rich awareness of discriminatory detail and an enhanced ability to discover and correct errors that could escalate into a crisis. For Snowden, it is the harbinger of important insight, or as Bateson says: “Information consists of differences that make a difference” (Bateson 1979:99). Cognitive dissonance occurs when different ‘bits of knowledge’ do not tally. Deliberate study of events and outcomes during non-linear change processes can facilitate using cognitive dissonance purposively to trigger learning. Viewing a set of data and seeing the extent to which it tallies with expectations can confirm existing views or call them into question. Hypothesis-led monitoring that adaptive management is an advocate is one option – comparing differences and hopefully some surprises. Aspects of surprise and difference are built into the enterprise of science but are only theoretically present in monitoring practice. And only then it concerns comparing what was expected with actual events, and does not include the unanticipated.

7 THE FUTURE OF MONITORING: REVISING DESIGN PRINCIPLES

So where does this leave the development sector? Recognising that rural resource management is all rather messy, non-linear and dynamic may clarify why mainstream monitoring efforts are limited. But this does not help in managing the process better. If those in rural resource management want to realise the learning potential of monitoring, then processes must be designed based on a different set of principles than is currently the case.

Monitoring is out of date and requires innovation if it is to deliver on the promise of enabling learning. A shift is needed to monitoring seen as: dialogical (not only a singular rationality), multi-ontological (not only assuming an ordered universe), distributed (not centralized), functioning through relationships and heuristics (not only through data and the hope of omniscience), essential for impact (not just a contractual obligation), sustaining collective cognition (not only the tracking of implementation), and seeking surprise (not only documenting the anticipated).

This final section suggests eight design principles that address the problems identified in practice and build on theoretical insights. These principles constitute a response to the limitations of mainstream and participatory monitoring as articulated above. Therefore, they are not a comprehensive set of design principles for learning-oriented monitoring. The first three principles relate to the purpose of monitoring, the next three principles to operational concerns, and the last two to sustaining monitoring practice.

1. Understand *the nature of institutional transformation* being pursued as a social change process, in order to know the degree of complexity one is dealing with, and the extent to which information needs can be anticipated and learning functions will be significant (see also principle 3). Four

questions need clarifying. What type of institutional transformation is being aimed for? What coordination mechanisms are at work? What ontological basis is present in the type of transformations and coordination mechanisms? What does this tell us about the underlying theory of change that is guiding the concerted action for which monitoring is required?

2. Recognise the nature of *actors and partnerships* on monitoring, by analysing the commitment of partners to concerted action, governance structures and decision making processes of each partner, allocation of responsibilities in the partnership, degree of overlap of information needs, way in which information is shared, and monitoring capacities. The reality of 'messy partnerships' in development forces a questioning of a hierarchical, intra-organisational model that underpins mainstream monitoring.
3. Specify distinct monitoring processes in terms of *learning purposes* to enable a more precise definition of tasks, protocols and responsibilities. For institutional transformation on the basis of deliberate concerted action undertaken by a messy partnership, nine learning purposes are likely to be relevant (though not all necessarily simultaneously or equally prominently). Five of these pertain to management of the development intervention: financial accountability; operational improvement; strategic adjustment; contextual understanding; and capacity strengthening. Four learning purposes are also as part of the development interventions themselves; research; self-auditing; advocacy; and sensitisation.
4. Plan for *sense-making* as well as information. The sense-making process must be appropriate for the type of situation and issue being considered (i.e. multi-ontological). Seek to understand what is needed for critical reflection to be possible among and between the partners and how insights are best communicated, which capacities must be built to make this possible, which additional communication processes are needed, and allocating resources to this end.
5. Balance *formal* protocols and *informal* processes, incorporating everyday interactions of sharing and debate into the monitoring system, and linking the informal sphere to formal processes and channels. Informal processes are not only crucial for ongoing sense-making but also a source of information sharing.
6. Value and seek diverse types of *information*, related specifically to the nature of development (principle 1) and the learning function (principle 3) that has to be met, and understand which processes exist and/or are needed to ensure that such information is shared and debated and informs decisions. The Cynefin framework helps locate the ontological domains for diverse forms of information, and locates narratives, stories, surprises in the domain of complexity. This domain plays an important role in the type of institutional transformation processes in which the Brazilian partnerships are engaged.
7. Ensure the *institutionalisation* of learning-oriented monitoring. Concerted efforts are needed to ensure that policies, practices, methodologies, responsibilities, and incentives are all helping make monitoring as discussed here possible. Monitoring processes need to consider the incentive structures in which they operate in order to have realistic expectations of the learning that might be possible, and, where possible, offer stimuli that can help those involved to perceive the usefulness of such processes. While agreements on how to monitor the implementation of concerted action results from collective learning (institutionalisation as an outcome of social learning, Ostrom 1990), it also requires explicit investment.
8. Approach monitoring as an *evolving practice*, thus allowing it to become a dynamic knowledge production process, which when subjected to regular critical reviews and adaptations retains relevance and usefulness. Monitoring must be viewed as an evolving cognitive process, subjected to regular critical reviews and adaptations as changes occur in understanding of monitoring, players and context

Final Comments

The problem with monitoring is not resolved by a tweaking of methods, and additional or different tools. Some of the design principles may appear commonsense and not surprising – yet these principles are not currently shaping the understanding and practice of monitoring. Mainstream

monitoring is driven by a set of erroneous presuppositions, lack of understanding of the consequences of partnership contexts, and a limited perspective of the cognitive process.

The issues discussed here have relevance beyond approaches and practices that can formally be labelled as being about 'adaptive management', 'collaborative resource management' or 'sustainable rural livelihoods'. And their relevance is far wider than only IFAD projects or the messy partnership in Brazil. The notion of development-as-project is being replaced by the recognition that shifting institutionalised injustice requires the adoption of a more diverse understanding of societal transformation. The idea of development as delivered contractually by organisations is being replaced by the understanding that messy partnerships and other types of alliances are the new configurations within which institutional transformation unfold. As Leach et al. (2007:24) write:

"Conventional approaches may sustain a myth of a world manageable through neat state-civil society-international institutions and distinctions, through scientific expertise and through uniform approaches to problem and risk assessment based on singular views of evidence. But the melee of real-life dynamics and interactions and of everyday practice amongst citizens, bureaucrats, and people crossing public-private boundaries suggests a far more dynamic, complex and messy world in which knowledge and notions of the problem are contested. Analytically, we need concepts and approaches that can capture critical dimensions of these processes that bear on the construction of pathways to Sustainability."

Monitoring, when conceived as a socially negotiated, evolving methodology for structuring information flows and use, offers an approach to help construct 'pathways to sustainability'. However, we need to significantly revise mainstream beliefs and practices about how monitoring can create feedback. It requires more than new methods for data collection or analysis and cannot be dismissed as a ploy to allow lazy thinking and dismiss evidence-based practice. It is not about guesswork but rather about considered reassessment of the epistemic and ontological perspectives and principles that underpin monitoring, and determine its feasibility, relevance and ultimately, usefulness.

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Annex 1. Abbreviations

AS-PTA	Assessoria e Serviços a Projetos em Agricultura Alternativa
CRM	collaborative resource management
CTA-ZM	Centro de Tecnologias Apropriadas-Zona da Mata
IFAD	International Fund for Agricultural Development
LFA	logical framework approach
M&E	monitoring and evaluation
NGO	non-government organisation
PM&E	participatory monitoring and evaluation
S(R)L(A)	sustainable (rural)livelihoods (approach)
STR	Sindicato de Trabalhadores Rurais
UFV	Universidade Federal de Viçosa