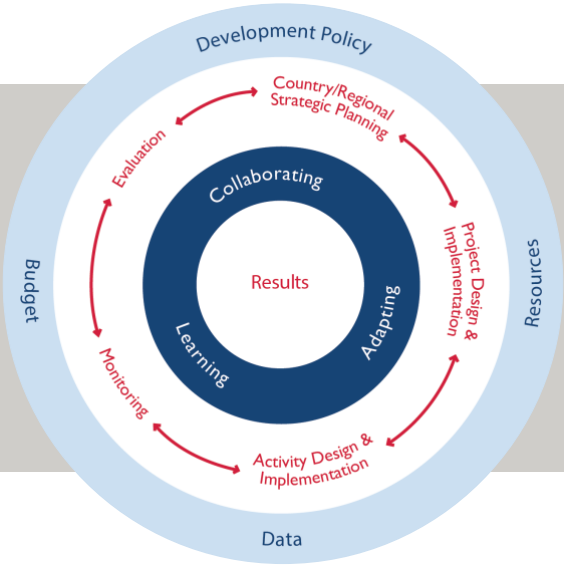
Discussion Note: Complexity-Aware Monitoring



This Note is a starting point for USAID staff to consider when to apply complexity-aware monitoring principles in ongoing monitoring. . Rather than prescribe a single method or approach, this note highlights principles and methods used by development practitioners.

Discussion Notes are published by the Bureau for Policy, Planning and Learning and explore principles or methods related to the Program Cycle and are intended to prompt inquiry. This Note complements USAID ADS Chapter 201.

Introduction

This Discussion Note complements ADS 201 and outlines general principles and promising approaches for monitoring complex aspects of USAID development assistance. Complexity-aware monitoring is useful when results are difficult to predict due to dynamic contexts or unclear cause-and-effect relationships.

Key principles of the Program Cycle include applying analytic rigor, managing adaptively, and utilizing a range of approaches to achieve results. ADS 201.3.5.4 identifies two types of program monitoring – performance and context.

All USAID programming incorporates performance monitoring and should include context monitoring. Performance monitoring "is the ongoing and systematic collection throughout [s]trategies, projects, and activities of performance-indicator data and other quantitative or qualitative information to reveal whether implementation is on track and whether expected results are being achieved."

Context monitoring is "[t]he systematic collection of information about conditions and external factors relevant to the implementation and performance of a Mission or Washington OUs strategy, projects, and activities." The ADS also identifies context monitoring as an approach to reveal unintended consequences of USAID programing.

This Discussion Note provides an explanation of when to use monitoring approaches that are complexity-aware and summarizes the three principles of complexity-aware monitoring.

IDENTIFYING COMPLEXITY: WHEN TO USE COMPLEXITY-AWARE MONITORING

Complexity-aware monitoring is appropriate for aspects of strategies, projects or activities where:

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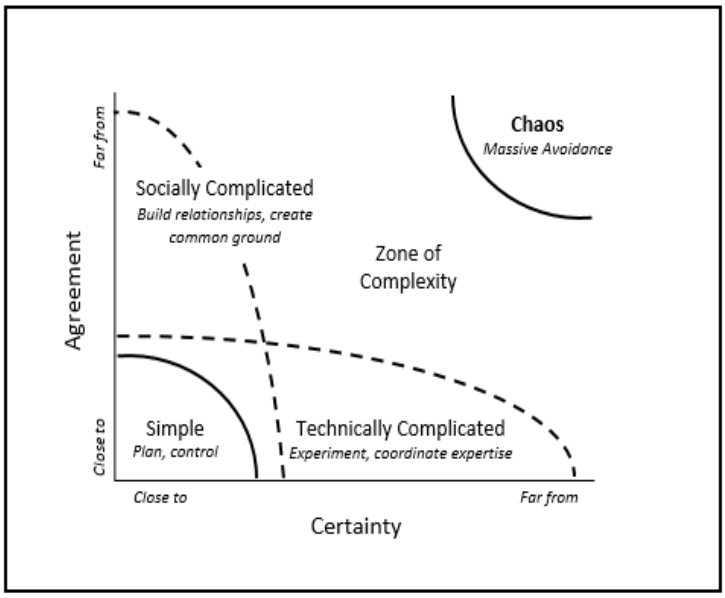
- Cause-and-effect relationships are uncertain;
- Stakeholders bring diverse perspectives to the situation, making consensus impractical;
- Contextual factors are likely to influence programming;
- New opportunities or new needs continue to arise; and
- The pace of change is unpredictable.

Programming environments can have some simple aspects, some complicated aspects and some complex aspects; it is more useful to identify these individually than to attempt to classify a whole situation as either one or the other.[1] In general, social change, development contexts, and programming tend to contain a mix of complicated and complex aspects. Thus, complexity is neither a special circumstance (such as conflict or transition), nor a blanket descriptor. Furthermore, judgments about complexity are ones about relative disagreement and uncertainty. Complicated aspects of a system may evolve to demonstrate complex dynamics or complex aspects may become complicated.[2] Also, aspects of complexity-aware monitoring may cross boundaries of interventions.

Identifying solutions in advance and drafting detailed implementation plans is difficult for complex aspects of programming. Expected results may also require refinement and revision as strategies, projects, or activities unfold. Projects or activities that rely heavily on adaptive management to steer effectively in dynamic contexts, including interventions that seek to influence social change or innovate to discover solutions, are likely candidates for complexity-aware monitoring. On the other hand, projects or activities that deliver services, or roll out, replicate, or scale up tried and true programming strategies can generally meet their needs through performance monitoring and context monitoring.

Figure 1. Agreement and Certainty Matrix
Source: Patton, M.Q. (2011). Developmental Evaluation: Applying Complexity Concepts to Enhance Innovation and Use. New York: The Guildford Press, p. 94.



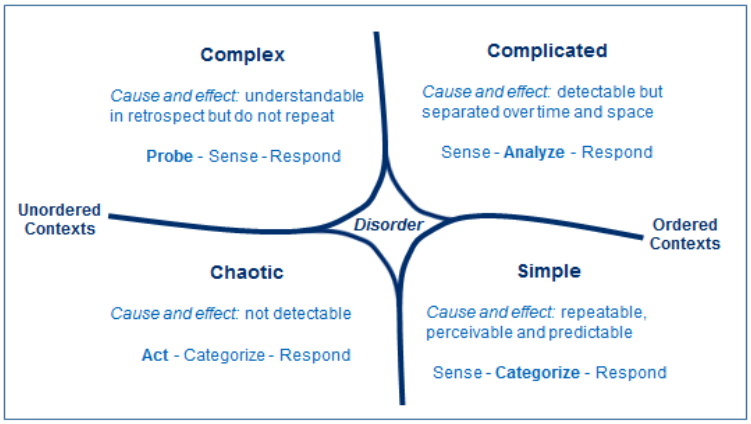
Two questions can help identify complex aspects of programming:

- What is the degree of certainty about how to solve the problem?
- What is the degree of agreement among stakeholders about how to solve the problem?

According to the Agreement and Certainty Matrix[3] depicted in Figure 1, complex aspects of situations are distinguished from simple and complicated by both low certainty and low agreement. In situations of low agreement, key stakeholders may disagree about both how to define the development problem and how to solve it. In situations of low certainty, cause and effect relationships are poorly understood and even the experts are uncertain about the best way to achieve results.

Those working with the Cynefin framework, depicted in Figure 2, recognize complexity when diverse elements interact with each other in unanticipated ways to create a new reality.[4] Complex aspects of a situation cannot be known or predicted ahead of time; cause-effect relationships emerge only retrospectively. Complexity responds well to "probe-sense-respond" management approaches in which development practitioners experiment, gather information, and then act accordingly.

Figure 2. Cynefin Framework



The Cynefin framework contrasts complex dynamics with simple, complicated and chaotic. In simple aspects, causal dynamics are well known. The right answer is common knowledge. Best practices have been identified. In complicated aspects of a situation, cause-effect relationships are knowable with additional expertise or time and energy to understand and measure. Experts would be expected to possess the relevant knowledge, and to be able to identify good practices. Chaotic aspects of a situation are ones in which there is so much turbulence that causal relations are not perceivable even after results emerge and there is no time to investigate or figure out right answers. Those dealing with chaotic aspects must act quickly and decisively to reduce the turbulence.

Let's take the example of a vaccination activity (Table 1). Aspects of the activity demonstrate simple, complicated, and complex dynamics. Vaccines work by introducing a modified version of a disease agent into the body, thereby stimulating the body's immune system to build up defenses against the pathogen. If a vaccinated individual encounters the disease agent again, the immune system will be able to ward off the disease. The cause-and-effect relationships are known and the effectiveness of vaccines is very high. Preventing common childhood diseases is generally agreed to be a worthwhile goal. Therefore, both certainty and agreement about how vaccinations work and the desirability of preventing childhood disease of the activity is high. We can call this aspect of the activity simple. Simple does not mean that a successful vaccination activity will be easy.

Table 1 presents certainty and agreement in simple, complicated, and complex aspects.

Table 1: Certainty & Agreement in Simple, Complicated, & Complex Aspects		
Simple	High certainty, high agreement	Stimulating immunity through vaccines
Complicated (technically)	Low certainty, high agreement	Delivering vaccines to remote populations through a weak health system; population values vaccines
Complicated (socially)	High certainty, low agreement	Delivering vaccines to resistant communities through a well-resourced health system
Complex	Low certainty, low agreement	Delivering vaccines to resistant communities through a weak health system

Other aspects of the activity, such as logistics, may not be simple. Implementing a vaccination activity can be challenging in a country without a strong health system, even if the population is generally supportive. Many vaccines require cold storage up until they are administered. Rural populations are difficult to access without an adequate transportation network. When facing logistical challenges but working in a population that shares common values of protecting the health of children through vaccination, delivery of the activity can be said to be technically complicated.

In some situations, the value of the vaccination effort itself may be in question. Recently, the U.S. has witnessed the rise of an anti-vaccination movement that claims a link between vaccinations and autism. Other studies have linked low rates of vaccination to lack of trust in medical workers among certain populations in the U.S. Both of these populations exhibit low agreement about the value of the activity and underscore the need for cultural sensitivity in vaccination campaigns. The U.S. health system makes vaccinations widely accessible throughout the country, but low agreement about the value of vaccinations makes reaching specific populations socially complicated.

Different interpretations of the value of vaccinations can be found in countries as diverse as Chad and the U.S., Australia and Pakistan. When working in a situation in which logistical challenges lower the certainty and cultural issues lower the agreement, delivery of the activity is complex.

During implementation of USAID programs, performance monitoring data are used to compare results achieved with the expected results and targets initially set at the beginning of a strategy, project, or activity. Thus, performance monitoring is built on known or hypothesized cause and effect relationships. For this reason, it is best suited for the simple and complicated aspects of a strategy, project or activity. Complexity-aware approaches, which can monitor dynamic and emerging aspects of programming, can complement and enrich performance monitoring.

Principles of Complexity-Aware Monitoring

The application of the three key principles listed below can be invaluable for monitoring the emergent and dynamic aspects of strategies, projects, and activities. When you apply these principles to your own situation, you may discover new monitoring solutions.

1. Attend to performance monitoring's three blind spots;
2. Synchronize monitoring with the pace of change; and
3. Consider interrelationships, perspectives, and boundaries.

ATTEND TO PERFORMANCE MONITORING'S THREE BLIND SPOTS

As part of the Program Cycle, performance monitoring is organized around answering questions about the progress of interventions towards desired results according to expected implementation plans. Consequently, some monitoring systems tend to focus on intended outcomes and the specific intervention(s) and associated logic model being implemented. This means monitoring plans may not address 1) a broader range of outcomes associated with the intervention or system including intended, unintended, positive or negative outcomes; 2) alternative causes - other actors and factors contributing to outcomes; and 3) change that is non-linear, meaning results are achieved without a clear, crisp and constant relationship among variables. This makes sense for monitoring the simple aspects of programming, however, ignoring unintended results, alternative causes, and non-linear change can undermine effective decision making for complicated and complex aspects of interventions and contexts.[5]

In programming environments of substantial complexity, complexity-aware monitoring can play a critical role in steering effective implementation. Where the ability to predict outcomes and causal pathways is low, complexity-aware monitoring data on a fuller range of outcomes, causal factors, and pathways of contribution complements performance and context monitoring data on desired results and planned pathways of change.

SYNCHRONIZE MONITORING WITH THE PACE OF CHANGE

As the pace of program adaptation quickens (or slows) to match the pace of change in the context, monitoring must adjust if it is to continue to provide useful information. Experience and engagement in the operating environment is the best way to gauge the pace of change. In most contexts, monitoring may take place on a frequent, or even on-going, basis. However, some significant results may require considerable time to emerge. It makes sense to monitor for these results less often, or to use interim milestones or leading indicators to monitor progress towards the longer-term result.

In both fast-paced and slowly evolving circumstances, effective management relies on timely information. In complexity, the emphasis shifts from advance planning to early detection. Performance monitoring, context monitoring, and complementary monitoring may be strengthened by the use of leading and coincident indicators, which provide data before (leading) or during (coincident) important changes in implementation and the environment. Leading indicators deliver early confirmation or advance warning, informing USAID staff and implementing partners whether they should stay on track or course correct. For example, for an activity supporting policy changes a leading indicator signals the first signs of

progress in the policy process, such as a key actor identifying or debating a policy issue. Monitoring systems that depend solely on indicators that provide data after the result has taken place (often with considerable time lag due to data collection routines and local result chains) may fail to alert staff in time to act.

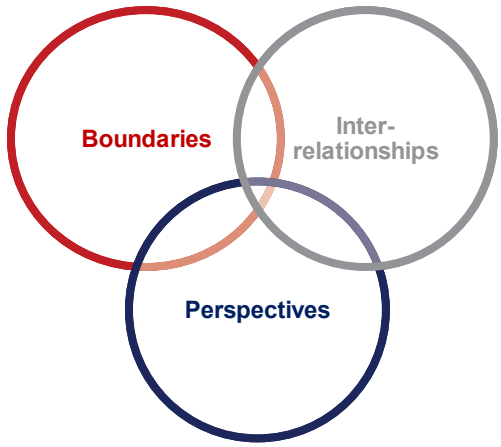
In most circumstances, and especially in complexity, information needs will change over the life of a strategy, project or activity. Synchronizing with the pace of change ensures that information is available when necessary. Monitoring systems that serve adaptive management respond flexibly to collect new data or discontinue monitoring tasks that no longer serve a purpose. Savvy managers continually assess the value and relevance of monitoring data, and prioritize information for decision-making, ensuring that monitoring, evaluation, and learning (MEL) systems are flexible enough to provide evidence as change occurs.

For more information about this principle, please see the Discussion Note: on Synchronizing Monitoring with the Pace of Change in Complexity.

ATTEND TO INTERRELATIONSHIPS, PERSPECTIVES, AND BOUNDARIES

Three central systems thinking concepts can guide monitoring in complexity – interrelationships, perspectives and boundaries. Taken together, these three concepts outline the scope, focus, and intent of the systems field (Figure 3). The concept of **interrelationships** emphasizes that the essential features of any system lie in the dynamic interconnections among parts, not in the individual parts themselves. Does monitoring track the structures, processes, and exchanges linking actors and factors within a system? Different actors in the system have different **perspectives** about the relevant interrelationships in a system, that is, they see, describe, experience, and value those interrelationships differently. Does monitoring provide information on the different perspectives within a system? Different actors may also define a system differently and include different elements and interrelationships. **Boundaries** determine what is included within the system and what is considered outside the system. Does monitoring provide information that is useful for the consideration of what is in and what is outside the system?

Figure 3. Three Central Systems Concepts
Source: Wilson-Grau, R., 2013



For maximum benefit, these systems concepts must be used synergistically. Apply the three together and to each other: What are the stakeholders' perspectives on the system's boundaries and interrelationships? What are the interrelationships between different perspectives and variations in boundaries? Whose perspectives and interrelationships are taken into account and whose are left out? Why? Every monitoring endeavor makes choices between which actors and factors are deemed relevant and which are not, which interrelationships it includes and which it excludes, which perspectives are honored and which perspectives are marginalized. When designing monitoring systems,

these three concepts can help you reflect on your choices. Systems concepts can also help when using monitoring data to guide implementation. Incorporating consideration of interrelationships, boundaries, and perspectives helps to incorporate diverse interpretations of a situation, and provokes more creative thinking and collaborative problem-solving.

For example, the producer, buyer, exporter, financier, and end-market consumer each experience a market system differently. It can be useful to consider these roles as each representing a distinct perspective with a unique understanding of the boundaries of the market system. The small-scale producer thinks primarily about her crop, buyers, and input services, like the shop where she purchases fertilizer. The exporter may not consider input services, instead he will emphasize the role of shipping and transport companies in the same market system. The financier will draw the market system boundaries to include debtors, creditors and banks.

Likewise, each perspective will view key interrelationships in the system differently. An individual's perspective encompasses how they see, understand, value, and are motivated to act in a situation (Williams, Britt, 2014, 4).[6] An individual's perspective is not an opinion; rather, it represents the understanding which undergirds an opinion and how an individual views the purpose of the system.

For example, a buyer who offers a sole source contract to a small-scale producer considers the provision of credit and harvest equipment as a fair exchange for a lower-than-market crop price. A small-scale producer may experience significant financial duress under this arrangement and consider the relationship exploitative. Another buyer views the imbalanced relationship between contract buyer and producer as a business opportunity and seeks to engage the producer in side-selling. If differing perspectives on a market system, and its boundaries and interrelationships, are taken into account when designing an intervention, they should be considered during monitoring as well.

Participatory monitoring approaches are one way to put systems concepts to work in monitoring. Interventions designed to achieve ambitious results necessarily involve and affect a diverse array of stakeholders who bring a variety of perspectives about and relationships to each other and the intervention. In participatory monitoring, tasks are distributed among stakeholders to allow for variety in content, analysis, interpretation, and uses of data to achieve outcomes. Participatory monitoring may contribute to the ongoing negotiations among stakeholders needed to steer an intervention effectively in complexity.

For more information on this principle, please see the Discussion Note: Attending to Interrelationships, Perspectives, and Boundaries.

Promising Complexity- Aware Monitoring Approaches

Any monitoring approach that aligns with the complexity-aware monitoring principles to provide useful information for operating in complexity can be referred to as "complexity-aware." Commonly used monitoring methods may be implemented in a complexity-aware manner when used with the principles. Conversely, the use of cutting-edge methods does not necessarily produce information useful for working in complexity.

When this Discussion Note was originally published in December 2013, it described five promising approaches[7] recognized for their potential to promote USAID's vision of evidence-based and flexible programming in situations where certainty and agreement are low. Since that time, USAID has continued to seek out and trial approaches for monitoring USAID strategies, projects and activities operating in complexity. A number of approaches have been recognized for the potential to provide information necessary for both accountability and learning for complex aspects of programs and contexts. The Systems and Complexity White Paper is one of several resources for those seeking information about promising approaches.[8]

Complexity-Aware Monitoring Approaches in the Program Cycle

All components of the Program Cycle are "interconnected and mutually reinforcing" and integrated through learning and adapting. Adaptive management is one of four principles underpinning the Program Cycle, stating that: "USAID must be able to readily adapt programs in response to changes in context and new information. To do this, the Agency must create an enabling environment that encourages the design of more flexible programs, promotes intentional learning, minimizes the obstacles to modifying programs, and creates incentives for learning and managing adaptively (ADS 201.3.1.2.B)."

The need for adaptive management increases in complex situations, and complexity-aware monitoring can play an important role in adaptive management of complex aspects of strategies, projects and activities. Where complexity is high, more adaptive approaches are necessary to manage the uncertainty and respond to dynamic changes in the context. Adaptive design of a strategy, project or activity, necessitates corresponding approaches in its MEL Plan. Complexity-aware monitoring elements of a MEL Plan should be flexible, and strongly linked to implementation and subsequent designs.

Conclusion

Performance monitoring is intended to "reveal whether implementation is on track and whether expected results are being achieved (ADS 201.6)" Complexity-aware monitoring complements performance monitoring for aspects of strategies, project and activities where cause-effect relationships are uncertain and agreement on problems and solutions is low. When USAID staff identify components of strategies, projects, and activities that meet these criteria, they may consider using complementary monitoring approaches that are complexity-aware in order to address performance monitoring's three blind spots (unintended outcomes, alternative causes and feedback loops), synchronize with the pace of change, and consider key systems concepts, such as interrelationships, perspectives, and boundaries. Complexity-aware monitoring can be used in conjunction with performance and context monitoring keeping in mind the distinctive strengths of each.

ADDITIONAL RESOURCES

Hummelbrunner, R. and Britt, H. (2014). Discussion Note: Synchronizing Monitoring with the Pace of Change in Complexity. Washington, DC: U. S. Agency for International Development.

William, B. and Britt, H. (2014). Discussion Note: Attending to Interrelationships, Perspectives and Boundaries. Washington, DC: U. S. Agency for International Development.

Britt, H., Hummelbrunner, R. and Greene, J. (2017) Causal Link Monitoring.

Davies, R. and Dart, J. (2005). The 'most significant change' (MSC) technique: A guide to its use. Melbourne.

Grau, R., & Britt, H. (2012). Outcome harvesting. Cairo, Egypt: The Ford Foundation's Middle East and North Africa Office.

ENDNOTES

[1]Rogers, P. (2011). Implications of complicated and complex characteristics for key tasks in evaluation. In K. Forss, M. Marra, & R. Schwartz (Eds.), Evaluating the Complex: Attribution, Contribution, and Beyond (p. 39). New Brunswick, New Jersey: Transaction Publishers.

[2]Kurtz, C. F., & Snowden, D. J. (2003). The new dynamics of strategy: Sense-making in a complex and complicated world. IBM Systems Journal, 42(3), 462-483.

[3]An early discussion of this matrix can be found in Zimmerman, B., Lindberg, C., & Plsek, P. (1998). Edgeware: Lessons from complexity science for health care leaders. Dallas, TX: VHA Inc. (page 141).

[4]Kurtz, C. F., & Snowden, D. J. (2003). The new dynamics of strategy: Sense-making in a complex and complicated world. IBM Systems Journal, 42(3), 462-483.

[5]Williams, B. (2011). All methods are wrong, some methods are useful. Systems Thinker, 22(4).

[6]William, B. and Britt, H. (2014). Discussion Note: Attending to Interrelationships, Perspectives and Boundaries. Washington, DC: U. S. Agency for International Development, p. 4.

[7]1) Sentinel Indicators, 2) Stakeholder Feedback, 3) Most Significant Change, 4) Outcome Harvesting, and 5) Process Monitoring of Impacts.

[8]Johns Hopkins, et al. (2016), SPACES MERL: Systems and Complexity White Paper