Building Sustainable Communities: Monitoring and Evaluation

BUILDING SUSTAINABLE COMMUNITIES: MONITORING AND EVALUATION

Module 4: Monitoring and Evaluation

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This publication should be cited as:

Plummer, R., Smits, A., Witkowski, S., McGlynn, B., Armitage, D., Muhl, E.K., Johnston, J. 2022. Building Sustainable Communities: Monitoring and Evaluation. https://ecampusontario.pressbooks.pub/bscmodule4/

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COURSE INTRODUCTION

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ACKNOWLEDGMENTS

About Us

This open access course was developed by members of the Environmental Sustainability Research Centre (ESRC) at Brock University. Located in St. Catharines, Ontario, the ESRC is a transformative and creative transdisciplinary community dedicated to research and education advancing environmental sustainability locally and globally. In working towards this mission, the ESRC:

- *encourages research excellence in environmental sustainability by faculty, librarians, and students;*
- *enables enriching educational experiences in environmental sustainability; and,*
- *engages in knowledge mobilization and fosters knowledge impacts.*

More information about the ESRC, including its undergraduate and graduate programming, is available here.

The ESRC is uniquely positioned to create the five open access modules about Building Sustainability Communities: The Impact of Engagement. It is one of the few universities worldwide to be located in a UNESCO Biosphere Reserve. It is also deeply committed to the enterprise of sustainability science. Throughout the modules, you will see examples of how the ESRC, and our partners are working to build sustainable communities.

Acknowledgements

Building Sustainability Communities: The Impact of Engagement, would not have been possible without the collaborative efforts and support of individuals at Brock University. Equally important are the many individuals beyond the campus who kindly agreed to take part in this project. We would like to express our appreciation to the following individuals for their input, support, and dedication to the project:

- *Brock University Team Members*
  - *Dr. Ryan Plummer (Project Lead), Professor and ESRC Director*
  - *Erica Harper, Research Assistant, ESRC*
  - *Jodi Johnston, Research Assistant, ESRC*
  - *Dr. Marilyne Jollineau, Associate Professor, ESRC*
  - *Bridget McGlynn, Research Assistant, ESRC*
  - *Amanda Smits (Project Manager), Centre Administrator, ESRC*

    - *Savannah Stuart, Research Assistant, ESRC*
    - *Samantha Witkowski, Partnerships Coordinator, ESRC*

- *Collaborating Partners*
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    - *Jennifer Fresque-Baxter: Manager, Sustainable Livelihoods and Traditional Knowledge, On the Land Unit Environment and Natural Resources Government of the Northwest Territories*
    - E*xternal Partner Leads of the ESRC Innovative Partnerships*

- *Brock University's Centre for Pedagogical Innovation (CPI)*
    - *Dr. Madelyn Law, Associate Vice-Provost, Teaching & Learning*
    - *Matt Clare, Associate Director, Technology Enabled Learning*
    - *Giulia Forsythe, Associate Director*

Our appreciation to Dr. Ingrid Makus, Dean of the Faculty of Social Sciences at Brock University who is supportive of introducing this course into the 2022/23 curricular offerings . We would also like to thank Kyle Mackie and Jodi Johnston who lent their expertise and talents to numerous pieces of this course.

We would also like to express our sincere thanks to the following individuals who took the time to help create video content for this project:

- *Dr. Julia Baird, CRC (Tier II) in Human Dimensions of Water Resources and Water Resilience, Associate Professor, Environmental Sustainability Research Centre and the Department of Geography and Tourism Studies*
- *Corey Burant, Project Manager, Forest Health Parks, Planning & Properties, Niagara Parks Commission*
- *Kerry-Anne Charles, Cambium Indigenous Professional Services*
- *Madu Galappaththi, University of Waterloo*
- *Lowine Hill, University of Waterloo*
- *Jodi Johnston, York Region District Schoolboard*
- *Michael Kirkopoulos, Chief Administrative Officer, Town of Lincoln*
- *Geoffrey Martynuik, Ecosystem Scientist and Marine Planner, Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site*
- *Shannon McKay, Director of Community Services, Town of Lincoln*
- *Simon J. Mitchell, VP Resilient Habitats, World Wildlife Fund-Canada*
- *Jayne Morrish, Knowledge Translation Officer, Brock University*

- *Ellen Savoia, Senior Manager, Environmental Planning, Niagara Parks Commission*
- *Dr. Liette Vasseur, Professor and UNESCO Chair in Community Sustainability, Brock University*
- *Dr. Ana Carolina Esteves Dias, Postdoctoral Fellow, School of the Environment, Enterprise and Development, University of Waterloo*

These videos could not have been created without the hard work of Brock TV, including Executive Director Matthew Scott and his wonderful team, who edited all videos and also assisted with some video production.

We would also like to thank Rachel Derrah, who provided all the introductory graphics throughout the course.

The ESRC would also like to thank the following reviewers whose constructive comments and feedback further enhanced the module content.

- *Dr. Jessica Blythe, Assistant Professor, Environmental Sustainability Research Centre, Brock University*
- *Dr. Ana Carolina Esteves Dias, Postdoctoral Fellow, School of the Environment, University of Waterloo*
- *Dr. Dana Thomson, Adjunct Professor, Environmental Sustainability Research Centre, Brock University*
- *Kassie Burns and Sydney McIntyre, Undergraduate Students, Brock University*
- *Cameron Carroll and Natasha Winckler, Undergraduate Students, University of Waterloo*

This project is made possible with funding by the Government of Ontario and through eCampusOntario's support of the Virtual Learning Strategy. To learn more about the Virtual Learning Strategy visit: https://vls.ecampusontario.ca.

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MODULE 4 INTRODUCTION

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LEARNING OBJECTIVES

Learning Objectives

After reviewing each of the lessons in this module, you will learn how to:

- Define monitoring and evaluation (M&E) and explain why they are important aspects of building sustainable communities.
- Understand the spectrum of M&E approaches.
- Appraise the benefits and challenges of engaging actors in M&E.
- Describe key tensions surrounding M&E for building sustainable communities.

LESSON 1: WHAT IS MONITORING & EVALUATION?

Lesson 1:
What is monitoring & evaluation?

INDIGENOUS COMMUNITIES & M&E

In the context of Indigenous communities "traditional Indigenous knowledge (TK) and traditional resources have been managed by Indigenous communities since time immemorial" (Indigenous Corporate Training Inc, 2018), including M&E.

The value of traditional knowledge in resource development projects, environmental management, government policies and co-management strategies has increased over the past four decades (Indigenous Corporate Training Inc, 2018).

It is especially important that any person or organization working with Indigenous communities is aware of the guidelines for monitoring TK studies, including Indigenous relations training, knowledge systems, and rights and legal systems surrounding these practices.

Supplementary reading

Please click here to read more about the history of Indigenous knowledge and participation in environmental monitoring, as summarized from academic literature by Thompson et al. (2020).

HISTORY OF M&E

Due to the wide application of M&E throughout many fields and practices, it is difficult to determine its exact origins. It can be argued that, as a field of practice, its origin is as old as mankind (Stockmann, 2011; Basheka & Byamugisha, 2015). Even pre-modern societies implemented some form of performance-tracking systems. In giving a more distant historical perspective of the importance and usefulness of M&E practice, Kusek and Rist (2004, p. 11) state: "there is tremendous power in measuring performance. The ancient Egyptians regularly monitored their country's outputs in grain and livestock production more than 5,000 years ago. In this sense, M&E is certainly not a new phenomenon."

However, the modern Western usage of the term within academic disciplines varies more significantly. M&E has become an integral part of research and practice, and as such, it is relevant to many different fields, from government and policy, education, natural resource management, and many others. One of the earliest calls for M&E in an environmental context came from C.S. Holling and colleagues (Stem et al., 2005). In the late 1960s the group developed what they called "adaptive environmental assessment and management", or adaptive management (Stem et al., 2005). Within this context, adaptive management "involves integrating project design, management, and monitoring to provide a framework for testing assumptions, adaptation, and learning" (Margoluis & Salafsky, 1998, p. 8).

Since the late 1960s, there has been growing recognition among scholars and practitioners that "effective project management goes beyond simple implementation, and is integrally linked to well designed monitoring and evaluation systems" (Woodhill, 2000 in Stem et al., 2005, p. 1; see also Hockings et al., 2000; Margoluis & Salafsky, 1998).

In particular, M&E has taken on increased importance in the sustainability domain, as scholars and practitioners struggle to demonstrate progress made towards addressing the contemporary problem domain (covered in Module 3).

KEY CONCEPTS

M&E are two distinct elements which work to compliment each other.

Monitoring is an ongoing activity during the life of a project that aims to provide stakeholders and rights holders with information regarding the performance of any ongoing activities (Estrella & Gaventa, 1998; Onyango, 2018).

Specifically, it helps to determine whether the stakeholders and rights holders need to make any meaningful changes in the activities being undertaken, so that it can be as efficient as possible (Estrella et al., 2000; Kananura et al., 2017). It uses the systematic, continuous collection of data on specified indicators to provide insight into whether a project is on track, and if any of its strategies or activities need to be changed so that it can be successful (Shah et al., 2006; World Bank, 2011). It is an internal project activity, and essential part of day to day management (Casley & Kumar, 1987).

Evaluation is an assessment, as systematic and objective as possible, of an ongoing or completed project, its design, implementation, and results. The aim is to determine the relevance and fulfilment of objectives, developmental efficiency, effectiveness, impact, and sustainability. The main purposes of evaluation are to isolate errors and take corrective action, as well as to highlight the successful mechanisms for current and future activities (Jackson & Kassam, 1998). Therefore, evaluation measures achievement, as well as positive or negative and intended or unintended effects (Kariuki, 2014). An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision-making process of everyone involved.

> Together, **monitoring and evaluation** is regarded as a process, undertaken to assess and improve the performance of a system in order to achieve a desirable outcome(s) (Estrella & Gaventa, 1998).

Monitoring and evaluation are interactive and mutually supportive processes. M&E provides stakeholders with better means for learning from past experience, improving service delivery, planning and allocating resources, and demonstrating results as part of accountability to rights holders and key stakeholders.

It is important that both of these phases (monitoring and evaluation) are conducted, so that accurate information can be obtained and used to analyze the system in relation to particular objectives. This is especially critical given the dynamic nature of socio-ecological systems, which may inevitably change project goals or strategies over time.

DIFFERENT USES OF M&E

M&E approaches vary by context and stakeholder or rights holder interests, thus serving multiple purposes (Stem et al., 2005). Numerous scholars have recognized the need to distinguish between M&E types, and many have attempted to do so based on the general purposes for which M&E is employed.

As such, the four main purposes of M&E can be categorized as (Stem et al., 2005, p. 297):

1. Basic research
2. Accounting and certification
3. Status assessment
4. Effectiveness measurement

Explore each purpose of M&E:

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KEY PERFORMANCE INDICATORS

Now what about identifying the information you need to collect?

As mentioned previously, effective M&E provides detailed and objective information for enabling improvements in a project. This must be preceded by stages of careful design and deliberation of measurable aspects. In other words, it is common to identify key performance indicators (or KPIs) that will serve as metrics for tracking and monitoring variables of interest in the evaluation.

What is a KPI?

Key performance indicators (KPIs) are measurable variables used to signal progress or achievements against pre-defined standards or objectives (Lime et al., 2004).

They are the compilations of data measures used to assess the performance or impacts of project (Toor & Ongunlana, 2010). Indicators are helpful to compare the actual and estimated performance of a project, in terms of effectiveness, efficiency, and overall quality (Cox et al., 2003).

These KPIs may provide quantitative information, which is expressed in numerical terms and can answer questions like "what", "how many", and "when". Or they may provide qualitative information, which is expressed through descriptive prose and can address questions like 'why' and 'how', as well as perceptions, attitudes and beliefs. Indicators of project performance and outcome depend on the objectives pursued and the strategies adopted, which vary from project to project.

A good indicator clearly demonstrates the expected progress or result. It measures the intended change as accurately as possible. It is clearly defined, easily understood, and easily measured. The specific KPIs chosen will depend on the overall goals and specific context of your own project.

Key tips for selecting KPIs:

Indicators need to be **SMART**:

- **S**pecific: Your indicators should be precise. They should lead to collection of similar data by different people or by the same person a second time.
- **M**easurable: Indicators should be based on accessible data that can be obtained efficiently.
- **A**chievable: Ask yourself: Am I aiming too high? Are my indicators realistic and truly obtainable?
- **R**elevant: Is the indicator demonstrably linked to the objective you wish to measure?
- **T**ime-bound: Ask yourself: What is the timeframe in which I want to develop and implement this project? What is achievable in that timeframe?

KPIS FOR SUSTAINABLE COMMUNITIES

Air Pollution Community KPIs (Adapted from Hemment et al., 2016)

This community project has an overall goal of improving citizen well-being by having fewer people exposed to unhealthy levels of air pollution.

One of the activities to help achieve this goal involves installing sensors in street amenities (e.g., lamp posts) in the community to monitor air quality at different heights and locations. Readings from these installations will be communicated via a web application to those with health conditions related to poor air quality, as well as made generally available for the public to support walking route options.

Some possible KPIs to track for a project such as this one might include the following:

- Number of citizen affected by respiratory illness in the defined community.
- Number of times the air quality application was downloaded.
- Frequency of visits to the emergency room related to respiratory illness before and after the intervention.

Trail KPIs (Adapted from Witkowski et al., accepted)

This project takes place in a protected park, which has an overall goal of providing rich visitor experiences while also maintaining the ecological integrity of the nature trails.

One activity to help achieve this goal includes increasing visitor education about trail safety and proper behaviour. Updated signage was installed at key points along the main trail, which provided

information on the "Leave No Trace" principles. A QR code was also printed on the sign so that trail users could scan the code and always have the information with them. After their hike, they are able to use the code to take a knowledge quiz about the principles.

Some possible KPIs to track for a project such as this one might include the following:

- Number of times the QR code was scanned.
- Number of litter items on trail with updated signage vs trails without signage.
- Visitor knowledge of trail safety.

GUIDING PRINCIPLES FOR M&E

It is useful to develop some guiding principles to ensure that your M&E is relevant, useful, timely, and credible. Some examples might include making sure the M&E and/or information you collect is:

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WHY DO WE NEED M&E FOR BUILDING SUSTAINABLE COMMUNITIES?

Consideration towards M&E for building sustainable communities is important for several reasons:

- At the basic level, M&E can not only provide detailed information about the efficiency and success of project, it also works to provide public and internal accountability and help demonstrate impact, which are essential functions in light of current sustainability challenges (Estrella & Gaventa, 1998; Goparaju et al., 2006; Stem et al., 2005).
- This cyclical process involving problem identification, taking action, monitoring, and reflecting and redefining the problem, inherently affords the opportunity to strengthen and deepen the contributions of primary stakeholders and rights holders, through shared learning, joint-decision making, co-ownership, etc. (Onyango, 2018).
- Additionally, in order to achieve sustainability under conditions of socio-ecological change, continuous learning in environmental management initiatives are crucial (Armitage et al., 2008). In line with this, greater public participation and learning about the interactions between science and society has become increasingly important (Kates, 2011). Berkes et al. (2003) argue that environmental management processes can be improved by making them adaptable and flexible, so as to be able to deal with the

uncertainty that complex systems inherently produce.

LESSON 2: THE SPECTRUM OF M&E APPROACHES

Lesson 2:
The spectrum of M&E approaches

SPECTRUM OF APPROACHES

As we can recall from Module 1, engagement exists along a spectrum of participation. The same can be said for M&E. In this lesson, we go through two types of M&E: conventional and participatory. These two approaches aptly highlight the different levels of engagement that can occur in M&E.

Conventional M&E, as the term suggests, has been practiced in program implementation much longer than participatory M&E has been done. Conventional M&E represents one end of the spectrum of approaches. On this end, community engagement or participation is not typically undertaken. Instead, the implementing agency drives the entire process, and "experts" that are external to the project are usually contracted to conduct the evaluation as a way to ensure objectivity (Estrella & Gaventa, 1998; Jackson & Kassam, 1998; Shah et al., 2006).

Participatory M&E (PM&E) is a product of the last two decades' emphasis on people's participation in the conceptualization and implementation of development projects that directly affect the stakeholders and rights holders themselves. It is on the opposite end of the spectrum because this approach builds on the involvement of all relevant stakeholders at every stage of the process, encouraging dialogue at the grassroots level (Estrella et al., 2000; Estrella & Gaventa, 1998; Shah et al., 2006; Margoluis & Salafsky, 1998).

To reiterate, conventional M&E is at one end of the spectrum because it does not typically involve engaging community members in the process. PM&E is at the other end of the spectrum because it focuses on the involvement and engagement of all relevant stakeholders and rights holders throughout the entire process.

CONVENTIONAL VS. PARTICIPATORY M&E

Conventional M&E and can be differentiated from participatory M&E in terms of three parameters:

1. Involvement and role of stakeholders and rights holders

In these two approaches, the roles and responsibilities of people involved are somewhat different.

In conventional M&E, senior managers, outside experts, and/or donor agencies typically drive the process. They are responsible for planning and managing the project, making key decisions, and so on. Community members or stakeholder participation is extremely limited in the sense that they are not involved in the planning of the M&E mechanisms and content; neither will they be involved in the processing and interpretation of results.

In PM&E, local people, project staff, managers, and other key stakeholders involved in the project are responsible for planning, managing, and decision making. The very essence of participatory M&E is involvement of stakeholders and rights holders in critical steps of the program cycle, even as early as the planning stage. Because they are the ones who have a stake in the whole process or those who have something to gain or to lose by being involved in the program, they are involved in every stage of the process.

It is important to note here that, regardless of the M&E approach taken, rights holders have constitutionally protected rights which require legal consultation or involvement in a project. This needs to occur before the project is initiated. The Government of Canada specifically has a duty to consult (covered in Module 1), and where appropriate, accommodate Indigenous groups when it considers conduct that might adversely impact potential or established Aboriginal or treaty rights. This requirement applies to federal, provincial, and territorial governments.

2. Focus of data gathering

Conventional M&E attempts to achieve breadth of information, and often relies on using pre-determined indicators to drive data collection. Often, these indicators are quantitative. Furthermore, in the data collection phase of conventional M&E, stakeholders are typically only involved in providing information (for example, by filling out a survey), rather than being involved in the data collection process itself.

PM&E typically focuses on depth of information, and can include a combination of quantitative and qualitative information. In terms of data collection, stakeholders and rights holders are typically involved in

decisions regarding the methods used for data collection, designing the instrument, and they may even be involved in collecting the data.

3. Overall approach

Finally, conventional M&E mainly focuses on achieving ultimate system or project effectiveness. The process focuses on utilizing scientific objectivity to make decisions that will improve the effectiveness of the project. It relies heavily on scholarship and pre-determined indicators to determine results.

Comparatively, the concept of PM&E as an experiential learning cycle towards building adaptive capacity serves to emphasize the notion that participants learn together from experience as well as through each other, resulting in action-oriented planning. Stakeholders and rights holders continuously reflect on the impact of their intervention or management plan, learning from their own success and mistakes.

SPECTRUM OF APPROACHES

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KEY CHARACTERISTICS OF CONVENTIONAL M&E

Let's take a deeper look at the key characteristics that make up conventional M&E.

Key Characteristics of Conventional M&E include:

- Top-down approach
- Emphasizes achieving ultimate system effectiveness
- Externally oriented towards enhancing cost efficiency or accountability
- Involve outside experts to conduct the evaluation
- Pre-determined indicators and measures to track progress or change
- Standardized processes of engagement (typically only to provide information)

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CONVENTIONAL M&E PROJECT CYCLE

Due to the wide application of M&E in various contexts, there is no exact recipe for conducting M&E (Estrella et al., 2000; Hockings et al., 2000; Margoluis & Salafsky, 1998; Stem et al., 2005). However conventionally, M&E has been approached using a project cycle framework involving seven different phases through which the project evolves, from a basic needs assessment or appraisal, towards evaluation and documentation of results (Shah et al., 2006).

The way in which projects are planned and carried out follows a sequence beginning with an agreed strategy, which leads to an idea for a specific action, oriented towards achieving a set of objectives, which then is formulated, implemented, and evaluated with a view to improving the strategy and further action.

The project cycle also provides a structure to ensure that stakeholders and rights holders are consulted and relevant information is available throughout the life of the project, so that informed decisions can be made at key stages in the life of a project.

Select the "+" over each of the phases to learn more about what is involved in each.

There are 7 phases of the Conventional M&E Project Cycle. Phase 1, Needs Assessment, is done to determine whether a project is needed and, if so, to inform its planning. Phase 2, Project Design, is the practical planning for the project to capture goals, objectives, activities, and develop indicators that will be used in the monitoring and evaluation phases of the project. This is also where you would set up basic M&E system infrastructure including systems for managing data. Phase 3, Baseline Data Collection, is the measurement of the initial conditions (appropriate indicators) before the start of a project. It is important to know where you are starting, before any progress can actually be measured. During phase 4, Project Implementation, the activities that were planned to reach the project goals can begin. During phase 5, Monitoring & Evaluation, stakeholders collect and analyze data for the purposes of their project. They manage activities and, based on the findings of ongoing monitoring, they consider and adopt course corrections, as needed. It is important to note that in the early stages of a project certain steps logically precede others, but as a project develops, it is beneficial to take what was learned from the experience and adapt the project strategies or activities as necessary (Goparaju et al., 2006; Estrella & Gaventa, 1998). That is why phase three is considered a continuous activity, occurring throughout the lifecycle of a project. Phase 6, Evaluation, takes place at the end of the project lifecycle. It assesses how well the project/program achieved its intended objectives/goals and what difference this has made. Data that evaluations generate is used to produce reports on the impact of the project and to identify lessons learned that can then be applied to other projects. In phase 7, Use of Results, project leads can take the information obtained through ongoing monitoring and evaluation to make key decisions about the project, including ways to make improvements. Skip to next piece of content.

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BENEFITS AND CHALLENGES OF CONVENTIONAL M&E

Benefits of Conventional M&E

One of the main reasons why conventional M&E is often used is because it produces **objective and quantifiable results**. Data is collected by someone outside of the project, which is argued to eliminate potential bias. Additionally, data is collected using pre-determined quantitative indicators. This provides information that can be expressed in numerical terms and can answer questions like "what", "how many", and "when". It is argued that this form of traditional scientific M&E is necessary to eliminate bias and ensure objective decision making in sustainability, especially when multiple interests or stakeholders are involved (Bennett, 2016; Koontz & Thomas, 2006; Sutherland et al., 2004). Scientific measures tend to be favoured for their reliability and accuracy, thus preventing mislead intuitions while increasing accountability (Cook et al., 2010; Forster et al., 2017; Pullin & Knight, 2003; Sutherland et al., 2004).

Benefits of Conventional M&E

- Objective and quantifiable results
- Easy to coordinate
- Timely

Conventional M&E is also **easier to coordinate** because there is inherently less people involved in the process. This includes scheduling activities, making key-decisions, and so on.

It can also be more **timely** in comparison to other approaches, as there are less steps involved (compared to PM&E), and therefore less variables that could slow or impede the process (for example, navigating conflicting objectives between community members).

Challenges of Conventional M&E

Challenges of Conventional M&E

- Typically focuses on quantitative indicators
- External experts do not have familiarity with project details
- Difficulty interpreting results
- Donor agencies drive the process/influence data collection
- High cost
- Lack of local knowledge and perspectives

Conventional M&E often **focuses on the examination of quantitative indicators**, such as biological measures and outcomes (Goparaju et al., 2006). While this is critical for providing information on the degree to which anticipated results are achieved, it has become increasingly important to move beyond looking strictly at ecological indicators (Bennett, 2016; Trimble & Plummer, 2018).

Another prominent challenge deals with having an external expert conducting the evaluation. Although this is done to ensure objectivity, the **external expert does not have familiarity** regarding the project history, or details of day-to-day operations. This can impact an evaluation in many ways. In line with this, the disconnect between external evaluator and project members can cause challenges in relation to interpreting results. Project members may be unable to understand, or make use of the evaluation information provided by an external entity. This negatively impacts the next decision-making steps in the process, as project members may be unclear on the actual results.

In conventional M&E, **donor agencies often drive and influence the M&E process**. This includes making decisions about what type of data to collect and how. This can lead to collecting data that is not necessary or relevant, as it only answers the concerns of the donor.

Conventional M&E is known to have **higher costs**, often associated with the type of data needing to be collected as well as the hiring of an external professional evaluator.

Finally, concerns have been raised regarding the **alienation of local stakeholders and rights holders** from initiatives and decisions that directly affect them (Goparaju et al., 2006). Local knowledge and perspectives are often unaccounted for in conventional M&E projects. This is problematic because it results in incomplete information about an initiative. It may also be more challenging for community members to understand, accept, and support decisions made for them instead of with them. In fact, without employing a wide range of approaches and methods of inquiry, important contextual factors may be obscured or misinterpreted, and can lead to culturally inappropriate, socially unjust, and ultimately unsound actions (Bennett, 2016). One of the biggest critiques of conventional M&E is the lack of engagement with respect to key stakeholders, rights holders, and other community members in projects. This lack of engagement impacts the likelihood of local knowledge and perspectives being included in the project. This can also negatively impact the results.

CONVENTIONAL M&E IN ACTION

A panel discussion with Ellen Savoia, Senior Manager, Environmental Planning, Corey Burant, Project Manager, Forest Health Parks, Planning & Properties, and Samantha Witkowski, Master of Sustainability graduate.

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KEY CHARACTERISTICS OF PARTICIPATORY M&E

Now we can take a closer look at the key characteristics that make up PM&E.

Key Characteristics of Participatory M&E include:

- Bottom-up approach
- Emphasizes and supports shared learning of stakeholders and rights holders at various levels (local, regional, national)
- Build capacity of local people to assess and analyze, reflect and take action
- Consider primary stakeholders and rights holders as active participants – not objects or mere sources of information
- Involves stakeholders and rights holders in all or most of the phases of the M&E process (the approach is designed with them)
- Focus on the views and aspirations of community members

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https://ecampusontario.pressbooks.pub/bscmodule4/?p=191#h5p-14

PARTICIPATORY M&E PROJECT CYCLE

Compared to a more conventional approach, the project cycle for a PM&E approach is somewhat different. A participatory approach to M&E builds on the involvement of all relevant stakeholders at every stage of the process, encouraging dialogue at the grassroots level (Estrella et al., 2000; Estrella & Gaventa, 1998; Shah et al., 2006; Margoluis & Salafsky, 1998). As such, additional steps or phases are important within PM&E, as stakeholders must collectively plan and design the M&E process. Additionally, emphasis is placed on the learning processes that can take place throughout a PM&E process, and the unique opportunity afforded to participants to learn from experience and adapt management strategies as new information becomes available (Estrella & Gaventa, 1998; Shah et al., 2006; Margoluis & Salafsky, 1998; Onyango, 2018). Therefore, feedback and participatory decision making based on evaluation results are an important step in a PM&E project cycle (Shah et al., 2006).

That being said, typically a PM&E process is organized into nine key phases.

Select the "+" over each of the phases to learn more about what is involved in each.

There are 9 phases of the participatory M&E project cycle. Phase 1, Appraisal, is the process that enables communities to analyze and share their knowledge, experiences, views, and concerns on different topics related to their physical, economic, and social conditions. This is also the step in which you would identify and actively engage with all relevant stakeholders and rights holders. Phase 2, Planning and Project Design, is where an activity or project is designed jointly by all of the relevant stakeholders. This means that all key decisions regarding the project will be taken jointly by the community participants and project leads, including objectives, activities to be implemented, timelines, processes, etc. During Phase 3, Development of Baseline Indicators, stakeholders collectively identify and select the project indicators. Phase 4, Baseline Data Collection, occurs before implementing the project. Collecting data after the project has already started means losing an opportunity to measure the project's impact by comparing a "before" and "after" snapshot of the community situation and the changes that occurred as a result of project activities. Phase 5, M&E Planning and Design, is where the M&E plan is designed jointly by all relevant stakeholders. This includes making decisions about recording the data and information, who maintains the records, how often data will be gathered, etc. During Phase 6, Implementation, the activities that were planned to reach the project goals can begin. In Phase 7, Monitoring and Review, stakeholders collect and analyze data for the purposes of their project. They manage activities and, based on the findings of ongoing monitoring, they consider and adopt course corrections, as needed. Phase 8, Evaluation, determines whether and to what extent the project or activity was able to achieve its objectives. Lastly, Phase 9, Feedback and Decision Making, shares information with partners and with others not directly involved with the project. Sharing information is also key to the

participatory evaluation process. Skip to next piece of content.

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BENEFITS AND CHALLENGES OF PARTICIPATORY M&E

Benefits of Participatory M&E

PM&E encourages local communities to **build adaptive capacity**. Participants involved are able to gain skills which strengthen local capacities for tasks such as resource management or planning, problem solving, and collaborative decision-making (Jackson & Kassam, 1998; Onyango, 2018). Participants also develop a greater understanding of the factors (internal or external), which affect the dynamics of a project, such as successes, failures, potential solutions, or alternative actions (Campos & Coupal, 1996 in Estrella & Gaventa, 1998).

The focus of PM&E as a **learning opportunity** is also significant (Margoluis & Salafsky, 1998; Selin et al., 2000). In order to achieve sustainability under conditions of socio-ecological change, continuous learning in community initiatives is crucial (Armitage et al., 2008). The cyclical PM&E process involving problem identification, taking action, monitoring, and reflecting and redefining the problem, inherently affords the opportunity to strengthen and deepen the contributions of primary stakeholders and rights holders, through shared learning, joint-decision making, co-ownership, etc. (Jackson & Kassam, 1998; Onyango, 2018).

Benefits of Participatory M&E

- Build local level adaptive capacity
- Continuous learning for everyone involved
- Localized knowledge and perspectives included
- Locally relevant results
- Stakeholder accountability and empowerment

An underlying objective of PM&E is to achieve a more holistic perspective of an initiative, by involving a **diverse set of stakeholders and rights holders** (Stem et al., 2005). Participation may also increase the likelihood that community sustainability decisions are perceived to be **locally relevant**, holistic and fair, while accounting for a diversity of values and needs and recognizing the complexity of human-environmental interactions (Jackson & Kassam, 1998; Richards et al., 2004).

Participation can **empower stakeholders and rights holders** through the co-generation of knowledge with researchers and increasing participants' capacity to use this knowledge (Greenwood et al., 1993; Okali et al., 1994). Participation may also increase the likelihood that community sustainability decisions are perceived

to be relevant, holistic and fair, while accounting for a diversity of values and needs and recognizing the complexity of human-environmental interactions (Richards et al., 2004).

Challenges of Participatory M&E

Challenges of Participatory M&E

- Time constraints
- Coordination
- Navigating power dynamics
- Varying levels of skills
- Communication
- Integrating multiple types of knowledge and perspectives
- Engaging with Indigenous communities and active consultation

Participation in M&E is **time consuming** because it requires involvement in all or most phases of the overall project, including planning, implementation, monitoring, and evaluation. Projects with community involvement may have more **difficulty coordinating** meetings due to differing schedules, travel requirements, etc. Community members will have livelihood, family, and perhaps other organizational obligations (Lasker & Weiss, 2003).

Unequal power structures among decision makers, scientists, and local community members are an inherent challenge of PM&E. It is important to think critically about power throughout the PM&E cycle, taking into account not only the power relations between the project leads and the community, but also those that exist within the community itself.

Although community members can learn new knowledge and skills through this process, it is common that each participant will have **varying levels of skills** at the beginning of the process. This can include project management skills, data collection, or even communication. Even language barriers can limit meaningful engagement.

In line with this, it can be difficult to **integrate multiple types of knowledge and perspectives from multiple diverse backgrounds**. This process of integration can even be accompanied by group conflict which required a skilled facilitator to work through and arrive at a final decision. For example, there may be key differences in a western perspective of sustainability compared to an Indigenous perspective of sustainability. It is important to acknowledge all perspectives as valid and informative.

Engaging with Indigenous communities and active consultation can be considered a challenge in PM&E. Often times, this step is overlooked or not undertaken at all. Although it may be difficult to understand *when* and *how* to engage and consult with Indigenous communities, it is essential. Think back to Module 2, where you have learned about the process of engaging with Indigenous communities, and how to respectfully enter into an Indigenous community.

PARTICIPATORY M&E IN ACTION

Here we learn from Dr. Ana Carolina Esteves Dias, University of Waterloo and Dr. Derek Armitage, University of Waterloo discussing participatory monitoring.

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WHICH M&E APPROACH IS BETTER?

Tensions arise regarding how to conduct M&E because real-world sustainability projects operate in complex and dynamic contexts, and thus different M&E needs require different approaches (Reed, 2008; Stem et al., 2005). The approach chosen depends on the overall goal of practitioners. Essentially, there is no one M&E approach that fits all sustainability efforts (Hockings et al., 2000; Margoluis & Salafsky, 1998; Reed, 2008). In order to determine which approach is most appropriate, practitioners must have a clear understanding of their M&E needs (Stem et al., 2005).

For example, if the goal of M&E for a project is to gain a general sense of the existing condition of the environment at one point in time, also known as a status assessment, it would be less time consuming and resource intensive to have an external expert complete the evaluation (conventional M&E). In contrast, if the goal of M&E for a project is to understand how your actions can improve community sustainability, also known as effectiveness measurement, it would be important to understand the impacts that your project is having on the intended audiences (PM&E).

Lastly, we must also be aware of the need and appropriateness of alternative approaches to M&E. While we touched upon two prominent examples in this lesson, you are reminded that M&E approaches exist along a spectrum. There are many other approaches that focus on or capture specific perspectives, ideas, and ways of knowing.

M&E INVOLVING INDIGENOUS COMMUNITIES

In many jurisdictions, M&E programs should involve Indigenous communities. There are different approaches to engaging with Indigenous communities in M&E efforts and which approach is most appropriate should reflect the interests and aspirations of the communities involved.

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INDIGENOUS LED M&E PROJECTS

The Sikumiut Model is a co-developed, decolonized approach to research practices for Inuit and non-Indigenous researchers.

This model supports Inuit governing research and Inuit youth mentored by non-Indigenous research partners in order to provide training so they can conduct the research themselves (Wilson et al., 2020, p. 1).

This model created the community-based sea-ice monitoring program "SmartICE". Local Inuit community members monitor and evaluate sea-ice as well as work together with new tools and technology to help teach Inuit youth about IQ and sea-ice.

This model shows how "having Inuit in decision-making positions ensured Inuit data ownership, accessibility, and control over how their Inuit Qaujimajatuqangit is documented, communicated, and respected for its own scientific merit. It examines the benefits and potential to build on the existing research capacity of Inuit youth and describes the guidance and lessons learned from a non-Indigenous researcher in supporting Inuit self-determination in research." (Wilson et al., 2020, p. 1).

From guidance to practice: the Sikumiut model

Read all of Wilson et al.'s (2020) Changing the role of non-Indigenous research partners in practice to support Inuit self-determination in research.

INDIGENOUS LED M&E PROJECTS: SMARTICE

SmartICE: Community-based sea-ice Monitoring Program

SmartICE is the "World's first climate change adaptation tool to integrate traditional knowledge of sea ice with advanced data acquisition and remote monitoring technology." (https://smartice.org). SmartICE supports communities' ice information needs for safer sea ice travel and community economic
development. Each community serviced by SmartICE has a Community Management Committee made up of Elders, youth, and representatives from community organizations.
"These Committees document Inuit Quajimajatuqangit that has been passed down through generations and teach young hunters and ice users how to plan, prepare, identify, and test the sea ice for safety while traveling. By sharing their accumulated sea ice knowledge, the communities are enabling younger generations to adapt to unpredictable sea ice conditions caused by changing climate."
The SmartICE website provides more about the SmartICE program!

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LESSON 3: CITIZEN SCIENCE AS A MECHANISM FOR BUILDING SUSTAINABLE COMMUNITIES

Lesson 3:
Citizen science as a mechanism for building sustainable communities

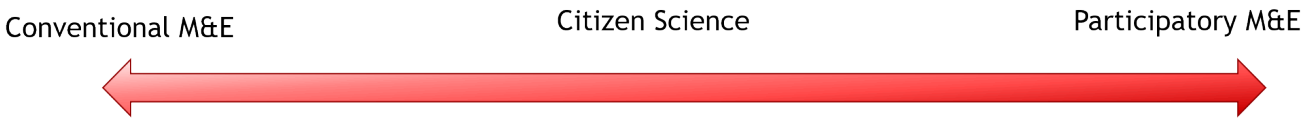
CITIZEN SCIENCE ACROSS M&E APPROACHES

Within the spectrum of approaches, which has conventional M&E on one end and PM&E on the other, the boundary between the two can seem fuzzy. What else exists along this continuum?

As M&E has gained more attention recently, there are now emerging methods and tools that exist to help support M&E. These methods and tools fluidly exist along this spectrum.

One example of an innovative method that supports M&E is citizen science. This method can fall on either side of the spectrum, depending on how involved or engaged the stakeholders and rights holders are in the process. If they are only part of one phase of the M&E process, it is likely that it leans more conventional. If they are involved in multiple phases, it may lean more participatory. We will touch on this more later.

In this lesson, we will learn what citizen science is, its history, explore its different uses, and see it in action.



CITIZEN SCIENCE

Defining Citizen Science

There is an inherent challenge in providing an exhaustive definition of citizen science, encompassing the many different purposes and approaches applied to even more diversified contexts. Over the past decade and a half, we have seen the emergence of typologies, definitions, and criteria for qualifying citizen science (Haklay et al., 2021). For example, in examining the challenges and dimensions of definitions related to citizen science, Halkay et al. (2021) note that:

> The Oxford English Dictionary (2014), define citizen science as "scientific work undertaken by members of the general public often in collaboration with or under the direction of professional scientists and scientific institutions.
>
> UNESCO (2013) describes it is "the participation of a range of non-scientific stakeholders in the scientific process. At its most inclusive and most innovative, citizen science involves citizen volunteers as partners in the entire scientific process, including determining research themes, questions, methodologies, and means of disseminating results."
>
> Finally, the US National Institutes of Health state "Citizen science efforts are driven by community concerns. These community-led projects may involve a partnership with an academic or research institution, where both parties work together to collect and share data. The goal is to address a community concern through collaborative research and to translate the research findings into public health action that benefits the community."

At its core, **citizen science** gets people involved in the actual science by directly contributing to the research or finding of new information for science and society. This can include collecting data, making records, analyzing, or sharing results. Citizen science fosters an approachable entry into science, reducing the distance between science and society, and contributing to the goal of an inclusive society. Together with public and private actors, citizen scientists can play a role in developing society, improving communities, and promoting public participation.

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History of Citizen Science

People have been participating and contributing to scientific research for centuries. Wells Cooke, a member of the American Ornithologists' Union, developed arguably one of the earliest formal citizen-science programs in the country in the late 1800s. Cooke began a program that looked at the patterns of bird migration. It expanded into one of the first government programs for birds—the North American Bird Phenology Program—and one that private citizens could join. A network of volunteers began collecting information about migratory bird patterns and population figures, and they recorded that information on cards. Today, those cards are being scanned and recorded into a public database for historical analysis.

Although citizen science has been around for centuries in practice, the term was actually coined in the 1990s, and has gained popularity since then. In particular, the invention of the internet has been a catalyst for citizen science. The internet has revolutionized scientists' ability to engage citizens in a huge array of research projects. Additionally, mobile phones and other electronic devices with recording capabilities made data collection for non-professional scientists a much more accessible and convenient process.

Recognition of citizen science is growing in the fields of science, policy, education, and in wider society. It is establishing itself as a field of research and a field of practice, increasing the need for overarching insights, vocabulary, and guidelines. In this lesson, we will learn about some of the uses of citizen science, reliability of data, and technology to support the process. You will also hear from researchers and practitioners engaged in these practices as well.

WHY USE CITIZEN SCIENCE?

We briefly touched on the use of citizen science in our two M&E approaches at the beginning of this lesson.

In conventional M&E, the participants conducting citizen science are only part of the data collection process. Their engagement is limited to this key phase. For example, a person downloads a citizen science application on their phone, which asks them to record the number and species of birds they see in a pre-defined area.

In PM&E, the participants conducting citizen science are involved in many aspects of the process. Their engagement can include sharing ideas, communicating among each other and the project lead, collecting data, and discussing the results. For example, a person is approached at the beginning of a sustainability project, and is consulted on each of the key steps throughout the project lifecycle.

Take a moment to reflect on how citizen science can be considered in a conventional M&E approach, compared to a PM&E approach. What do you think is the biggest difference?

Regardless of the way it is used, there are many benefits or reasons why you might choose to incorporate this method into your M&E plan. As you can see from the list of examples here, citizen science provides benefits to the individuals involved, the environment, the community as a whole, research, and more!

Why use citizen science?

- Spread awareness to an environmental or scientific issue
- Achieve temporal and geographical coverage
- Achieve inclusiveness
- Increase scientific literacy of a community

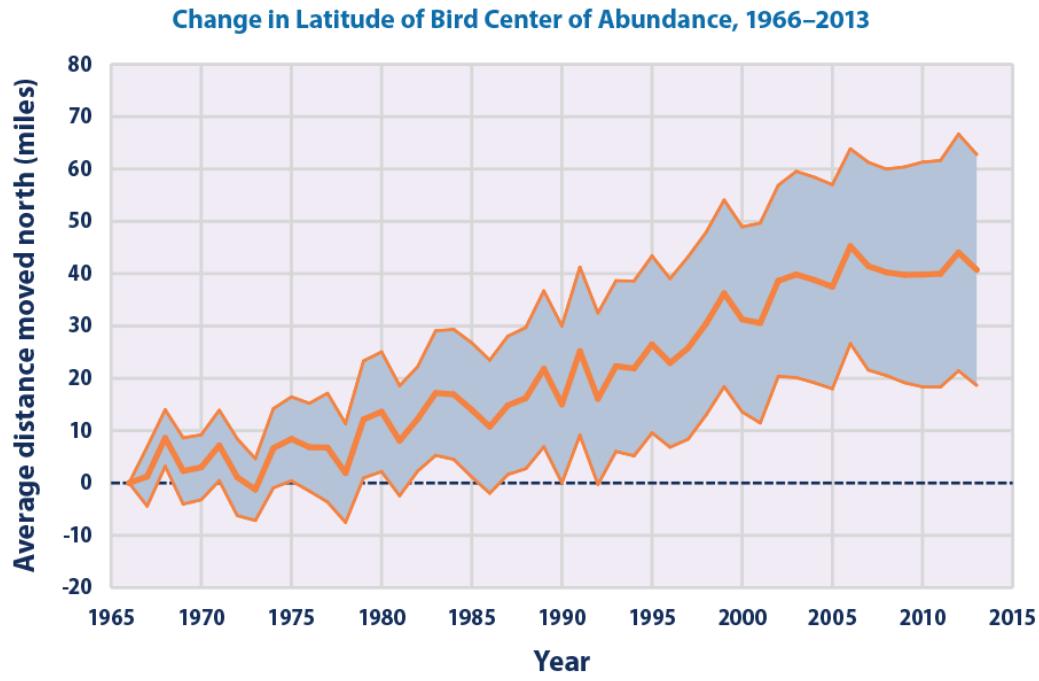
- Increase access to resources
- Create enjoyable and engaging experiences
- Produce scientific outputs
- Incorporate both local knowledge and scientific knowledge
- Address specific societal challenges experienced by the community

CITIZEN SCIENCE IN ACTION

The Christmas Bird Count

The Christmas Bird Count, celebrated annually since 1900, is one of the longest-running citizen science programs, with one of the largest ecological datasets available. It involves citizens in observing and collecting information about local birds between December 14th and January 5th each year. The Christmas Bird Count has been going on for over a century and is now a nationwide project with more than 2,000 amateur birding groups participating. Learn more about the Christmas Bird Count and few yearly results.

The Value of the Christmas Bird Count



Change in latitude of bird center of abundance, 1966-2013 (EPA, 2014)

This figure shows annual change in latitude of the center of bird abundance for 305 widespread bird species in North America from 1966 to 2013. Each winter is represented by the year in which it began (for example, winter 2013–2014 is shown as 2013). The shaded band shows the likely range of values, based on the number of measurements collected and the precision of the methods used. Explore more about this data from the United States Environmental Protection Agency here.

IS CITIZEN SCIENCE RELIABLE?

The expansion of citizen science has resulted in debate about the scientific qualities of the contribution of citizens.

In a study published in Plos One in 2014, researchers evaluated a review of 10 claims of impacts of climate change on avian migration. They found no reference to "citizen science" in any of these publications, although citizen science actually contributed to 24-77% of references. Cooper et al. (2014, p. 1) stated that the "quality of data collected by volunteers, on a project-by-project basis, has generally been found as reliable as the data collected by professionals."

Here, we are going to hear more on this from Dr. Julia Baird and the research she led comparing citizen science data with data collected by an expert in the field of natural resource management.

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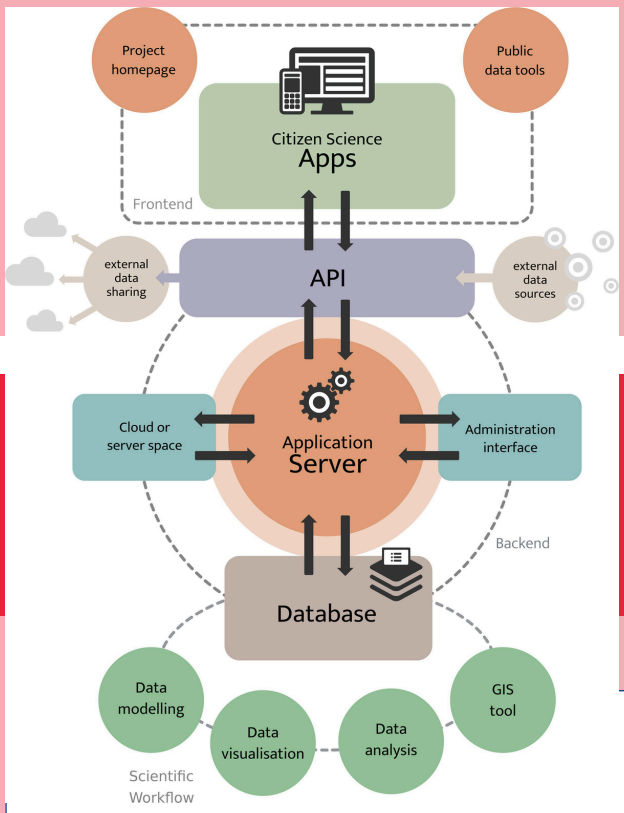
Baird et al.'s (2021) study compares four different approaches for evaluating ecological outcomes of a grassland restoration site located on Niagara Parks Commission property. Data on the ecological health of the site was collected using the following approaches: field expert, community science, stakeholder perceptions, and remote sensing. Findings from the study suggest that for overall site assessments (more broad), community scientists and stakeholders may be able to provide a reasonably accurate assessment. However, the use of a field expert or multiple methods of data collection may be necessary for more detailed or specific M&E needs. Click here to read the full study in the Journal of Environmental Management.

CITIZEN SCIENCE APPLICATIONS

Technology has fuelled the way for citizen science projects to expand locally, as well as nationally or even globally. The widespread use of smartphones has created new opportunities in the field of citizen science (Silvertown, 2009; Newman et al., 2012; Bonney et al., 2014; Wynn, 2017 in Lemmens et al., 2021). Mobile applications provide a new way to steer the data gathering process as part of the scientific method. Communication with and among participants is now possible at any time, as many people carry their smartphones with them almost constantly. These applications can host a citizen science project, which the project lead manages and operates on the back end. Users, or citizen scientists, can then download the application, and input their data in real time and on their own schedule. On the back end, these applications can often model data, help visualize data, store it safely, and more (depending on the design of the application).

Citizen Science in the Digital World of Apps (Lemmens et al., 2021)



An app/server system with a common online infrastructure (Lemmens et al., 2021)

Lemmens et al. (2021) discuss the value of technology for citizen science, and summarizes different types of applications to meet different project needs. Read their article here if you would like to learn more about citizen science in the digital age.

Real time monitoring of community based programs | Bester Mulauzi | TEDxLilongwe

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Bester Malauzi speaks about a smartphone application called PanPhone. This application is being used in community-based childcare centres in Malawi, to help care-givers track real time data for the purpose of monitoring their development program in remote areas. Think about what you have learned about M&E so far, and how access to this application can benefit the community. What are some challenges a care-giver might experience using this application?

META Podcast: Two Exciting Ways to Use Mobile Data Collection in Refugee Programs

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Here is another example of how citizen science applications can be used in the community. On this episode of the META podcast, we are introduced to two women who are using mobile data collection to support programs for refugees in the U.S. Hear from Rachel Factor of Refugee Services of Texas about Refugee Mobile, a project that gives clients smartphone technology and collects data through text message. Abigail Clarke-Sayer of the IRC also shares about a pilot program that put iPads in the hands of caseworkers to help them enter data on-the-go. You might want to think about the feasibility of using a data collection approach with technology, including what the cost might be for yourself, an organization, or even the citizen scientist.

> "No one will protect what they don't care about; and no one will care about what they have never experienced".
>
> – David Attenborough

LESSON 4: BENEFITS, CHALLENGES, AND KEY TENSIONS OF M&E

Lesson 4:
Benefits, challenges, and key tensions of M&E

COMMON BENEFITS AND CHALLENGES

Common Benefits

Stem et al. (2005) hold that under most circumstances, doing good M&E leads to better decision-making, and therefore improved outcomes. In reality, there are many more benefits to conducting M&E that are experienced across approaches and regardless of context:

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Common Challenges

Despite the benefits and importance of M&E, it also comes with numerous challenges.

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KEY TENSIONS SURROUNDING M&E

So far we have explored the benefits and challenges of each individual M&E approach, as well as those that can be experienced across M&E approaches. We now move on to surfacing a few key tensions surrounding M&E for building sustainable communities. Whereas challenges are well established from experiences in literature and research studies, key tensions deal with contested factors that inherently have a direct consequence in every M&E project. They do not have a set solution, but require careful consideration on how to navigate in each M&E project.

1. There is no exact recipe for conducting M&E

The first key tension is that there is no exact recipe for conducting M&E. Efforts have been made to develop practical and consistent M&E systems within and between disciplines, often with mixed results (Bamberger et al., 2016; Naidoo, 2012; Reed, 2008; Stem et al., 2005). Tensions arise regarding how to conduct M&E because real-world sustainability projects operate in complex and dynamic contexts, and thus different M&E needs require different approaches (Reed, 2008; Stem et al., 2005). The approach chosen depends on the overall goal of practitioners. As Reed (2008, p. 2419) states "different levels of engagement are likely to be appropriate in different contexts, depending on the objectives of the work and the capacity for stakeholders to influence outcomes (Richards et al., 2004; Tippett et al., 2007)." However, it is up to the project lead, or project members to make key decisions about which M&E approach will be used, as well as when reflection and corrective actions will take place. Again, these decisions will be different depending on the context of the project, the people involved, resources available, and so on.

2. 'Success' looks different for each project

Second, 'success' looks different in every community project (Davis, 2014). The very concept and definition of 'success' is often debated in literature. It can vary between disciplines, within disciplines, and even among similar projects. Different project members may even start out having different ideas of what a 'successful' project looks like (Reed, 2008). This is common, and it is ok! In order to move forward with your project in a good way, it is important to start by considering your own context and goals, and what success means to those involved in the project. You must come to an internal decision about what success looks like for your specific project in order to be able to move towards it.

3. Who's views are being represented?

Finally, who's views are being represented? Although the level of stakeholder engagement is different in each M&E approach, representation must be considered carefully. As demonstrated throughout the project cycles, this is a key decision that affects, not only the remaining activities in the project, but may also have consequences for how project results are used or implemented, or even accepted by different groups (Bennett, 2016; Estrella & Gaventa, 1998; Shah et al., 2006; . However, it is not always clear exactly who should be involved, and/or when they should be involved (Estrella & Gaventa, 1998; UNDP, 1997). Again, this is a critical internal decision that needs to take place near the beginning of a project. A key question you might ask to help you identify key stakeholders and rights holders, and ensure appropriate representation in your project is "Who will be affected by this project?". Think about who might be affected in terms of ongoing activities, and results. It will be especially important to communicate and engage with these groups to understand their perspectives and ensure their views are being represented. You will also need to ask what legal requirements you may have to engage or consult with rights holders in this context.

WHY DO WE NEED M&E?

Despite these key tensions, M&E is still essential for effective projects. According to the World Bank, effective M&E provides answers to the following questions:

1. Are we ***doing the right things?***

- Are our interventions contributing to the project objectives?
- Relevance, rationale, and justification
- Satisfaction of donors or community members

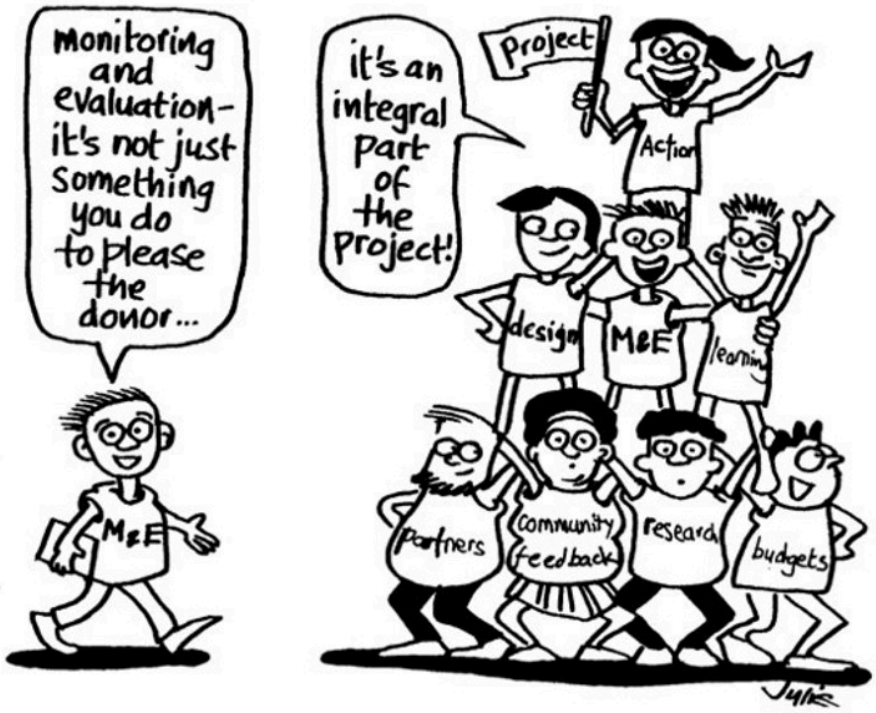
2. Are we ***doing it right?***

- How effective have we been in achieving expected outcomes?
- How efficient have we been in optimizing resources?
- Are these results sustainable?
- What is the performance? Impact?

3. Are there ***better ways of doing it?***

- What are the best practices identified?
- Alternatives
- Lessons learned

Explore more about effective M&E in the United Nations Development Group's (2011) Results-Based Management Handbook.



IFRC Project/ Programme M&E Guide (2011)

MODULE 4 REFLECTION AND ASSESSMENT

Module 4 Reflection and Assessment

MODULE 4 LEARNING CHECK

Learning Check

After reviewing each of the lessons in this module, you should now be able to:

- Define monitoring and evaluation (M&E) and explain why they are important aspects of building sustainable communities.
- Understand the spectrum of M&E approaches.
- Appraise the benefits and challenges of engaging actors in M&E.
- Describe key tensions surrounding M&E for building sustainable communities.

MODULE 4 KEY TAKEAWAYS

Key Takeaways

- Defining and understanding the components associated with M&E
    - Monitoring and evaluation are two distinct aspects that work together to provide information about a system
    - KPIs are integral to effective M&E
- Approaches to M&E
    - There is a spectrum of approaches for conducting M&E
    - Conventional M&E is at one end of the spectrum, and PM&E is at the opposite end
- Citizen science to support M&E approaches
    - Citizen science gets members of the public involved in scientific research
    - It can be considered more conventional or more participatory depending on the way it is utilized
    - Smartphone technology is a helpful tool to engage stakeholders in citizen science and M&E
- Benefits and challenges of M&E, and key tensions
    - There are numerous benefits and challenges that can be experienced across M&E approaches
    - There are three key tensions surrounding effective M&E
    - It is essential to address and navigate these tensions as M&E is a critical component for building sustainable communities

RESOURCES FOR FURTHER LEARNING

Supplementary Resources

Explore activities related to the tracking of progress towards achieving the SDGs on the SDG Knowledge Hub.

Academic journal articles:

Cooper, C. B., Shirk, J., & Zuckerberg, B. (2014). The invisible prevalence of citizen science in global research: migratory birds and climate change. *PloS one*, *9*(9), e106508

Plummer, R., Witkowski, S., Smits, A., & Dale, G. (2021). Higher Education Institution–Community Partnerships: Measuring the Performance of Sustainability Science Initiatives. *Innovative Higher Education*, 1-19, https://doi.org/10.1007/s10755-021-09572-8

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MODULE 4 ASSESSMENT

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/bscmodule4/?p=86#h5p-1

MODULE 4 REFLECTION

An interactive H5P element has been excluded from this version of the text. You can view it online here:
https://ecampusontario.pressbooks.pub/bscmodule4/?p=88#h5p-2

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