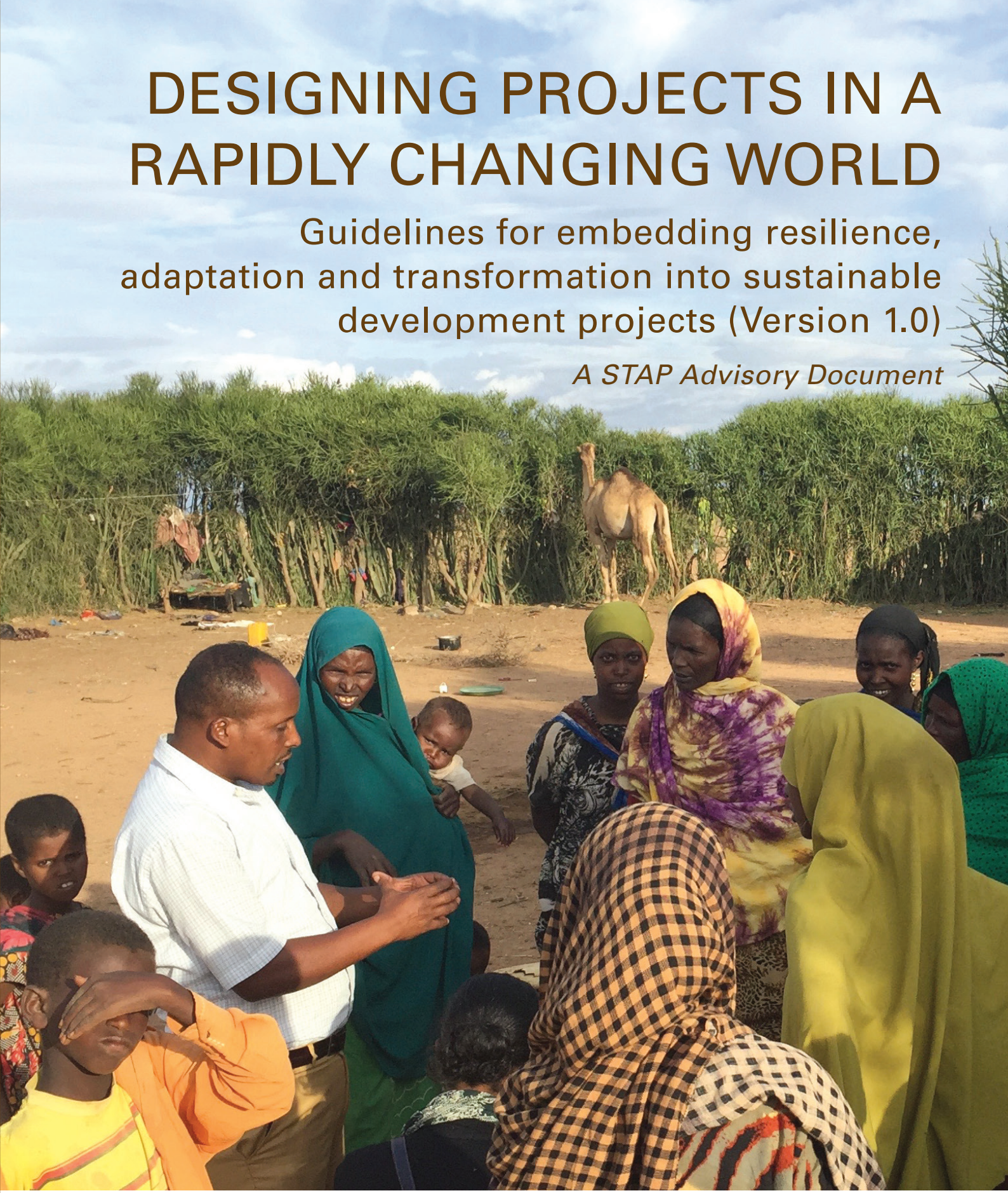
DESIGNING PROJECTS IN A RAPIDLY CHANGING WORLD

Guidelines for embedding resilience, adaptation and transformation into sustainable development projects (Version 1.0)

A STAP Advisory Document



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SCIENTIFIC AND TECHNICAL ADVISORY PANEL
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Prepared on behalf of the Scientific and Technical Advisory Panel (STAP) of the Global Environment Facility (GEF) by the Commonwealth Scientific and Industrial Research Organisation (CSIRO).

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ABOUT STAP
The Scientific and Technical Advisory Panel (STAP) comprises seven expert advisors supported by a Secretariat, who are together responsible for connecting the Global Environment Facility to the most up to date, authoritative and globally representative science. http://www.stapgef.org

ABOUT GEF
The Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit, to help tackle our planet's most pressing environmental problems. Since then, the GEF has provided $14.5 billion in grants and mobilized $75.4 billion in additional financing for almost 4,000 projects. The GEF has become an international partnership of 183 countries, international institutions, civil society organizations, and the private sector to address global environmental issues. http://www.thegef.org

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25 years gef UNEP UNDP *Empowered lives. Resilient nations.* CSIRO

FOREWORD

Growing human pressure on the environment is having unprecedented impacts on our planet. Managing these impacts requires understanding of the dynamic interactions and interrelationships between humans and the Earth's natural systems. Building resilience of productive human-environment systems is vital – for food security, for protecting ecosystem services, and to sustain livelihoods as the global population grows. The Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), and the United Nations Framework Convention on Climate Change (UNFCCC), for example, all urge us to build and maintain the resilience of ecosystems.

Resilience was a key issue in the major global negotiations that concluded in 2015. The Addis Ababa Action Agenda on Financing for International Development (FfD3) underscored the "need to ensure that our development efforts enhance resilience". The Sustainable Development Goals (SDGs) carry this mandate forward and emphasize resilience across many areas. The Paris Agreement recognizes that successful adaptation and resilience to future climatic impacts are essential to our future in a warmer world.

"Resilience thinking" is critical to plan climate change adaptation interventions, improve the sustainability of cities, reduce disaster risks and advance many other aspects of sustainable development. However, applying resilience concepts to individual projects poses many challenges. We need consistent approaches to define, assess and report resilience at different scales. We need to identify options to adapt and transform. We need to help decision makers prepare for the future. This involves planning for and achieving sustainability goals amid a context of uncertainty, plural values, and conflicting interests.

The RAPTA (Resilience, Adaptation Pathways and Transformation Assessment) Framework offers practical guidance in how to apply the concepts of resilience, adaptation and transformation in planning projects so they are better designed to deliver valuable, durable outcomes in the face of high uncertainty and rapid change. RAPTA provides a framework to increase focus on resilience during project planning and will help project and program developers to apply resilience concepts across a wide range of project types. RAPTA is being piloted in the Integrated Approach Pilot program on Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa and elsewhere in the GEF Program.

RAPTA was commissioned by the Scientific and Technical Advisory Panel (STAP) of the Global Environment Facility (GEF) as a tool to help assess resilience and apply resilience concepts. We strongly commend the authors of this report for producing clear and practical guidelines for incorporating resilience, adaptation and transformation into development projects. We particularly wish to thank STAP's Panel Member for Land Degradation, Annette Cowie, the CSIRO team led by Deb O'Connell, along with our colleagues from UNDP for their exceptional effort in completing this timely report.

Rosina Bierbaum, Chair
Scientific and Technical Advisory Panel
The Global Environment Facility

Naoko Ishii, CEO & Chairperson
The Global Environment Facility

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ACKNOWLEDGMENTS

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- The Enabling Adaptation Pathways team at CSIRO Land and Water – some are authors of this report but we also draw on the work of the rest of the team – including Seona Meharg, Michael Dunlop, Russell Gorddard, Matt Colloff, Tim Capon, Rachel Williams, Alistair Hobday, Michael Doherty, Suzanne Prober, Helen Murphy – who have spent many years developing, testing, integrating and applying these concepts in different projects. The enthusiasm, challenging discussions and deep knowledge of the topic of the whole team have infused this report in so many tangible and intangible ways.

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- The many participants of the Food Security IAP inception meeting, and the participants of the UNDP informal national dialogue on Resilience (Addis Ababa in September 2015), for providing robust discussion and input as we were developing these guidelines. Thanks to the project development team for the Ethiopian country project including Wubua Mekonnen (UNDP), Alan Nicol (IWMI), Fassil Kebebew (Consultant) and the participants of the workshop in Addis Ababa March 2016. Together with some of the co-authors of these guidelines, we started the process of using RAPTA to design the Ethiopia project. The process is still in the early stages, but as the images show, the participants made a wonderful start in piloting this approach.

- Thomas Hammond and Guadalupe Durón (STAP Secretariat) and Mohammed Bakarr (GEF Secretariat) for the thought-provoking discussion and questions, and concrete suggestions offered on earlier drafts.

- The STAP Secretariat for their collaborative and supportive management of this project.

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ABSTRACT

RAPTA is a unique tool to help project designers and planners build the ideas of resilience, adaptation and transformation into their projects from the start, to ensure outcomes that are practicable, valuable and sustainable through time and change. This report offers practical advice to planners, project managers, policy makers, donors, farmers, researchers and other stakeholders on how to do this. This version of the guidelines was developed especially for meeting challenges around the future security of agriculture but applies equally well to planning for climate change adaptation, urban development, disaster management, biodiversity conservation and other vital fields.

RAPTA offers a fresh dimension to the familiar task of project planning and development – one which allows for rapid social, physical and environmental change in an uncertain world – leading to projects which deliver better results, more durably, reliably and consistently. It seeks to accommodate the rate, magnitude and novelty of the changes we face and the fact that, for these challenges, there are no "off the shelf" solutions. It promotes a structured approach to learning that enables constant improvement and adaptation to change.

EXECUTIVE SUMMARY

Resilience, adaptation and transformation are a set of related concepts which can operate within a continuum – from maintaining a healthy, resilient system in its present state, through to incremental adaptive changes or indeed radical transformational change to a completely different system. This report is about how to build the ideas of resilience, adaptation and transformation into our plans for a sustainable future.

Resilience is the ability of a system (e.g. a community of people, an ecosystem, a city) to absorb shocks (e.g. disasters) or trends (e.g. increasing greenhouse gases), while maintaining the same identity. Adaptation is the process of change that enables a system to maintain its identity, and transformation is the shift from a current system to a new and different one (e.g. from a pastoral to a cropping system).

Understanding how to use resilience, adaptation or transformation to manage a system will help people to make intentional changes (or system interventions) with a stronger chance of reaching their sustainability goals. Modern society has not previously faced the current rate, magnitude and novelty of the changes that are now before us. There are no "off the shelf" solutions for these challenges. Therefore, we need a structured approach to learning from the interventions that we make, to enable constant improvement and adaptation of our management interventions, while understanding how the systems we are managing are themselves rapidly changing. These ideas are incorporated into the 17 Sustainable Development Goals (SDGs) adopted by the United Nations in its 2030 Agenda as the blueprint for a healthier, safer, fairer, happier and more sustainable future for ourselves and our planet.

The challenge now is to make operational the concepts of resilience, adaptation and transformation, and embed them into the design of development programs and projects. We have developed the Resilience, Adaptation Pathways and Transformation Assessment (RAPTA) Framework to help project designers and planners build the ideas of resilience, adaptation and transformation into sustainable development projects from the start. This will help to ensure outcomes that are practicable, valuable and sustainable through time and change. This first version of the guidelines was developed particularly for meeting challenges around the future security of agriculture, but applies equally well to managing climate change, attaining sustainable growth in the Earth's megacities, better responding to the accumulating risks that confront humanity and transforming (or protecting) the social and ecological systems which support us. These challenges are compounded by rapid change and growing uncertainty, as surging human needs and demands come up against the finite capacity of the Earth to meet them, at a time when the best-laid plans may be undone by unforeseen developments.

The core features of RAPTA are a systems view, focus on key drivers, risks and thresholds, adaptive management, and stakeholder participation in planning and implementation of intervention options. RAPTA is underpinned by the system description that identifies the main resources and products of the system, key controlling variables, threshold effects, cross-scale interactions and feedback loops. Detailed resilience assessment includes identifying risks or points-of-no-return, opportunities for adaptation and/or transformation, and the costs and benefits of these options. RAPTA does this iteratively, as understanding and competence grow. It builds in learning at every stage and uses the increasing understanding to refine the project plans and develop the capacity of stakeholders to manage them to successful implementation, no matter what else arises.

RAPTA COMPONENTS

1. *Scoping*: a standard component of project development that summarises the purpose and nature of the project. These guidelines highlight the aspects of scoping that are unique to RAPTA. Applying RAPTA in the project identification stage involves a "light pass" through all seven components, after which *Scoping* is revisited to confirm or revise the initial plan.

2. *Engagement and Governance*: Effective stakeholder engagement means getting the right people involved, in the right way, at the right time, using ethical and transparent processes. Stakeholder engagement seeks to develop shared understanding of the many perspectives on problems and solutions. Defining the roles, responsibilities and accountabilities of stakeholders involved in project design, implementation and governance should be an important component of projects seeking to integrate resilience. *Engagement and Governance* is essential to all phases of the project cycle. Using RAPTA, it comes in early and is continually strengthened and modified as the project develops.

3. *Theory of Change*: Existing Theory of Change methods can be complemented and enhanced by RAPTA, by systematically considering resilience, adaptation and transformation (e.g. there is a deliberate consideration of options for transformational versus incremental change). It emphasizes the testing of initial hypotheses, improvement through learning and responsive management. *Theory of Change* is a key activity in the project identification phase and early in the project design phase. It is also an important input into the implementation phase of a project and underpins monitoring and assessment, and project evaluation.

4. *System Description*: Drawing from stakeholders' diverse perspectives, as well as the literature, the *System Description* produces a record of the current understanding of what the system consists of and how it is connected, and the assumptions and evidence underpinning this understanding. It forms a fundamental base for assessing the system's resilience, and underpins both the next two components.

5. *System Assessment*: The *System Assessment* identifies potential risks, points of no return and key controlling influences ('controlling variables') associated with anticipated future shocks or changes, as well as opportunities for adaptation or transformation. It draws heavily on resilience concepts and tools that are central to the RAPTA. It is a major focus early in the project cycle and is often revised, through *Learning*.

6. *Options and Pathways*: Here, the intervention options are identified and arranged into a provisional order for implementation. Their qualitative and quantitative benefits and costs are estimated. This helps form an implementation plan which is closely linked to *Learning* and is actively updated and adaptively managed over time.

7. *Learning*: an iterative component, which encompasses Monitoring and Assessment and Knowledge Management, that connects all other RAPTA components. Effective learning requires a structured approach that utilises the *system description* and *system assessment* to guide the focus of monitoring and assessment (M&A) (e.g. data collection and interpretation), so that the insights gained are used in project design and implementation. Results of M&A inform adaptive management and testing of the *Theory of Change*. Learning is captured to inform future phases of the project and program, as well as future projects. The engagement of stakeholders (e.g. land users, government policymakers, NGOs, community members) in *Learning* is essential to enhance self-assessment, awareness of their roles and their capacity to influence future action.

WHERE TO START?

The RAPTA components are presented in the order which we think works well. However, following this order is not essential: users should choose a sequence that best suits their project. Each project is a complex social system in its own right and requires its own capacity to learn and adapt in a sequence that best serves its goals. Within each component, these guidelines offer a logical sequencing of tasks. Users may wish to adapt the sequence to suit their own project – for example, the component on *Options and Pathways* will be more robust if all of the previous components are completed, but may still be of use in adaptation planning even if a full resilience assessment is not conducted.

Rather than prescribing an order or sequence, the components and their steps can form a checklist, to help the project team reflect on project activities and ensure that all components have been considered. Where a well-established practice for a particular component (e.g. Theory of Change) already exists, the guidelines are not intended to replace it but rather show how it can be adapted to incorporate resilience thinking.

SUMMARY

RAPTA supports the design of actions which can help to guide linked social and ecological systems into the future, informed by sound science, underpinned by a structured learning process to gather and analyse evidence, followed by continual adjustment of actions based on what has been learned. It opens a new way to think about development projects, one which offers more durable and flexible outcomes and longer-lasting benefits in the face of the rapid, unpredictable change, whether global or local, human or environmental, which confronts the modern world.

HOW TO USE THIS REPORT

RAPTA was developed to help embed the concepts of resilience, adaptation and transformation in the heart of sustainable development projects. These guidelines are written for practitioners who are developing projects with communities and are interested in strengthening their project's resilience to shocks, stresses and major external change. It is intended that practitioners will discuss and use this document with local stakeholders.

These guidelines are particularly relevant for projects addressing resilience of agricultural systems, such as those on African dryland agriculture, and draw on the Global Environment Facility's (GEF) "Fostering Sustainability and Resilience for Food Security in sub-Saharan Africa" (Food Security IAP) program (see Appendix A). However, RAPTA also applies to a much broader range of programs and sectors related to the UN's Sustainable Development Goals. With further elaboration and guidance, RAPTA can also be applied to support project implementation, monitoring and assessment, and project evaluation.

The guidelines will be tested in the Food Security IAP and other projects. A revised version of these guidelines will be produced after piloting, and further training materials will be developed to facilitate their widespread adoption.

This document uses a nested approach, with progressively more detail and a narrower "target audience" for each successive chapter:

Part I: Overview of RAPTA - for general readership

- Chapter 1 provides an overview of the whole report including the rationale behind the RAPTA framework, a brief summary of the approach, some comments on the "value-add" of RAPTA and a look forward to "what next".
- Chapter 2 summarises the RAPTA process with a quick overview of the components and how they might be used. This chapter will be of use to those who wish to know a little more about the process, but do not need to look at the detailed guidelines.

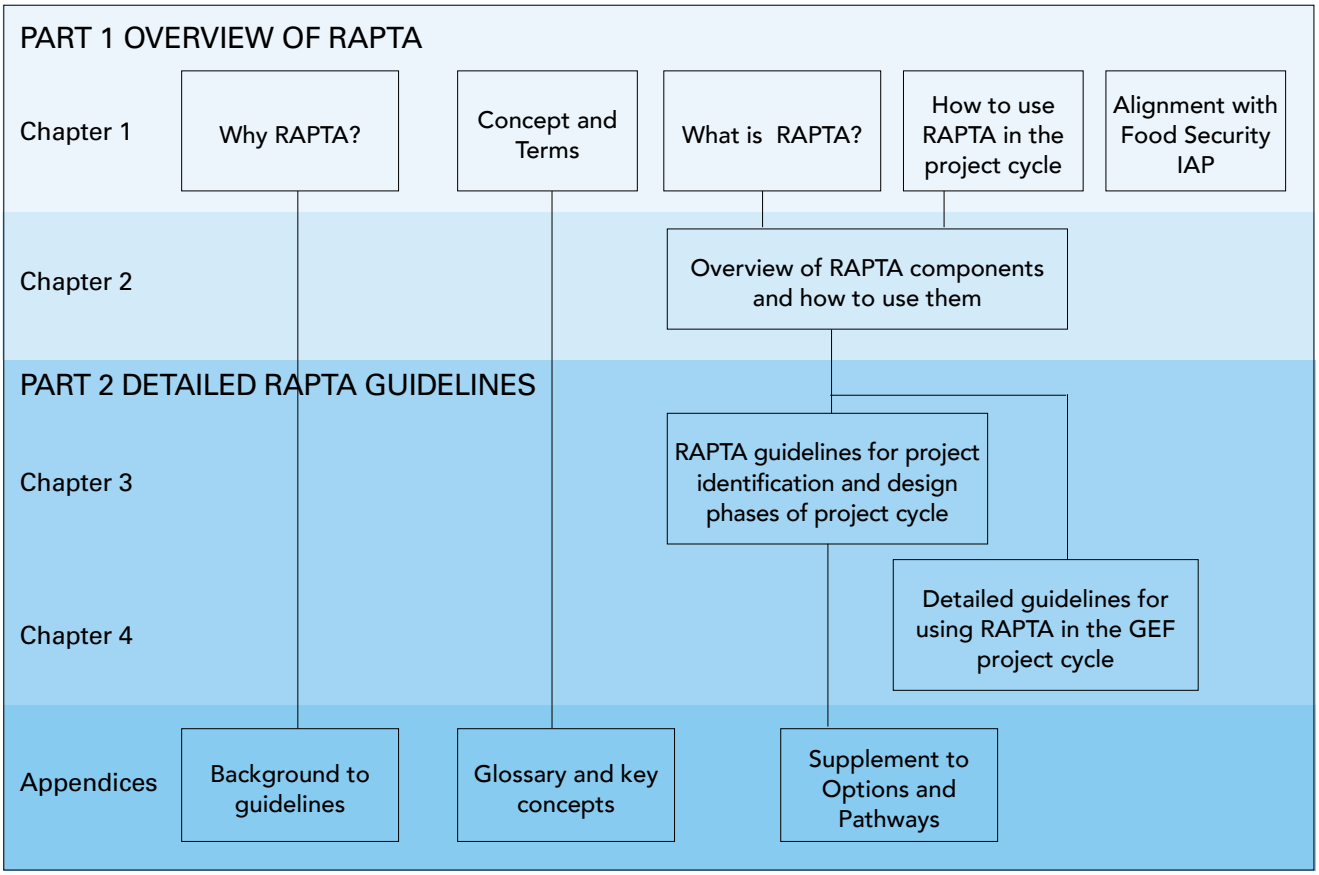


Figure (i) A map of the document structure

Part II: Detailed RAPTA Guidelines for project designers

- Chapter 3 contains the guidelines themselves, and provides a level of detail relevant to those who wish to design a project that incorporates the principles of resilience, adaptation, and transformation. Although the guidelines are aligned mainly with the Food Security IAP, they can also be used in other sectors, particularly those related to natural resource management.
- Chapter 4 provides specific information on how to use RAPTA in the GEF project cycle to develop the required elements of project documentation. It is, therefore, of particular interest and relevance to those who are designing and implementing GEF projects.

Further guidance for readers with different needs is provided in Table (i) and Figure (i). Ultimately, we intend to produce a set of documents (with dynamic links) to describe RAPTA and guide users:

- a technical manual covering the background and science
- a "field guide" for RAPTA users, and
- a set of worked examples (e.g. on food security, sustainable cities or biodiversity) to further assist users to apply RAPTA in different contexts.

This report is an interim guidance document to support the immediate needs of project developers, so it covers each of these three aspects to some extent. The three documents listed above will be produced after pilot testing of RAPTA is complete.

Table(i) Recommended use of this document by readers with different needs

Audience	Recommended use of document
Are you designing or delivering a Global Environment Facility (GEF) project?	The whole report is relevant to you. These Guidelines were commissioned to help integrate resilience into the GEF's Food Security IAP, and the examples in Chapter 3 are relevant to this type of application. The Guidelines are also applicable to other sustainable development project types. You may be well-versed in some of the components (such as *Scoping*, *Theory of Change*, *Engagement and Governance*, and *Learning* components. We have included them for completeness and have focused on the aspects that may need to be done differently to capture the core concepts of RAPTA. You may find these additional resources useful for providing more background on the science behind resilience thinking (see Resource links sections in Ch 3). Chapter 4 explains how you can use RAPTA throughout the project cycle to deliver the specific documentation required by GEF.
Are you a decision maker, researcher or student, or in a policy area? Interested in a quick overview of RAPTA and in how it can be used to enhance project design and delivery generally?	Part I is for you. Chapter 1 provides a broad overview of RAPTA's context and application. If you want more details, read Chapter 2 as well.
Are you designing or implementing projects not funded by GEF? Do you want to know how to use RAPTA to embed resilience, adaptation, and transformation into the design of projects in other areas such as disaster management, conservation or resilient cities?	Chapters 1, 2, 3 are relevant to you. Although the context might be quite different, the generic approach is adaptable for use in different areas. Chapter 4 relates specifically to the use of RAPTA in GEF projects and is less relevant. The RAPTA process is compatible with, and complementary to, the many integrated assessment and/or adaptive management approaches and project management practices already in use. RAPTA requires further testing and development for use across a broader range of applications.
Are you a researcher or practitioner in the area of resilience, adaptation or transformation, who is less familiar with the requirements of working in applied areas of development and aid?	Part I will be most useful, but if you are developing a project then Chapter 3 will be of use. You may be familiar with much of the material in *System Description*, *System Assessment*, and *Options and Pathways*, but may find it useful to read *Theory of Change*, *Multi-Stakeholder Engagement and Governance*, and *Learning* as well as becoming familiar with the different phases of the project cycle (project inception, design, implementation and post-project legacy) which differ from the usual academic research project design.
Are you a farmer, a donor or a project stakeholder with a general interest in the ideas of resilience, adaptation, and transformation (rather than project design and delivery)?	Though the early chapters provide an overview, perhaps you might like to start with something more general – see, for example, the references in Resource links section 3.4.5.

PART I OVERVIEW OF RAPTA

1

INTRODUCTION

TO RAPTA AND ITS APPLICATION IN PROJECT DESIGN AND MANAGEMENT

This chapter is for the reader who requires a quick overview.

Our world is changing at an unprecedented rate. We are uncertain about the nature and magnitude of many of these changes and, often, we cannot predict them. In response, many governments and non-government organizations, industries, businesses, programs and policies as well as civil society are now developing aspirational goals which embody the concepts of resilience, adaptation, transformation and sustainability.

The UN's Sustainable Development Goals (SDGs), the Convention on Biological Diversity, the UN Framework Convention on Climate Change, the UN Convention to Combat Desertification and donors funding environment and development projects all encourage investment in resilience, adaptation and transformation. However, there is little universal agreement about what these concepts mean, and how to identify suitable actions and design projects to deliver them.

The challenge is to make operational the concepts of resilience, adaptation, transformation and sustainability, and embed them into project design.

These concepts are not a set of scientific theories that can be developed and tested in controlled conditions. There are no "off the shelf" tried-and-tested recipes for how to manage the changes we face, because the changes we are facing are unprecedented. Each project, challenge, or set of decisions requires a tailored approach for that context, which must be flexible and able to adapt to novel, uncertain and rapidly changing circumstances. This approach supports the design of actions which can help to guide linked social and ecological systems into the future, informed by sound science, underpinned by a structured learning process to gather and analyse evidence, followed by continual adjustment of actions based on what has been learned.

1.1 WHY DO WE NEED RAPTA?

There are many tools and approaches for adaptive management and systems analysis. Likewise, much effort is going into developing and applying the concepts of resilience and adaptation in a wide range of situations. However, different communities of practice define these concepts differently and employ different approaches, which can cause confusion for those seeking to apply the concepts to project development and implementation. There is a need for tools that bring together the concepts of resilience assessment with adaptation planning, and provide practical guidance to project developers. Recognising this gap, the Scientific and Technical Advisory Panel of the Global Environment Facility (STAP) commissioned CSIRO to review and advise on leading practice methods for embedding resilience, adaptation pathways and transformation into the design of projects (Appendix A). The Resilience, Adaptation Pathways and Transformation Assessment (RAPTA) framework (O'Connell et al, 2015)[1] is the result of this commission.

RAPTA has been developed to bridge some of the divides between different tools and approaches to resilience, adaptation and transformation, and to support effective, durable planning by embedding these concepts at the heart of a project.

RAPTA helps project design teams to:

- determine if a project has any hope of achieving its stated objectives
- increase the chances of success through a clearer understanding of the factors that control resilience. This
  - helps untangle the complexity, helps to focus on root causes, and assesses the likelihood of a community's continued well-being despite shocks
  - supports intentional transition to desired systems
  - reduces the probability of unplanned transitions to undesired systems
  - distinguishes cases where transformational social–ecological change is needed from cases where smaller, incremental actions can suffice
- determine where achieving the desired state is impossible or unrealistic with existing project resources.

RAPTA cannot deliver certainty about the future any more than existing project appraisal and design methods, but it has the potential to help projects to deliver better outcomes with greater certainty. It achieves this by helping planners, practitioners and communities build strategies that cope with risk, shock and uncertainty in projects. RAPTA is designed to support the active planning of pathways towards sustainability goals, and to embed the practices of learning and acting on that learning. It also reduces the risk of investing in support for livelihood systems that are likely to fail when shocks occur.

1 O'Connell, D., Walker, B., Abel, N., Grigg, N. (2015) The Resilience, Adaptation and Transformation Assessment Framework: From Theory to Application. CSIRO, Australia.

1.2 KEY CONCEPTS: RESILIENCE, ADAPTATION, TRANSFORMATION AND SUSTAINABILITY

The terms resilience, adaptation and transformation mean different things to different groups of experts (See Box A (Key terms and Concepts) and Appendix B (Glossary and Key Concepts) for more discussion on alternative usage of these terms). In some cases, the terms are framed in a way which implies that high levels of resilience, adaptation or transformation are desirable for their own sake, in others they are framed as aspirational goals (e.g. "increase resilience of agro-ecosystems" or "create resilient cities"). In RAPTA, we define all three terms as value-neutral, that is, neither positive nor negative attributes. We assume that the concepts will be *applied* to help reach value-driven goals (for example sustainability goals, which are seen as positive).

Resilience, adaptation and transformation are here seen as a set of related concepts which are considered as a continuum that ranges from maintaining a healthy, resilient system in its present state, through to transforming it into a different system where necessary. We do not try to resolve the definitional differences, as consensus on definitions is not a prerequisite to applying these concepts: when using RAPTA, the important thing is to focus on the desired goals, and the magnitude, types and pathways of changes to the system required to attain those goals.

The RAPTA Guidelines are:

- about how to make key **interventions** in the system…
- informed by the concepts of **resilience, adaptation, and transformation**…
- applied in an **intentional** way…
- in order to move towards **sustainability** goals.

We have put forward a practical approach, consistent with the literature on resilience and adaptation, to inform sound project design. The concepts are critical, but the actual labelling of interventions and implementation pathways as "building resilience", "adaptation" or "transformation" is not important to project design. One good reason to use RAPTA is because its inherent flexibility makes it usable in many different project contexts, and under different interpretations of resilience, adaptation and transformation.

Northern Burkina Faso - Innovative farmer portrayed on land used for agroforestry using rainwater harvesting strategies known as zai pits. Larger zai can be used in the context of forestry to plant trees, while smaller pits are used to plant crops such as maize, millet, or sorghum (foreground). Zai pits are common to the area, and are generally useful to increase agricultural productivity on highly eroded and crusted soils by trapping surface runoff, sediments, and nutrients. While highly labor intensive, these strategies remain the best option to maintain agricultural production in the area. The use of forestry zai on the other hand is quite unique, and has been used here to do reforestation with the intention to yield medicinal products and as a source of fuel. It also provides shelter for animals. However, the lack of official land tenure has led to rapid city encroachment onto this land, and threatens the sustainability of the reforested area.

1.3 WHAT IS RAPTA?

BOX A
Key Terms and concepts*

There is a Glossary and key concepts section in Appendix B. We present some fundamental concepts here, consistent with the ecological resilience literature.

- **Resilience** is the capacity of a social–ecological system to absorb shocks and trends (e. g. like drought) and to reorganise so as to retain the same functions, structure, and feedbacks (i.e. the same identity). Resilience is neither good nor bad – a system can be in an undesirable state yet still be resilient to shocks, e.g. a grassland that has been invaded by unpalatable shrubs.

- **Adaptation** refers to the process of change that enables a system to maintain its identity, so that it is better able to cope with trends and shocks, or to reduce vulnerability to disturbance.

- **Transformation** is a shift from the current system to a substantively new and different one. For example, the transformation of a cropping system to an agro-pastoral system.

- **Adaptation and transformation may be planned (intentional) or unplanned (autonomous)**, wanted or unwanted, imposed by a government, community-led, or the result of a government-community partnership. It may happen at community-wide scale, or one household at a time. RAPTA helps to design interventions which are intentional adaptations and transformations.

- **Changes that adapt or transform a system can be fast (shocks) or slow (trends)**, or a combination of both. A controlling variable may change in a slow, predictable way (e.g. such as a rising groundwater table), but the impacts of that change may not be smooth and can exhibit threshold effects. For example, once saline groundwater rises to within a certain distance of the surface, capillary action draws it to the surface creating saline topsoil where trees and plants struggle to survive even if the water table falls again. In this case the controlling variable (groundwater level) changes smoothly, but the rapid change in soil condition causes a sudden, often irreversible, shock to land use.

- **It's all a matter of scale, in time and space.** Big changes such as a decline in soil fertility, or a rise in greenhouse gases, may be called "trends" when viewed against the time frame of the decisions of a person, or a government. However, over longer timescales they can be viewed as "shocks". Likewise, a sequence of actions which are labelled "incremental adaptation" over the shorter term, may be seen as transformational over the longer term. Sometimes, in order to maintain the same system at one scale, transformations may have to occur at a finer scale. For example, if a river basin is to continue to supply irrigation water and the overall amount of rainfall is reducing due to climate change, some irrigation areas within that river basin may have to be closed down (i.e. transformed to dryland agriculture), in order to maintain an irrigation industry at the river basin scale.

**Distilled from many sources in the social-ecological resilience literature, including Walker, BH & Salt, D 2012. Resilience Practice: Building capacity to absorb disturbance and maintain function, Island Press, Washington, D.C., USA.*

BOX B
Seven principles of resilience thinking

The Stockholm Resilience Centre has distilled seven principles for applying resilience thinking, from a wealth of case studies and experiences*. These are deeply embedded in the RAPTA Guidelines:

1. maintain diversity and redundancy
2. manage connectivity
3. manage slow variables and feedbacks
4. foster complex adaptive systems thinking
5. encourage learning
6. broaden participation
7. promote polycentric governance systems.

**Simonsen, S.H., Biggs, O., Schluter, M., Schoon, M., Bohensky, E., Cundill, G., Dakos, V., Daw, T., Kotschy, K., Leitch, A., Quinlan, A., Peterson, G., Moberg, F. (undated). Applying resilience thinking: seven principles for building resilience in social-ecological systems. www.stockholmresilience.su.se*

The RAPTA process contains a set of seven linked components. These guidelines provide step by step guidance for applying these components in a flexible, iterative manner through the various phases of the project cycle. Some components of RAPTA will be familiar to project designers as "leading practice". This is because the intent of the RAPTA guidelines is to mainstream the central tenets of resilience, adaptation pathways, and transformation into existing project design processes. The guidelines emphasise the extra elements required to apply the core concepts of resilience, adaptation and transformation in project design and implementation.

The RAPTA process comprises (Figure 1)

1. *Scoping*
2. *Multi-Stakeholder Engagement and Governance, also called Engagement and Governance*
3. *Theory of Change*
4. *System Description*
5 *System Assessment*
6. *Intervention Options and Adaptive Implementation pathways, also called Options and Pathways*
7. *Monitoring and Assessment, Learning and Knowledge Management, also called Learning.*

Northern Burkina Faso - Boy using a donkey cart, often a luxury in the area, to transport better quality millet or sorghum stover for storage. The stover can be used for a number of purposes, including as animal feed, building material, or as cooking fuel.

Photo Credit: Matthew Smiley

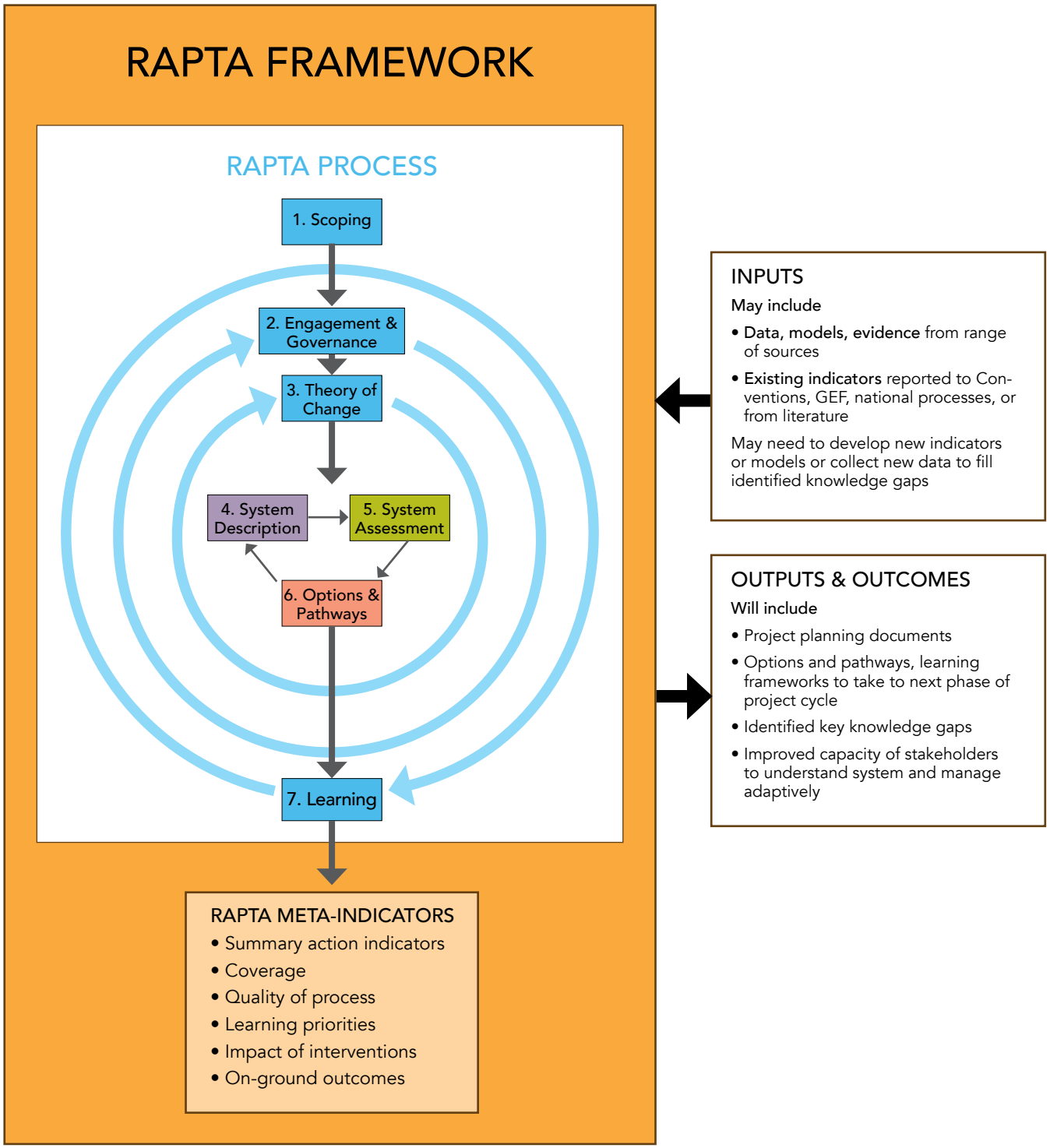


Figure 1 Overview of the RAPTA Framework

The RAPTA process (blue frame) is complemented by (proposed) meta-indicators (orange box) which report on the progress and quality of the process. The RAPTA process relies on inputs from other sources, including evidence, data, models and indicators. It produces a number of outputs, including standard project planning documents, clear intervention options, adaptation pathways for implementation, and identification of key knowledge gaps. It improves the capacity of stakeholders to effectively manage the system.

BOX C
Intervention options and adaptive implementation pathways from RAPTA

- **Intervention options** developed using RAPTA may include:
  - measures to change national laws and policies that currently limit the ability of households to adapt – e.g. food prices or drought relief policies
  - measures that are necessary foundations for adaptation – e.g. sound local governance or improved equity in land tenure and decision-making
  - measures to prevent irreversible change – e.g. maintaining topsoil depth above critical levels
  - filling important knowledge gaps.
- **Adaptive implementation pathways:** single interventions are seldom sufficient, and on their own can often have unwanted secondary effects. Where more than one intervention is called for, interventions must be sequenced into pathways which are themselves monitored and adapted as circumstances change and understanding grows.

Figure shows:

- the RAPTA process (inside the blue frame)
- proposed meta-indicators[2] for reporting on the application, progress and outcomes of the process (orange frame below). These are intended to meet the need for indicators which can be reported in a consistent fashion at national level. These meta-indicators could provide:
  - consistent summaries of the types of actions or interventions that may be appropriate
  - quantitative measures of the progress of resilience and adaptation planning and implementation, showing how widely RAPTA has been applied across the target region or systems
  - quantitative measures of the quality of the assessment with respect to factors such as robustness, salience, transparency and replicability of the process.
- inputs (upper white frame on the right), such as data and indicators from other sources (some examples are given). The RAPTA process helps users to identify key attributes and controlling variables for their system, and users should choose those indicators most relevant to these key aspects. In this way RAPTA enables users to focus effort and resources on the most meaningful and useful data for their project. The relevant inputs will be very specific to a system/project, so no universal set of input indicators is defined. They are not dealt with in detail in these guidelines.
- outputs (e.g. project planning documentation, knowledge, and sequenced sets of interventions, see Box C).

The components in the RAPTA process are applied iteratively and to varying levels of detail as the project is developed from identification, to design, implementation and legacy phases (Figure 2).

2 Meta-indicators are indicators that provide information about other indicators or about the process of identifying indicators. Further work is required to develop meta-indicators, which are not detailed in these RAPTA Guidelines.

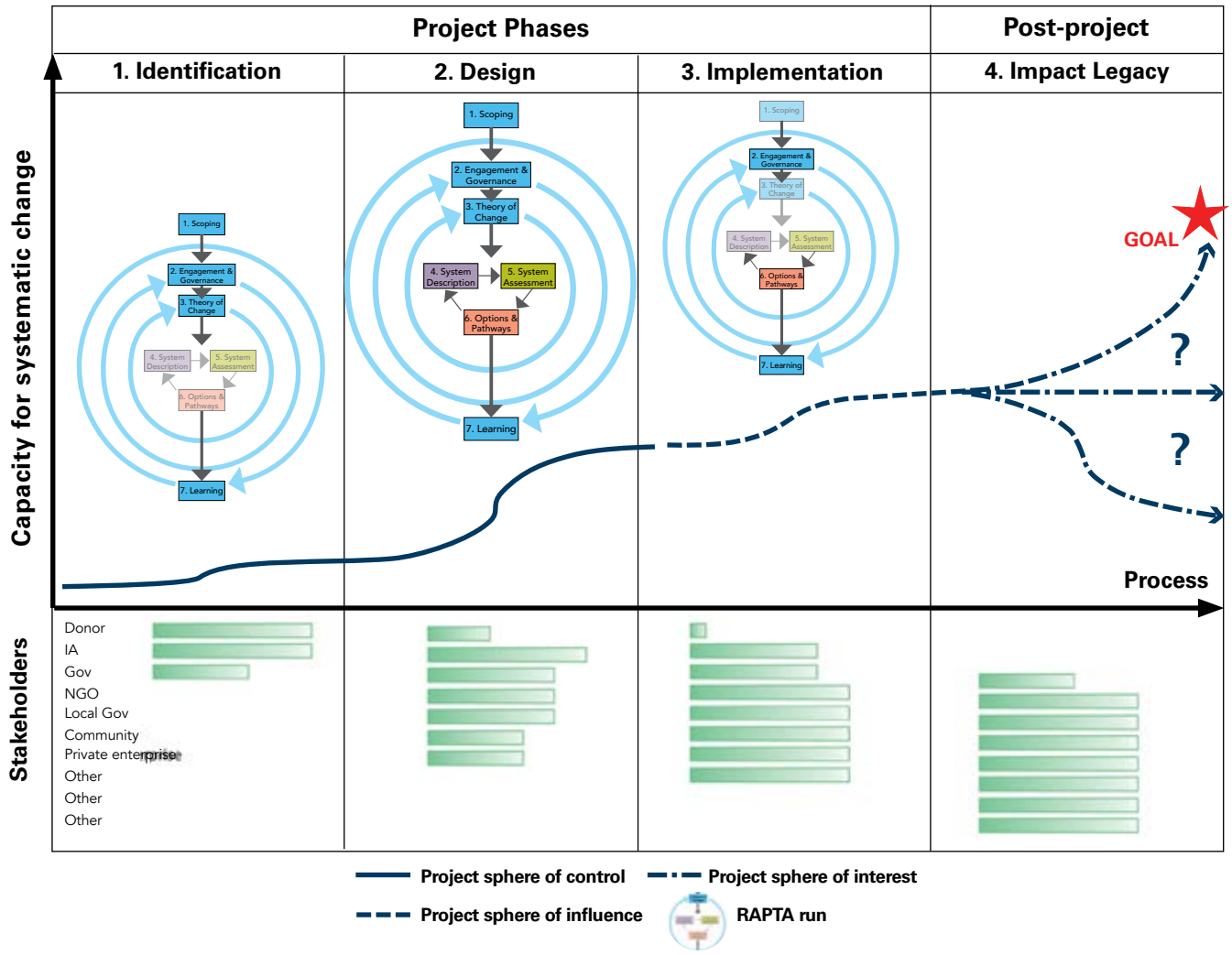


Figure 2 Overview of how RAPTA can be used iteratively throughout the development and implementation of a project

1.4 HOW TO USE RAPTA TO SUPPORT THE "PROJECT CYCLE" OF IDENTIFICATION, DESIGN, IMPLEMENTATION AND LEGACY

Projects are developed through the familiar "project cycle" with phases of identification (conceptualisation), design, delivery and impact legacy (Figure 2).The fourth phase is ongoing, as the project can continue to have influence after funding ends. RAPTA encourages users to invest in interventions that pave the way for an adaptation pathway that continues after the formal end of the project. The application of RAPTA in the GEF project cycle is described in detail in Section 4.

RAPTA is designed to be used iteratively, and to guide the *Learning* and focus of subsequent effort in each iteration. A "pass" through RAPTA is one iteration through all the components. Each pass is tailored to meet the project needs at different phases of the project cycle. It can be a rapid, simple process by one person taking less than two weeks to produce the project concept. Alternatively, it can be a detailed, thorough process involving many stakeholders over several months to produce the project Logical Framework, Theory of Change, and associated project documentation.

The systems understanding developed through RAPTA assists project developers and stakeholders to devise more effective interventions, and identify indicators for monitoring and assessment that drive subsequent learning. RAPTA can then be applied in the project implementation phase as a measure of progress, to support monitoring and assessment, and implementation of adaptive management. It can also be used to identify and fill knowledge

gaps. In short, it is a flexible, adaptable tool that can generate many valuable outputs for different phases in the life of a project.

These guidelines focus on using RAPTA for conceptualizing proposals and designing projects (phases 1 and 2 in Figure 2, however we also include some material on how to use RAPTA during project implementation in Section 3.

A detailed explanation of how to use RAPTA in the GEF project cycle is provided in Section 4. Different phases of the project involve different stakeholders and generate different outputs. RAPTA is designed to support these processes, providing a coherent framework against which activities can be checked. Not all RAPTA components require detailed attention in every pass. For example, if the scope remains unchanged between RAPTA passes, then each pass simply builds upon the previous one, and focuses in greater detail on the components relevant to that phase (See section 2.9 below.)

1.5 RESOURCE NEEDS FOR RAPTA

Applying RAPTA in project design may require more resources than are commonly allocated to the design phase, to accommodate effective multi-stakeholder engagement and comprehensive consideration of implementation pathways. The application of RAPTA in the project implementation phase will require an adequate budget for all aspects of the learning component, project governance and ongoing multi-stakeholder engagement. Users are encouraged to consider what other funding and implementing partners, or types of projects, may be required to complement the project.

1.6 ALIGNMENT OF RAPTA WITH THE FOOD SECURITY IAP

The GEF Council approved three Integrated Approach Pilot (IAP) programs during its forty-eighth meeting in June 2015. The three IAPs – "Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa", "Sustainable Cities" and "Taking Deforestation out of Commodity Supply Chains" – are designed to test the delivery of integrated approaches that address urgent global social and environmental challenges.

The IAPs are intended by the GEF to encourage holistic and synergistic investment that secures global environmental benefits. The purpose of GEF financing is to ensure that key global environment issues are adequately considered in the broader context of sustainable development, and it encourages the innovative use of funds in ways which achieve a larger impact and scale.

The programs are in line with priority themes of the post-2015 Sustainable Development Goals, and are key components of the GEF 2020 strategy. The GEF 2020 vision is a long-term strategy that positions the GEF as a champion of the global environment, supporting transformational change and achieving global environmental benefits at scale.

Because of the explicit focus on "resilience" in the Food Security IAP, the RAPTA guidelines have been tailored to support this IAP especially, using examples related to food security challenges in Sub-Saharan Africa. They will be applied in developing the Food Security IAP projects of some participating countries. This approach will test and apply RAPTA from the early design phase to full implementation of select projects of the Food Security IAP. Anticipated benefits include:

- RAPTA draws together many academic disciplines and communities of practice, translating theory into a practical, coherent construct that is accessible to practitioners;
- RAPTA is a scalable, flexible approach that can be tailored to produce the specific requirements of each project phase. It can include existing tools (provided they are compatible with the fundamental concepts on which resilience theory rests);
- RAPTA can be used for different kinds of cross-scale integration, such as:
  - linking different forms of knowledge
  - integrating activities to support goals at different scales. For example, in GEF terms, integrating the local objective (such as better agricultural yields) with the project objective (such as improved soil health and fertility), with the focal area objective (e.g. improved ecosystem services from sustainable land management), with the overall program objective (e.g. improved food security);
  - integrating understanding of the social–ecological system at multiple scales;

- linking local scale assessment, using local indicators (which will vary between systems and locations), to assessments at sub-national, national, and international scales (which use common aggregate indicators). This supports reporting from project up to national scale;
- inclusion of new partners (e.g. diverse organizations and government departments, non-traditional actors), and the building of options for wider collaboration, mainstreaming, up-scaling and out-scaling beyond the project's lifetime.

- RAPTA can be used to focus scarce resources where they are most effective, to build resilience in systems that are potentially sustainable and transform those that are not;
- RAPTA is a learning system which can be used to engage communities, governments and funding agencies in building a mutual understanding of multiple perspectives. It identifies the causes of, and solutions for, local sustainability problems, and defines the practical adaptation pathways needed to address them;
- Most RAPTA components reflect good project practice and are advisable whether RAPTA is used or not (e.g. multi-stakeholder engagement processes). Seen this way, using RAPTA need not be a significant overhead, but rather a part of good practice. Working within the RAPTA framework ensures an integrated approach, while building resilience thinking, incremental and/or transformational change and learning into each project.

1.7 WHERE TO NEXT WITH RAPTA?

These guidelines require further testing, development, improved accessibility of information (perhaps through web-linked documents with nested levels of detail) and a set of worked examples to draw on. Parts of the RAPTA framework (such as the meta-indicators) can only be developed by testing the approach. Nevertheless, we consider that they offer a useful and practical place to start when embedding resilience, adaptation pathways and transformation into project design.

The RAPTA approach has the potential to:

- bring resilience, adaptation pathways and transformation into the design and implementation of projects in other GEF IAPs (e.g. sustainable cities) and focal areas, as well as other development programs
- complement the UNCCD's progress indicators with indicators at national and subnational scales
- contribute to the UNFCCC parties' National Adaptation Plans (NAPs) by encouraging a systems perspective that informs a holistic approach
- support the underpinning design and implementation of actions to progress the Sustainable Development Goals (SDGs), including SDG #1, 2, and #15.[3] The concepts and aspirational goals of resilience, adaptation, transformation and sustainability are deeply woven into the SDGs – but there are challenges in operationalising them. A comprehensive approach that is cross-sectoral and multi-scale is needed to understand and apply these concepts to underpin development in all its dimensions.
- apply to a wide range of different sectors. A range of different applications is being actively explored.

3 SDG #1 is "End poverty in all its forms everywhere". SDG #2 is "End hunger, achieve food security and improved nutrition and promote sustainable agriculture". SDG #15 is "Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss".

2

OVERVIEW OF THE RAPTA PROCESS

If you require more detail about the RAPTA process and how it can be used, this chapter will be useful to you. The RAPTA framework and process were introduced in section 1.3 and Figure 1. Here we summarise the RAPTA process (inside the blue frame in Figure 1), and how the seven linked components can be used to embed resilience, adaptation pathways, and transformation into project design and implementation. There is some overlap with Chapter 3 as the aim of this chapter is to provide a general summary.

The RAPTA process has seven linked components (See Figure 3), briefly summarized in this chapter. See Chapter 3 for more detail.

The components shown in blue are critical *supporting* processes for assessing resilience and identifying adaptation and transformation options. These guidelines build on existing project design tools and link to elements that are already a familiar part of project design processes (such as Scoping and Theory of Change). We recommend small changes to these elements in order to realise the benefits of the RAPTA approach. Therefore, these guidelines emphasize adjusting, not replacing, standard elements of project design and management.

RAPTA's unique features are the three components at the centre of the diagram (System Description, System Assessment and Options and Pathways). Some project design processes already include these components, but the RAPTA approach may differ substantially from current practice. We therefore provide more detail on how to apply them.

2.1 SCOPING

Scoping is a standard component of project development that summarises the purpose and nature of the project. The RAPTA guidelines include it for completeness, and to highlight the aspects of scoping that are unique to RAPTA. The RAPTA approach encourages a deep understanding of the system, challenges faced, and how to address them effectively through adaptive implementation pathways. Applying RAPTA in the project conceptualisation stage (Phase 1, Identification, in Figure 2) involves a "light pass" through all seven process components, after which *Scoping* should be revisited to confirm or revise the initial plan.

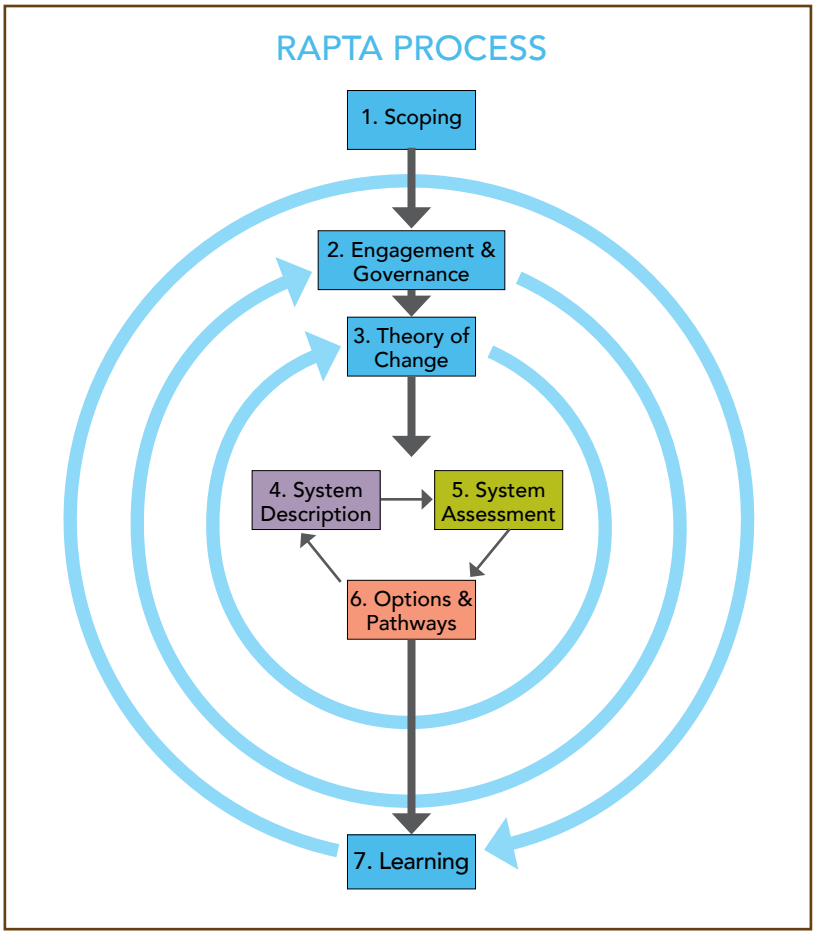


Figure 3 Overview of the RAPTA process detailed in these Guidelines

Applying RAPTA is an iterative process. Though numbered for ease of reference, the components can be applied in whatever order best suits the specific context. The components in blue are both discrete steps and ongoing processes. They are a routine part of most development projects but are included here because they are critical to applying RAPTA successfully. Some may need to be modified to reflect RAPTA concepts. The heart of what is new in bringing RAPTA into project design is shown in the centre – System Description, System Assessment, and Options and Pathways.

The "systems view" encouraged by RAPTA means that different interventions and stakeholder partnerships may emerge than in the original concept. Some problems, key points and interventions identified through RAPTA may fall outside the initially-envisaged source of funding, requiring some re-thinking. Applying the RAPTA process can influence project budgets, as RAPTA emphasises components such as learning that are often under-resourced.

Scoping comprises:

- Step 1 Explore context, problems, and aspirations of the stakeholders and define project goal.
- Step 2 Define provisional scope, scale and location of the project.
- Step 3 Review relevant past work and consider how the project will build from this.
- Step 4 Identify stakeholders and governance structures relevant to the phase of the project cycle.
- Step 5 Review how resources are to be allocated to the different RAPTA components in the current phase of the project cycle.
- Step 6 Revisit and revise *Scoping* to reflect learning from other RAPTA components.

2.2 MULTI-STAKEHOLDER ENGAGEMENT AND GOVERNANCE

Multi-Stakeholder Engagement and Governance (also referred to as Engagement and Governance) provides the process for **ethically and transparently getting the right people involved, in the right way, at the right time**. This is a basic requirement for most development projects, but some aspects of standard practice may need to be adjusted to reflect RAPTA concepts.

Effective multi-stakeholder engagement and project governance is critical to the development of locally-appropriate interventions, their acceptance by stakeholders and effective project implementation because it brings together the diverse knowledge held by stakeholders, governments and the funding agency. It also builds a shared understanding of the many perspectives that exist about the problems and their possible solutions. It establishes roles, responsibilities and accountabilities. To work well, stakeholder dialogue should be supported by facilitators experienced in resilience, adaptation and systems analysis. These aspects are emphasized in RAPTA because working across scales and sectors increases the chances that power and knowledge differences exist, and that complex ethical considerations may arise. These aspects are especially important where the project is focussed at the "transforming the system" end of the spectrum.

Engagement and Governance is essential in all phases of the project cycle. It comes early in the application of RAPTA, and is strengthened and modified as the project develops.

Engagement and Governance comprises:

- Step 1 Explore the range of approaches to multi-stakeholder engagement and identify those relevant to your project.
- Step 2 Conduct stakeholder analysis.
- Step 3 Establish or review project governance arrangements.
- Step 4 Consider the requirements for dialogue, and the role and level of skills required of the facilitator.
- Step 5 Develop a multi-stakeholder engagement plan, or review and revise the existing plan, for each RAPTA component.

2.3 THEORY OF CHANGE

Developing a theory of change is good practice in sustainable development projects and is often required by funders. It can be used:

- to capture the **rationale** for the design and implementation of interventions
- to place the linked activities, outputs, outcomes and impacts within a **logical framework** (sometimes called a log frame); and
- retrospectively, to **evaluate** the impacts, costs and benefits of the project.

Existing theory of change methods are enhanced by RAPTA through a systematic consideration of resilience, adaptation, and transformation. For example, there is deliberate consideration of the options for transformational versus incremental change. The *Theory of Change* component is closely linked to adaptive implementation pathways (*Options and Pathways*), and both components inform each other during the project's duration. The multi-scale perspective inherent in RAPTA encourages a nested approach that links goals, activities, outputs and outcomes of the individual project

through to those applicable at the organisational level (e.g. GEF), or national level. Furthermore, the *Theory of Change* matures through RAPTA iterations, emphasizing the testing of initial hypotheses, improvement through learning, and responsive management.

Theory of Change is a key activity in the project identification phase and early in the project design phase. It is also an important input into the implementation phase of a project and underpins monitoring and assessment, and project evaluation.

Theory of Change comprises:

- Step 1 Assemble the key stakeholders for constructing the *Theory of Change*.
- Step 2 Explore the magnitude of change needed to reach the project goal.
- Step 3 Develop impact pathways to reach the project goal.
- Step 4 Describe how *Theory of Change* interacts with other components of RAPTA.
- Step 5 Adjust *Theory of Change* to capture learning from other RAPTA components.

2.4 SYSTEM DESCRIPTION

There is an art to finding the appropriate balance between overly simplistic and unnecessarily complicated system descriptions. The *Theory of Change* and *Scoping* help to put appropriate boundaries on the system being described, so it is not unwieldy. RAPTA emphasizes iteration, starting with simple workable descriptions that are revisited and revised throughout the project. The *System Description* produces a record of the current understanding of the system and the assumptions and evidence underpinning this understanding. This serves as a fundamental base for assessing the system's resilience and the need for adaptation, as well as for devising interventions.

The *System Description* component is minimal when using RAPTA in the project conceptualisation phase (project Identification, in GEF terminology); it may be inferred from a preliminary literature review or from the existing knowledge of the stakeholders. In the project design phase, the *System Description* is essential for underpinning the *System Assessment* and *Options and Pathways* components, and it interacts strongly with all other RAPTA components. In the project implementation phase there should be a means to modify the *System Description* in response to new knowledge (the *Learning* component).

Stakeholders invariably bring different knowledge, experience and perspectives to a project. The *System Description* component is where these come together to develop a mutual understanding of the many perspectives held among the stakeholders.

System Description comprises:

- Step 1 Explore stakeholders' views of the system, including what they value and why, and what stresses they anticipate. (Also known as Resilience "of what, to what".)
- Step 2 Describe the social and economic aspects, including institutions and governance of the system.
- Step 3 Describe the biophysical aspects, focusing on key determinants of structure and function of the system.
- Step 4 Describe key social-ecological relationships of system function.
- Step 5 Identify interactions with the scales above and below the scale targeted by the project.
- Step 6 Synthesize conceptual models, supported by evidence, from Steps 1 to 5.

2.5 SYSTEM ASSESSMENT

The *System Assessment* component draws heavily on the resilience concepts and tools that are central to RAPTA. It can build on other assessment methods such as vulnerability, risk or triple bottom line assessments, if these have been undertaken or are required of the project.

The *System Assessment* identifies potential risks, points of no return and key controlling influences (controlling variables) associated with anticipated future shocks or changes, as well as opportunities for adaptation or transformation.

This component is used differently in various phases of the project cycle. System assessments made in the early project conceptualisation phase are likely to rely on the judgement of a small subset of stakeholders and may need revision once a well-developed system

description is available. The *System Assessment* is a primary activity of the project design phase, and underpins the *Options and Pathways* component. In the project implementation phase the assessment outputs should be revisited and revised in the light of lessons from the *Learning* component.

System Assessment comprises:

- Step 1 Explore alternative futures.
- Step 2 Assess general resilience, that is, adaptive or coping capacity for unknown risks, trends or shocks.
- Step 3 Assess specified resilience, to known risks, trends or shocks.
- Step 4 Identify the potential benefits of maintaining current system identity, adapting and/or transforming the system.
- Step 5 Summarise resilience status and adaptation or transformation needs.

2.6 OPTIONS AND PATHWAYS (INTERVENTION OPTIONS AND ADAPTIVE IMPLEMENTATION PATHWAYS)

In this component the intervention options are identified, and arranged into a provisional order for implementation. Their qualitative and quantitative benefits and costs are estimated, and they are assembled into an implementation plan which is closely linked to *Learning*, and actively updated and adaptively managed over time.

It is in this component that the value of applying RAPTA to design effective intervention options should become apparent.

This component draws on *Scoping* and *Engagement and Governance* for goals and objectives, and on *System Assessment* for constraints and opportunities that will influence what the project achieves. In this component, project designers collaborate with stakeholders to develop intervention options and sequenced pathways for implementing them. Goals, objectives, interventions and pathways are fed back to update the *Theory of Change*, particularly its cause-effect assumptions.

The implementation plan will thus be co-designed with key stakeholders who will be involved in making decisions and taking actions. It will provide the basis for a funding application and subsequent implementation. Co-designing adaptive implementation pathways is a recent field of research and what we present here summarizes current understanding, which will improve with experience.

Participants and co-author Alice Ruhweza (on left) at the UNDP-GEF Ethiopia workshop discussing the design of the project for the Integrated Approach Pilot on Fostering Sustainability and Resilience for Food Security in Sub-Saharan Africa.

Photo Credit: Deborah O'Connell

In the first phase of the project cycle, there will probably not be sufficient time and resources to focus heavily on this component though it may guide thinking. In the project design phase, the *Options and Pathways* component can be used to full effect, providing the basis for the implementation phase. During project implementation (and beyond), adaptive implementation pathways should be adjusted in response to information from *Learning*.

Options and Pathways comprises:

- Step 1 Draw on *Theory of Change*, *Engagement and Governance* and *System Assessment* to develop intervention options.
- Step 2 Build pathways for implementing the intervention options.
- Step 3 Devise a logical sequence for intervention options and pathways.
- Step 4 Set provisional implementation triggers (or review and revise any previously identified triggers).
- Step 5 Document and visualise the pathways.
- Step 6 Build the understanding gained from all components into an implementation plan.
- Step 7 Action the implementation plan, actively using the learning and adapting the pathways over time.

2.7 LEARNING (MONITORING & ASSESSMENT, LEARNING AND KNOWLEDGE MANAGEMENT)

Monitoring & Assessment, Learning and Knowledge Management are increasingly recognised as essential project components, but the overarching "learning" element is more fundamental to RAPTA than other approaches. As discussed in Chapter 1, the world faces changes at unprecedented speed and scale, for which there are no tested solutions. Therefore, a "learning by doing" approach must be taken. RAPTA is designed to facilitate structured learning and adaptive responses across the whole project cycle (Further discussed in 2.9).

The *Learning* component is a flexible, iterative component that links all the RAPTA components. Many of the project stakeholders are part of the system under consideration (such as government policymakers, NGOs, farmers, community members). Their engagement in *Learning* is essential so they become aware of their roles and potential influence on the outcomes of the project, and can self-assess and adjust as it progresses.

Effective learning requires a governance framework that supports monitoring and assessment, including collating and managing information, interpreting data and enabling responses to the insights learned from that information. Putting structures in place to monitor and assess is good practice in any project; however there are particular requirements for RAPTA. For example, core components of *System Description*, *System Assessment* and *Options and Pathways* are most effective when supported by learning processes that reinforce ongoing iteration and revision, particularly in the project design and implementation phases.

Learning comprises:

- Step 1 Understand why learning is important in RAPTA.
- Step 2 Identify the kind of learning environment that suits your project, context and stakeholders.
- Step 3 Specify the project needs that *Learning* will meet, informed by all the other components.
- Step 4 Select the appropriate learning tools and methods to meet the identified needs.
- Step 5 Ensure adequate resourcing for *Learning* activities across all phases of the project cycle.

2.8 WHERE TO START? THE SEQUENCE OF RAPTA COMPONENTS

The RAPTA components are presented in the order which we think works well. However, following this order is not essential; users should choose the order that best suits their project. Each project is a complex social system in its own right, and requires its own capacity to learn and adapt in a sequence that best serves the project. Within each component, these guidelines provide a logical sequencing of tasks. Users may adapt that sequence to suit the specific requirements and circumstances of their project.

Rather than a prescribed order or sequence, the components and their tasks listed here can serve as a checklist, providing markers against which the project team can reflect upon project activities and ensure that all components have been considered. Where a well-established practice for a particular component (e.g. Theory of Change) already exists, the guidelines

are not intended to replace current practice, but rather show how it can be adapted to make the most of the core RAPTA components. For example, the component *Options and Pathways* will be more robust if all of the previous components are completed, but may still be of use in adaptation planning even if a full resilience assessment is not conducted.

One reason the order or application is not so important is because of the priority placed on ongoing learning and adaptation through iteration. For example, at the start of the project, a small project team can start work on the *System Description component* as a desktop exercise to inform the *Engagement and Governance component.* Later in the project the *System Description* component can be revisited, and a more mature description developed with the full multi-stakeholder engagement plan in operation. In Figure 3, the grey arrows are the suggested logical high-level sequence of tasks, and the blue circular arrows represent the iterative nature of components; all components will be revisited as part of the learning process, and this learning should feed into the next project phase.

2.9 USING RAPTA IN DIFFERENT PHASES OF THE PROJECT CYCLE: IDENTIFICATION, DESIGN, AND IMPLEMENTATION

No matter how thorough and detailed the knowledge base generated through RAPTA, it can only ever be a partial representation of the system. It is impossible to fully understand and predict how complex social–ecological systems will change over time. Knowledge gaps will always be found during the RAPTA process and many assumptions must be made as each component is completed. Lack of full knowledge, or over-bold assumptions, should not become reasons to do nothing. However, implementation must be structured to learn the most about the system while simultaneously addressing the current challenges identified and adapting plans where needed. Even in the best-studied and -understood regions, knowledge will always be incomplete and will always need to evolve as the system changes over time. In fact, knowledge gaps and assumptions should be viewed as reasons *to* act. The RAPTA process and the outputs from the process should be viewed as an *evolving process*, where knowledge is developed, applied, tested and reviewed in a continuous learning framework.

The focus on learning, on testing assumptions and improving the knowledge base sets RAPTA apart from traditional approaches to project design and implementation. It is this focus that will break the cycle of business-as-usual investment that does little to fundamentally change the dynamics of complex systems. To achieve this requires a strong commitment to building the knowledge systems and the learning culture which support this shift. A deliberate approach to structured learning should be adopted, in recognition of the need to put learning at the centre of efforts to manage social–ecological systems. Through this process stakeholders systematically fill critical knowledge gaps and test assumptions over time, while still achieving their project objectives.

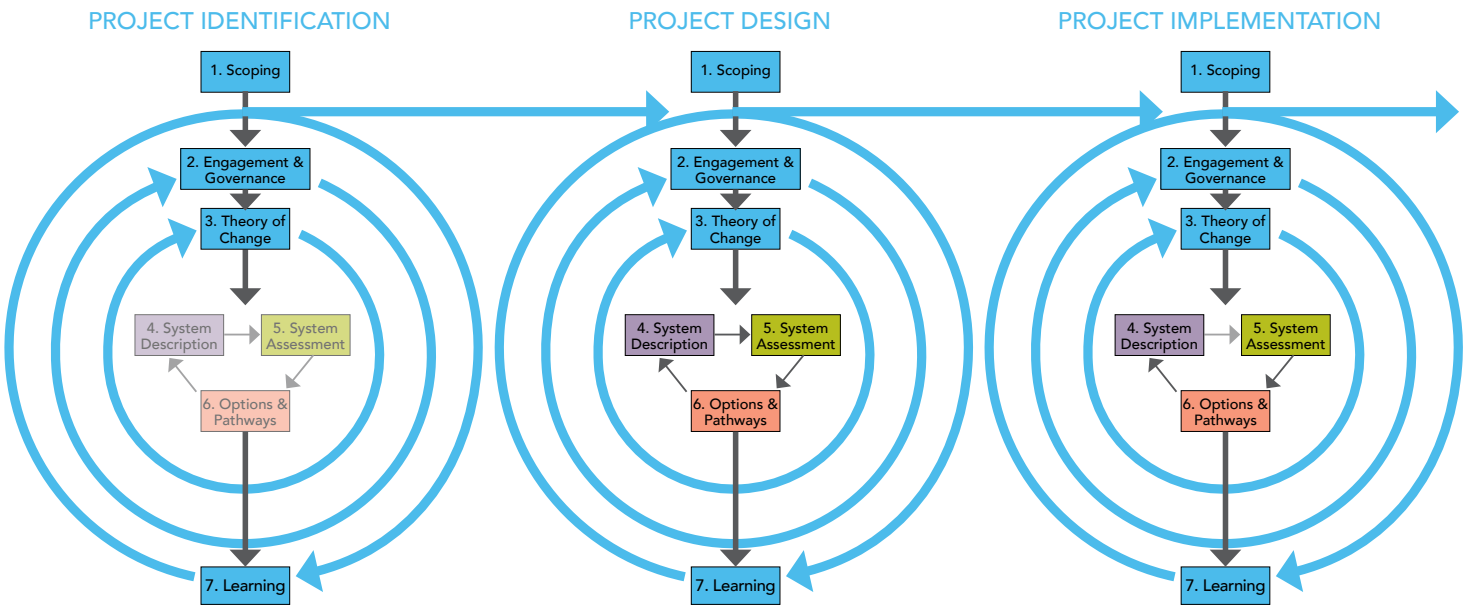


Figure 4 Iterative use of RAPTA through the project cycle of identification, design and implementation

RAPTA will be used iteratively in different phases of the project cycle, but the emphasis on different components will vary. In the project identification (conceptualisation) phase (left hand cycle) *Scoping* is emphasized, and the other components are used in a light way to guide the *Scoping*, but no detailed analysis occurs. In the Design phase, all components should be completed, including revisiting *Scoping*. The design phase *Theory of Change* is used to set up preliminary hypotheses about intervention options and pathways, which are then further tested and developed by other components of RAPTA. The revised *Theory of Change* then underpins the implementation phase, which focuses on implementing interventions, and monitoring and learning. The implementation phase may also include addressing critical knowledge gaps in the other components (as identified in the design phase) (signified by lighter colours on the right hand figure).

2.10 EXAMPLE OF USING RAPTA IN PROJECT DESIGN AND MATCHING TO GOALS, STAKEHOLDERS AND FUNDING SOURCES

RAPTA both builds on, and challenges, existing project design approaches by encouraging a thorough system analysis and design of options and implementation pathways before bringing in the pragmatic considerations of mandate and resources. It does this through:

- Taking a holistic view and analysis of the problem, opportunities, goals, state and dynamics of the system;
- Evidence-based dialogue and proposals on what needs to change or be preserved to achieve the desired goals – initially unconstrained by the specific mandate and limited resources that project designers may have. This encourages stakeholders to explore the full breadth and quality of changes covered by the concepts of resilience, adaptation and transformation;
- Detailed work on intervention options that are prioritized, grouped and sequenced into pathways to bring about the required level and quality of change;
- Determining which intervention options and pathways will apply in the project and what role this particular project will play with respect to the required magnitude and quality of changes foreseen. Also, the partnerships and resourcing needed to achieve the goals;
- Robust theory of change, and learning processes that enable *adaptive* implementation of the options and pathways, fill gaps in understanding, address unexpected challenges and seize opportunities that may arise.

Once RAPTA is fully piloted it will be easier to give real-life examples, but for now a hypothetical example is used to indicate the kinds of new perspectives

and requirements that RAPTA could bring to design of projects that address complex problems such as chronic food insecurity.

The goal of the GEF Food Security IAP is to *enhance sustainability and resilience of food production and supply* in participating countries. This goal is shown as a star in Figure 5. There are also a number of specific goals for achieving global environmental benefits through this investment (visualized simply here by the green "envelope of safe operating environment" within which the food security goal must be met).

The systems view promoted by RAPTA interprets this goal by including all the dimensions of food security:

- *availability* of adequate and nutritious food to households in the district
- *access* to adequate and nutritious food
- *utilization* of this food by individuals in a household
- *stability/resilience* of the availability, access and utilization of food in the face of shocks and stresses, over time.

Past projects for food security have typically focused narrowly on one aspect of food security – availability. Often too, they focused specifically on maintaining or enhancing the current system of food production, to the neglect of other factors like access or health. RAPTA will encourage project designers to frame the problem broadly and provide a more comprehensive understanding of the current state and trends of the food system instead of only considering the food *production* system.

Nowadays, food systems are increasingly interconnected and local food production systems have implications for local and global food security as well as environmental change. The design of pathways to achieve desired goals has to consider resilience to local and global stresses and shocks. Chosen pathways also need interventions that preserve and enhance local biodiversity and ecosystem services to ensure that the achievement of local food security is sustainable, while contributing to global environmental benefits.

Suppose the *System Description and System Assessment h*ave shown that enhancing the resilience of current pastoral production can provide a sustainable supply of adequate and nutritious food. Better management of the shared landscape and "index insurance"[4] that reduces the impact of livestock losses may be effective interventions that enhance the resilience of the pastoral system. These may need to be complemented by additional interventions that ensure access by women, children and the disabled to the available food, as well as interventions that improve sanitation and primary health care of the population to enhance the utilization of food.

To take an example: an initial pass through RAPTA may show that human population increase has reduced the ratio of livestock to humans below the threshold necessary for a reliable supply of milk for households, and that household incomes are not sufficient to buy an adequate and sufficiently diverse diet for the population. At the same time, livestock losses due to drought of increasing frequency and intensity make index insurance not viable. The revised assessment may identify intervention options that will shift the system towards agro-pastoralism – as opposed to grazing alone – as the dominant food production system.

Subsequent assessments then reveal that, even though agro-pastoralism may improve the food availability situation in the short term, climate change projections show that in the longer term it cannot continue to be viable in the region. In this case, a more radical shift towards new product lines and alternative livelihoods may be required to transform the system.

In reality, the situation will probably require a mix of all three strategies. So, planning for the longer term transformations will need to occur in parallel with putting in place strategies that sustain short-term food production.

Early use of RAPTA may show that there is high leverage in the system through some of the other aspects of food security, such as access to, and control of, resources (e.g. through improved access to education for girls and women). If the donor agency or project proponents are not mandated, or do not have the capacity, to deal with such aspects of the system, new partnerships and donors must then be approached to develop complementary projects,

4 Jensen, et al (2015). For full reference see Resource Links.

or else the original proponents may wish to revise the project.

This example illustrates that in order to achieve both sustainability and resilience in food security at a higher scale you need to encourage exploration beyond the idea of simply maintaining current food production systems.

The first step is to explore what it would take to achieve the desired goals and futures, before considering what the project and stakeholders can do within the limits of their mandate and resources. This analysis is complemented by considering what partnerships and resourcing are needed do the rest.

Resource links

Jensen, N., Barrett, C., & Mude, A. (2015). The favourable impacts of Index-Based Livestock Insurance: Evaluation results from Ethiopia and Kenya. *ILRI Research Brief*, *52*.

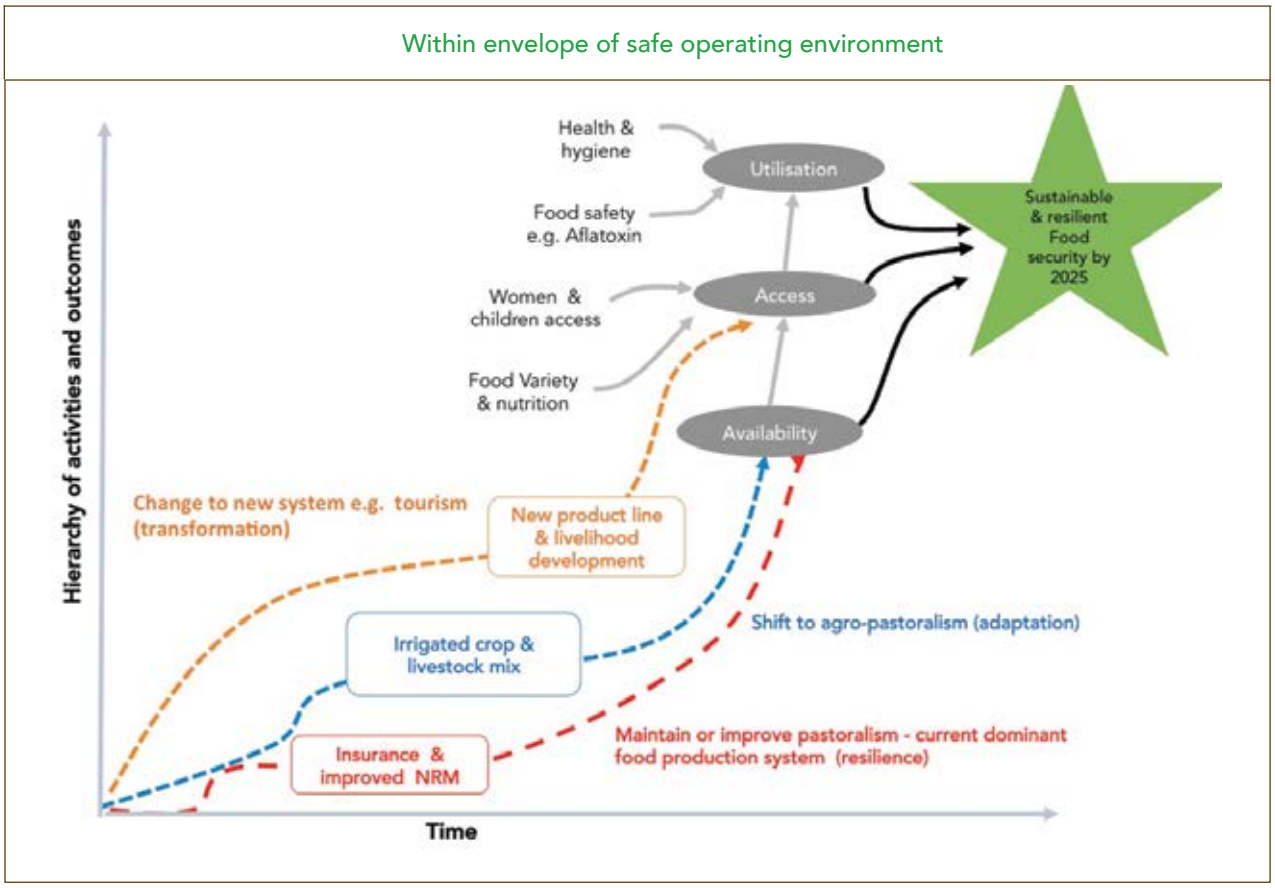


Figure 5 An example of adaptation and transformation pathways which could be implemented to meet the food security goal

PART II DETAILED RAPTA GUIDELINES

3

RAPTA GUIDELINES

FOR PROJECT IDENTIFICATION AND DESIGN PHASES OF PROJECT CYCLE

This Chapter is addressed directly to project designers.

We assume that you have read Chapter 2 which provides an overview of the RAPTA process.

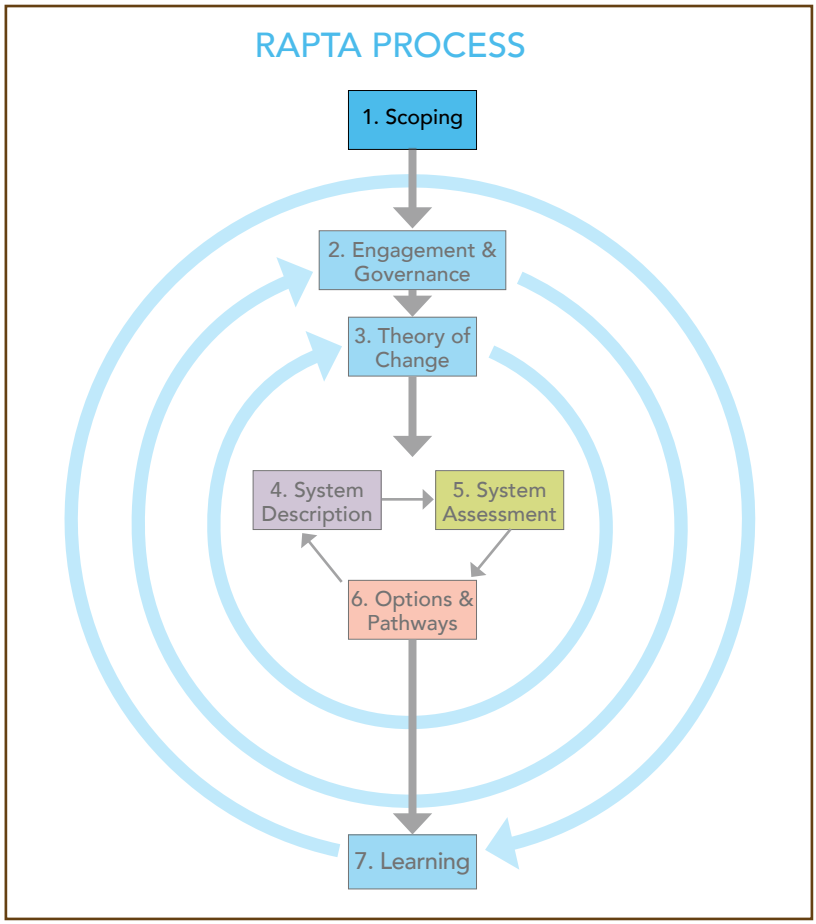
This chapter contains detailed guidelines for each component of RAPTA, listing some of the "whys" and "hows" of each, and provides examples mainly drawn from food security projects. However, this chapter may also be of use to those designing projects focused on other topics, including outside the GEF. Chapter 4 provides an outline of how to use RAPTA to deliver the GEF requirements for project development and documentation.

We know that it would be helpful to provide some worked examples that illustrate each element of the whole process for one example project, but as these guidelines have not yet been piloted, it is not possible to do so. Thus we have drawn, initially, on hypothetical examples.

We provide examples of tools used by some organizations involved in the GEF Food Security IAP to assess resilience: The United Nations Development Program provided a contribution describing its resilience tool (COBRA), focused at the household and community level, and how the RAPTA complements it through a systems analysis. The Food and Agriculture Organization of the United Nations (FAO) provided a description of its Self evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP) tool, which assesses the resilience needs of farmers and pastoralists at the household and community level. SwedBio, at the Stockholm Resilience Centre, provided an example demonstrating the value of multi-stakeholder dialogues in defining comprehensive solutions that are inclusive of the opportunities and challenges defined by the multiple actors.

If you are not actually designing a project, we suggest you focus mainly on Part I of this report.

3.1 SCOPING



SCOPING

Step 1 Explore context, problems, and aspirations of the stakeholders and define project goal

Step 2 Define provisional scope, scale and location of the project

Step 3 Review relevant past work and consider how the project will build from this

Step 4 Identify stakeholders and governance structures relevant to the phase of the project cycle

Step 5 Review how resources are to be allocated to the different RAPTA components in the current phase of the project cycle

Step 6 Revisit and revise Scoping to reflect learning from other RAPTA components

Figure 6 Steps of the *Scoping* component

3.1.1 Purpose of *Scoping*

The purpose of *Scoping* is primarily for the proponents of a project to understand more about the problem and opportunities to address it, and to secure political support and/or funding to conduct a project or program in the targeted countries/regions.

A project is usually initiated by a subset of the stakeholders – such as governments, donors, NGOs and other key agencies. The project initiators/owners generally have a broadly defined purpose or goal related to the source of the funding, or to the missions and goals of the agencies involved. In the case of the Food Security IAP, it is the country governments and GEF agencies who identify a challenge or opportunity that needs GEF funding. They already have a strong baseline (existing investments in this issue) but they need incremental funding to build resilience into their existing food security programs.

Scoping is a standard component of project development that summarises the purpose and character of the project. The RAPTA guidelines include it for completeness, and to highlight the aspects of scoping that are unique to RAPTA. The RAPTA approach encourages a deep understanding of the system, the challenges faced and how to address them effectively. Application of RAPTA in the project conceptualisation stage (Phase 1, Identification, Figure 2) will involve a "light pass" through all seven process components, after which *Scoping* should be revisited and revised where necessary. The insights gained through RAPTA may lead to a significant change in scope (See example in section 2.10). The "systems view" encouraged by RAPTA means that different interventions and stakeholder partnerships may be proposed than were originally envisaged. Some of the problems, key points and types of intervention identified through RAPTA might be out of scope for the initially-envisaged source of funding. For example, a different set of projects and funders may be identified if a funding program is limited to working only on interventions by small-scale farmers, yet the most critical adaptive pathway for the system to attain its goal requires intervention in health, transport or education. Applying the RAPTA process may result in project resources being allocated differently, emphasizing components (such as learning) that are often under-resourced.

3.1.2 Use in phases of the project cycle

Scoping is particularly important in the project identification phase of project cycle. It may not need to be repeated in the project design and implementation phases if all the key stakeholders are present in the initial pass (during project identification), and if the subsequent steps for design and implementation remain focused on the original scope. If key factors such as the context or scale change, then *Scoping* will need to be revisited in subsequent phases.

Users are encouraged to consider that other funding and implementing partners, or types of projects, may need to be brought in to complement the original envisaged project.

3.1.3 Steps to conduct Scoping

Step 1 Explore context, problems and aspirations of the stakeholders, and define project goal

Discuss key questions, for example:

- The SDGs and other high level goals have explicit aspirations for resilience, adaptation, transformation and sustainability. How do these apply to this project, at this scale? Whose aspirations do they represent? Are the aspirations shared by existing and potential stakeholders? Are they a priority of those who stand to gain or lose benefits?
- Often the aspiration is reasonably easy to agree on; it is harder to gain agreement on the problem and how best to address it. What are the different understandings of the system, the nature of the problem and the ways of addressing it among current and potential stakeholders?
- Define the goals of the project on the basis of the above. Some programs of funding such as the GEF Food Security IAP, have "given" goals e.g. delivery of global environmental benefits, that need to be achieved at program level from the aggregate impact of individual projects (See Box D).

Step 2 Define provisional scope, scale and location of the project

In addition to determining the broad scope and location of the proposed project, it is important to:

- Ensure that the spatial and temporal scales for assessing the project are aimed at household, community, region or national scales, as appropriate. These can be defined in geographic or governance terms. The project may also define its success over 1, 5 or 20 year time-frames, for example.
- See *System Description* for more detail.

Step 3 Review relevant work that has been done in the past, and consider how the project will build from this

It is standard practice to collate and review previous relevant work and use the lessons from it to assess what is known and identify knowledge gaps to be addressed in the current project. RAPTA encourages users to do this. To fully incorporate resilience approaches it is important to:

- Counter the tendency to adopt approaches which are reductionist or "close down risk" instead of acknowledging uncertainty and responding accordingly

BOX D
Linking environmental and development benefits in the goal

Contributed by Mohamed Bakarr, GEF Secretariat

Designing and implementing projects in complex social-ecological systems demands careful alignment of environmental and developmental benefits. This applies at most scales and will ensure that opportunities for positive synergies are identified, while potential negative trade-offs avoided. The chosen goals must take into account many interests and needs within the targeted agro-ecological context. For example, in sustainable land and forest management, the goal could be to improve and maintain ecosystem services (healthy soils, water flow, vegetative cover, and agrobiodiversity) in ways that underpin rural livelihoods (e.g. crop and livestock production, improved access to energy, and water for consumptive use). In landscapes where such links are well established, the local stakeholders will have a vested interest in approaches that deliver these multiple benefits, and consequently use resilience thinking to work collectively toward the project goal.

The Food Security IAP has a strong focus on safeguarding natural resources—water, soils, trees, and genetic resources—as the basis of sustainability and resilience in food production systems. It aims to bring a holistic perspective to the management of natural resources in smallholder agriculture, since smallholders account for more than 70% of agricultural production in Sub-Saharan Africa. Within this broad and ambitious framework, all projects under the IAP program are asked to embody actions that are holistic and integrated, with goals that are relevant to the local, national or regional context.

At local level, the sustainability and resilience of production systems relies on the efficient management of natural capital –soil, water, vegetation, and genetic resources – by farmers and local communities. The IAP therefore enables scaling-up of appropriate interventions for soil and water conservation, diversification of production systems and integrated natural resource management in agro-pastoral systems. These interventions complement efforts to increase access to improved drought-tolerant seeds, better management of soils and other inputs, adjustment of planting periods, cropping portfolios and the management of on-farm agrobiodiversity

At national level, the program will promote creation or strengthening of institutional frameworks which enhance collective action on integrated approaches in smallholder agriculture. This will increase the prospects of combining at scale the multitude of successful efforts by smallholders to integrate management of land, water, trees and genetic resources. At the regional and sub-regional levels, an institutional framework will be promoted for engagement with the main development partners, scientific institutions, international organizations and economic agencies.

- Identify and challenge assumptions that humans understand and control the system. This avoids 'blueprint solutions' that resist change and try to "stabilize" the old, failing system
- Identify tendencies in donor–recipient relationships that may cause perverse incentives and add to problems they were meant to solve.

Step 4 Identify stakeholders and governance structures relevant to the phase of project cycle

It is standard practice to identify stakeholders who need to be involved in the current phase of any project. However, resilience considerations place a much greater emphasis on thinking across scales and time, and on identifying a wider set of stakeholders who may influence or have responsibility for implementing the project outcomes. Therefore:

- Develop a list of stakeholders who should be involved in each phase of the project cycle, recognizing that this will be revised in the *Engagement and Governance* component. Most importantly at this point, consider which stakeholders will enable you to carry out the Theory of Change steps credibly.
- Consider options for governance structures.

Step 5 Review how resources are to be allocated to the different RAPTA components in the current phase of the project cycle

A review of the RAPTA component requirements will inform proper budgeting for the application of RAPTA

- Ensure that adequate resources are allocated to each RAPTA component, particularly the *Engagement and Governance and Learning components.*

Step 6 After applying other RAPTA components: Revisit and revise Scoping to reflect learning from other RAPTA components

- After applying the RAPTA process, revisit the
  - project goals and scope, and
  - stakeholders who should be involved in each component of the next project phase.

3.1.4 What this component will produce

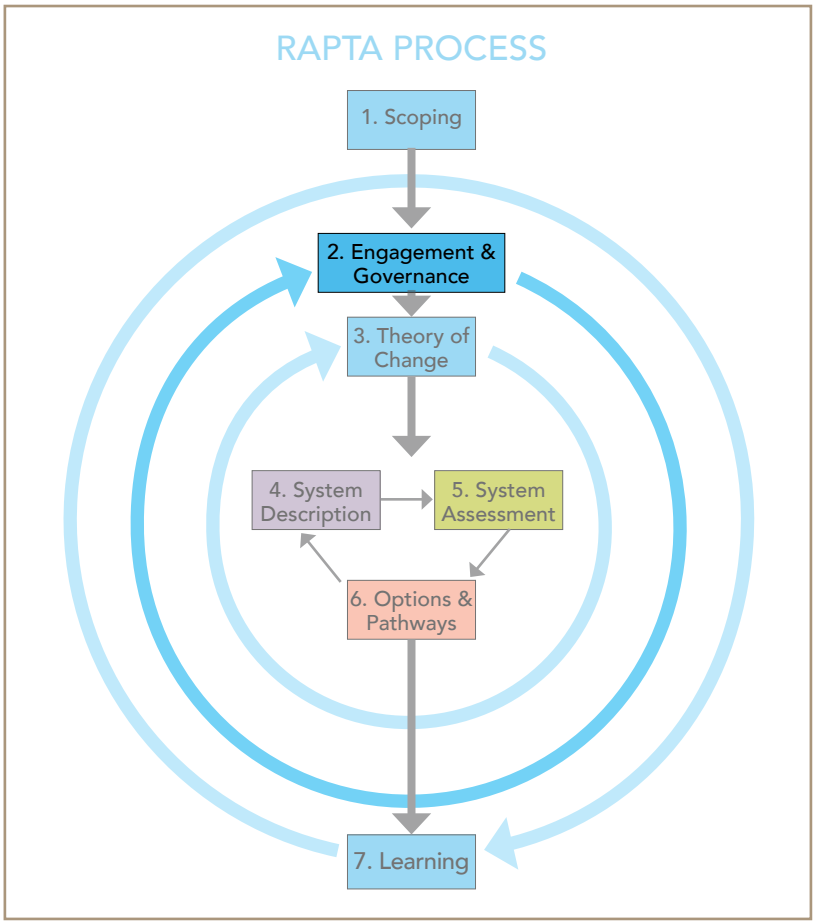
By the end of *Scoping*, it is expected that you will have:

- A clear statement of the aspirations and goals of the project
- A preliminary undertanding of the project area, its problems and potential opportunities within national and regional contexts
- A list of potential stakeholders to consult or include, and possible governance structures
- An understanding of relevant past and current interventions in the project area and how this project might complement or replace them
- An understanding of the resources required to apply RAPTA.

Ethiopian-GEF project design team member in discussion with a women's focus group, near Mekele, Tigray Region, Ethiopia March 2016.

Photo Credit: Alan Nicol

3.2 MULTI-STAKEHOLDER ENGAGEMENT AND GOVERNANCE (ENGAGEMENT AND GOVERNANCE)



ENGAGEMENT AND GOVERNANCE

Step 1 Explore the range of approaches, and identify those relevant for your project

Step 2 Conduct stakeholder analysis

Step 3 Establish or review project governance arrangements

Step 4 Consider the requirements for dialogue, and role and level of skills required of the facilitator

Step 5 Develop or revise multi-stakeholder engagement plan for each RAPTA component

Figure 7 Steps of the Multi-Stakeholder Engagement and Governance component

3.2.1 Purpose of Engagement and Governance

Multi-Stakeholder Engagement and Governance (also known simply as *Engagement and Governance)* provides a process for **ethically and transparently getting the right people involved, in the right way, at the right time.** This is a requirement for most development projects, but there are aspects of standard practice that may need to be adjusted in order to support RAPTA.

Effective multi-stakeholder engagement and governance is critical to the development of locally appropriate interventions, their acceptance by stakeholders and effective implementation, because it brings together the diverse knowledge held by stakeholders, governments and funders. It also builds a shared understanding of the many views about problems and solutions, and establishes roles, responsibilities and accountabilities. Dialogue may need to be supported by facilitators who are experienced in resilience, adaptation and systems analysis. All of these aspects are emphasized in RAPTA because the nature of working across scales and sectors increases the chances that power and knowledge differences exist and that more complicated ethical considerations may arise. These aspects are especially important where the project is focussed towards the "transforming the system" end of the spectrum.

3.2.2 Use in phases of the project cycle

Engagement and Governance is essential in all phases of the project cycle and is an ongoing element throughout the RAPTA process. It begins early in a pass through RAPTA, and is strengthened and modified in subsequent project phases. In the project identification phase it is likely to involve a small number of stakeholders. The number and range of stakeholders will be much greater and more comprehensive in the design and implementation phases.

3.2.3 Steps to *Multi-Stakeholder Engagement and Governance*

Step 1 Explore the range of approaches to multi-stakeholder engagement and identify those relevant for your project

There are many different ways to develop and implement effective stakeholder engagement and project governance (see Resource Links at end). We suggest you keep the following in mind as you develop your own approach:

- There is no one-size-fits-all approach. Multi-stakeholder engagement may involve a range of different consultation and dialogue processes such as formal and informal meetings, focus groups, surveys, interviews and interactive learning activities. The choice depends on the project (e.g. the particular problems and goals) and the broader context (e.g. country, culture, decision-making processes).
- The chosen approach needs to be flexible and adaptive. New knowledge or a shift in funding, socio-political, economic or environmental conditions may require changes in the project, so it is important that project development does not lock itself into a particular engagement process or governance structure.
- Multi-Stakeholder Engagement and Governance are not separate from other project phases and activities but rather are embedded across all aspects. In these guidelines, they are described as a separate component for the sake of clarity. In reality, they are ongoing processes in RAPTA that cut across all aspects of the project. They are critical to any successful project as they play an integral role – throughout the project and potentially beyond – in bringing together diverse sources and types of knowledge, building shared understanding, responsibilities and accountability and supporting appropriate decisions and effective actions.
- You will need sufficient resources, time and commitment. The success of the project will depend heavily on the effectiveness of this component, so it must have the enough people with the right skills, sufficient money to build capacity and fund processes, and enough time allocated to meetings, interviews and discussions. As effort and commitment from stakeholders is critical to effective *Engagement and Governance*, thought needs to be given to the incentives for them to become involved (i.e. What is in it for them? What will they get out of engaging and/or being part of the governance structure?)
- Tailor the types of approaches and tools according to the type of engagement and learning environment the project is aiming to build. Identifying what kind of learning environment the project aims to support is discussed in the *Learning* component, to which this component is closely linked. It is important to consider whether the approach you are establishing is respectful to a diversity of stakeholders, includes those who lack power (such as women), is worthy of trust, and has decision-making processes that are transparent to all participants.
- We propose that capacity-building in *Engagement and Governance* should be considered an intervention in its own right.

Step 2 Conduct stakeholder analysis

It is important to develop a strategy for engaging with stakeholders and developing a governance structure based on sufficient information about the range of people and groups the project may involve. The quickest way to gather this information is by conducting a stakeholder analysis. Many different approaches and tools can be used (See for example 3.2.5).

- Conduct stakeholder analysis, using the following questions are important to consider *throughout the RAPTA process, in each component:*
- **Who** are the stakeholders? At the end of this section are links to various ways of doing a stakeholder analysis. The analysis will enable you to answer these questions:
  - Who needs to be there? (e.g. who needs to be involved in developing the *Theory of Change* for the project?)
  - Which organizations should be represented, and who from each organization is the right person to invite?
  - Who has capacity to participate?
- **What** are the potential barriers and opportunities for *Engagement and Governance* in general and for engaging with the identified stakeholders?
  - Consider who can be in the room with whom, issues related to physical and social access, representation or leadership conflicts, timing of activities with respect to stakeholders' routines and commitments
  - Pay specific attention to issues of gender and power (See Box E)
  - Revisit the previous questions around **who** should be engaged to ensure alignment and consistency
  - What incentives might encourage participation, what social or economic constraints might inhibit it, and how can these be countered?

BOX E
Climate change impacts are not gender-neutral

Contributed by Gabriella Richardson Temm, GEF Secretariat

Climate change impacts are not gender-neutral, and neither are technologies, policies nor projects related to adaptation and resilience.

Environmental and climate change often aggravate gender inequalities and affect the food security and nutrition of women, men, girls and boys differently. Equally, projects and programs that seek to enhance resilience also affect women and men differently. Coping and adaptation prospects and strategies of men and women vary considerably. Gender inequalities and barriers that limit women's access to financial resources, land, education, health and other rights and opportunities limit their capacity for coping with and adapting to climate change. Resilience-building approaches must therefore carefully identify and address gender-specific vulnerabilities and risks to identify shocks and stresses, and build on gender-specific needs, capabilities, and knowledge to enhance resilience and project outcomes. Women play critical roles in food security and throughout the agricultural value chain including the availability, access and utilization of food. Gender-blind stakeholder engagement strategies can compound existing gender inequalities and prevent women from fully contributing to or benefiting from the project. Failure to include women explicitly in the stakeholder engagement analysis and strategy could effectively mean neglecting their needs and rights, excluding them as important agents of change and as a relevant stakeholder group to the project.

A gender-responsive stakeholder analysis can be undertaken at all stages of the project cycle, but most critically should be carried out at the start of a project. There are a number of approaches to undertake a gender-responsive stakeholder analysis, including workshops, focus groups and interviews. Whatever approach is used, a gender-responsive stakeholder analysis and engagement:

The design stage can help to:

- Identify key women and men stakeholders and stakeholder groups, including women's organizations and gender advocates;
- Detect and understand gender differences in knowledge, interests, priorities and power within stakeholder groups, as well as differences between stakeholder groups;
- Incorporate information on activities, responsibilities, contributions, priorities and needs of both women and men into the *Theory of Change* and risk analysis, and shape the development of effective project activities, and gender-sensitive project outcomes, outputs and indicators.

The implementation, monitoring and evaluation phases can help to:

- Understand critical contributions of all stakeholders, and how best to engage women and men stakeholders, e.g. identify how and when different women and men stakeholders should be involved in project activities;
- Ensure equitable participation and inclusion of women, and identify potential benefits, opportunities and risks for gender equality and women's empowerment;
- Take steps to actively reduce disparities and promote equality between women and men to improve project outcomes and sustainability;
- Monitor and track the effectiveness of the engagement with both women and men stakeholders and assess whether there are adequate resources and competencies to deliver on project goals and outcomes and define important course corrections;
- Make visible differential impact of the project on women and men and the benefits of mainstreaming gender for the success and sustainability of the outcomes, and provide lessons for future programming.

- **How** should the identified stakeholders be engaged in the project?
  - What roles should stakeholders play in governance of the project?
  - What other ways can stakeholders contribute to the project (e.g. share information, help build networks, provide advice and guidance, etc.)
- In some cases it will be appropriate for the stakeholder analysis to be part of the *System Description* component, recognising that stakeholders are key agents and shapers of change in the social-ecological system. Additionally, the *Options and Pathways* component may identify stakeholders who were not considered in the original stakeholder analysis, so requiring a means to revisit the stakeholder analysis in light of new system insights (e.g. improved maternal health may be a key enabler of options, and may point to specific stakeholders in the health sector).

Step 3 Establish or review project governance arrangements

RAPTA makes the distinction between project governance (dealt with in this step), and system governance (dealt with further in *System Description*, *System Assessment*, and *Options and Pathways)*. Governance is common to all projects, but has particular importance in projects involving resilience, adaptation and transformation because the greater the level of change to the social–ecological system, the more attention must be paid to issues of power, decision-making and accountability.

Governance is the process through which project owners make important decisions about the design and management of the project, determine who is involved in decision-making, and guide implementation of the project. Funders, governments and stakeholders increasingly demand good governance and it has become a critical element for the success of projects.

- Implement effective governance by considering what it will look like and who it will involve (structure) and the underpinning roles, responsibilities, and the processes (or rules). Many different types of governance structures are available. One example is to have a steering or advisory committee, containing representatives of key stakeholder groups and the project leader, whose role is to provide advice and guidance and ensure that the project delivers its goals, engages the right stakeholders, addresses issues of power and inequity, and fosters a culture of constructive debate and improvement. Often there is also a project management team, responsible for day-to-day management of the project and which reports to the steering committee. There may also be a technical advisory committee.
- Set clear rules to underpin these governance structures or bodies, guided by key governance principles (See Box F). These lay out: the roles and responsibilities of the governing bodies and the procedures and terms of reference for each; engagement processes between project participants (project director, sub-program leaders, project staff) and the broader set of stakeholders; mechanisms for resolving disputes and conflicts of interest; and procedures for changing the rules when circumstances change.
- Consider three key questions that will guide how the project will work and with whom, based on five key governance principles (See Box F). These questions are:
- How have you made the RAPTA process transparent and conducive to learning?
  - Those with key governance roles need to be able to gain relevant information quickly, and learn. Those in high-level decision-making roles are often busy and have information overload, so providing ways for people in key governance roles to participate conveniently and **learn**, is crucial
  - The volume of information, range of people and ideas in a RAPTA process means that unless these ideas and issues are communicated clearly and transparently to all stakeholders it will be confusing, rather than empowering
  - Consider how to enable access to all project documents (through the *Learning* component)
- Is there flexibility to deal with uncertainty and alternative ideas?
  - Consider including stakeholders who have alternative points of view, or innovators who can make big ideas work
  - Pay specific attention to learning *from new knowledge, wherever it comes from*
  - Revisit early assumptions along the way
- How are stakeholders **ethically** considered in the project?
  - Stakeholders have many potential roles and, depending on who is included and when, it can affect other stakeholders' perspectives of, and engagement with, the project. Having a diverse range of stakeholders is desirable, and the honesty and integrity of those included should always be a consideration.

BOX F
The Five Key Governance Principles

- Include the **legitimate voice** of key stakeholders either directly or through legitimate representative groups. Especially focus on including a broad representation of donors and key partners, those who have a mandate from their parent organizations to be involved and make decisions, champions of the project and stakeholders who are open to a reflexive learning approach and to potentially uncomfortable feedback.
- Develop a **vision** that is shared by the project partners and stakeholders with a broad and long-term perspective on human development. This can be through clear terms of reference and informal or formal guidelines about modes of operation
- Establish **responsive, effective** and **efficient** processes to produce results that meet needs while making the best use of resources. This can be through regular meetings, particularly in the design phase, and through ensuring adequate resources are devoted to all areas (especially *Learning*, which is often overlooked)
- Ensure **accountable** and **transparent** decision-making such that all stakeholders are clear on how it works, why, and who is accountable
- Deliver **fairness** in how the project operates and in its final decisions by considering the equity of all stakeholders, especially women and the poor, while working within the Rule of Law.

Graham et al 2003. For full reference see Resource Links.

  - Consider whether ethical guidelines, clearance or permission for specific interventions or engagement are needed.
- Plan the evolution of project governance arrangements and participants through the project cycle. Those responsible for the governance of the system may be considered as stakeholders in the early stages of the project. As the project cycle matures, those responsible for system governance may have an important and effective role to play in the project governance.

Step 4 Consider the requirements for dialogue, and the role and level of skills required of the facilitator

The dialogue processes, and the need for facilitation skills are context-dependent. For example, if the system changes and/or interventions envisaged in *Scoping* and initial *Theory of Change* are at the "maintain or enhance current system" end of the continuum, the requirements for facilitation skills and supporting process are completely different from the "transform system" end of the spectrum, or if there are highly conflicted communities. In the latter case, specialist skills in negotiation and adequate processes for mediation and conflict resolution – as well as an appropriate governance structure – are necessary (See Box G). It may also be valid to decide that the scale of transformation is so large or disruptive, or the values so highly contested, that the project should not go ahead if it has a low chance of success or even a chance of making conflicts worse.

- Assess the requirements for the *System Assessment, System Description and Options and Pathways* components, each of which will have particular requirements of the facilitation and dialogue processes, and these are identified in this step. These requirements may need to be revisited and revised in response to other components (e.g. if conflict between stakeholders is not expected, but then emerges in the *Options and Pathways* component).
- Clarify the role and skills required of the facilitator. The major role of your facilitator is to elicit the knowledge and preferences of stakeholders so they can influence project design and implementation which may require:
  - An ability to listen, to draw out shy people and contain domineering ones, encourage rather than criticize, to summarize and synthesize, and to read moods and change methods accordingly. It also needs understanding of local culture, empathy, and ability to bridge differences rather than taking sides.
  - An understanding of the science content. While the facilitator does not need to be an expert, they do need a good working knowledge of

BOX G
Example of engagement process to support transformation

Quito Dialogues – Multi-actor dialogues on scaling up biodiversity finance[5]

Contributed by SwedBio at Stockholm Resilience Centre

This is an example of how structured dialogue processes can be used to support formal discussions of issues which involve actors holding divergent views and agendas.

In most international processes and negotiations there are conflicting views based in real differences in position. There may also be knowledge and trust gaps that have to be understood before solutions can be reached. The issue of innovative finance mechanisms for biodiversity was one of the most difficult points for the Convention on Biological Diversity (CBD) negotiations in 2010. Parties could not reach agreement because some considered that the institutional frameworks, market regulations and safeguards were not elaborated sufficiently. There was also a lack of trust and dialogue between actors with different political views.

The SIDA-financed program SwedBio at Stockholm Resilience Centre co-organized "multi-actor dialogues" to support the formal negotiation of financial mechanisms. They brought together diverse groups such as United Nations and government organizations, scientists, civil society – including indigenous peoples and local communities' organizations – and private sector actors.

The multi-actor dialogues were based on the conviction that all the participants together can craft a suite of solutions, rather than assuming there is a single answer that fits all. This approach encouraged active listening with the intention to understand each other's viewpoints, find meaning and agreement, rather than listening to imposed positions, finding flaws and making counterarguments. It was about revealing assumptions for re-evaluation. According to Yankelovich (2001) three distinctive features differentiate a dialogue from a discussion:

1. Equality and the absence of coercive influences
2. Listening with empathy
3. Bringing assumptions into the open

Two international multi-actor dialogues were held in Quito, Ecuador, to improve understanding of resource mobilization and "innovative financial mechanisms" for biodiversity, safeguards for both biodiversity and social equity, mainstreaming, and valuing biodiversity, ecosystem services and functions. The dialogues discussed different worldviews underlying conflicts, contributed to enhanced understanding and clarified areas of convergence and divergence in preparation for negotiations under the CBD.

The intention of the Quito dialogues was not to draft formal recommendations, but to enhance mutual understanding of various perspectives and so prepare for the upcoming negotiations. Areas of convergence identified and generated through the Quito dialogues included the need for country-specific financing mechanisms and policies, safeguards and appropriate governance structures to avoid unintended outcomes. Fiscal reforms, particularly green tax reforms and removal of perverse subsidies, were considered promising, as were green markets.

The Co-chairs' report from the meeting became an official information document to the CBD negotiations and the Quito dialogue was referred to in the negotiation texts. At CBD COP11 several negotiators referred to the Quito dialogue and said that it had brought content and a better understanding of opportunities and challenges with different financial mechanisms, and had created a better atmosphere and trust for the negotiations.

More detailed elaborations of the seminar discussions and outcome are available in the Co-chairs' summary reports http://swed.bio/focal-areas/approaches/dialogues-learning/multiactor-dialogues/quito-dialogue/, http://swed.bio/focal-areas/approaches/dialogues-learning/multiactor-dialogues/quito-dialogue/quito-ii-dialogue/ →

5 From: "SwedBio. A knowledge interface on resilience and development at Stockholm Resilience Centre". Proposal to SIDA for 2016–2019 (2015).

→ SwedBio has also co-organized multi-actor dialogue seminars on Connecting Diverse Knowledge Systems in Panama[6]; Integrating Social-Ecological Resilience into the New Development Agenda in Colombia 2013[7]; and on Dialogue Workshop on Assessment of Collective Action in Biodiversity Conservation[8], and lately with UNDP and MELCA on Resilience Assessments, performed in Ethiopia. Further details can be found at SwedBio website: http://swed.bio/

6 Tengö & Malmer (2012). For full reference see Resource Links.
7 Rockström, J. and Baptiste,B. (2013). For full reference see Resource Links.
8 Pérez, E. Schultz, M. (2015). For full reference see Resource Links.

the project's topic of focus (e.g. of the food production and distribution system, or local biodiversity, etc.), as well as core resilience concepts (discussed in more detail in *System Description*, *System Assessment, Options and Pathways)* and familiarity with practical examples of how "Resilience thinking" makes a difference to projects on-the-ground.

- An ability to help people identify a problem in the system, rather than telling them about it. As participants come to understand that transformational changes are needed, a skilled facilitator should be willing to ask "what if" questions that challenge local values, knowledge and beliefs and conventional solutions. This can be risky, but the risk is reduced if the facilitator uses "what if" questions which help people to break through habits of denial to reach a new understanding of their problem and its fruitful solution (See also Appendix C Promoting thinking in new ways).
- Ability to understand when to push for innovation and change – and when to stop. When values are contested and world views differ significantly or when politics and power distort relations between stakeholders, then a collaborative approach is unlikely to work. Effort is needed to build trust, reciprocity and a common understanding of issues between stakeholders rather than seeking complete consensus or agreement. One of RAPTA's strengths is that the *Options and Pathways* component seeks adaptive implementation pathways that support discussion and navigation of contested options.

Step 5 Develop a multi-stakeholder engagement plan, or review and revise the existing plan, for each RAPTA component

You have seen in the overview how RAPTA can be applied iteratively across different phases of project development (Section 1.4), and that each phase will benefit from engaging different stakeholders at different times for different purposes (Figure 2). Likewise, different components of RAPTA require different stakeholders to be engaged, and the nature of this engagement may vary.

Make a plan for "who and how" to engage with among the stakeholders for each component, noting that this component is a continual process throughout RAPTA. The following four questions need to be asked for each component:

- **Why** do you want or need to engage with stakeholders? What objectives are you trying to achieve by engaging stakeholders in this component?
  - Is it to deliver the RAPTA component? To build relationships? To develop strategic insights? To meet external pressures/needs? (E.g. list motivations and ambitions or objectives.)
- **Who** do you need to engage?
  - From the stakeholders listed in the initial stakeholder assessment, who do you need to involve in this component? Why? (E.g. does the stakeholder have information or expertise that is helpful for this component? Does the stakeholder have influence or is (s)he a key gatekeeper? Is it a stakeholder who could delegitimize or derail the process if they are not involved in this RAPTA component?)
  - Are there any other stakeholders not listed that we should involve? Why? (Same questions as above.)
- **How** should you engage?
  - Numerous "ladders of participation" are available that highlight different roles and powers of stakeholders, from inform to empower.[9]

9 See https://www.iap2.org.au/documents/item/84

- **How** do you make this RAPTA component relevant and appropriate to the stakeholder?
  - Multi-stakeholder engagement processes are much more successful when stakeholders are given specific tasks to undertake; when they feel that they have some control in the process; and that it is of benefit to them to be engaged in the process as well as the project outcomes.

When conducting this step for each of the RAPTA components, consider the following:

- In *Scoping and Theory of Change* – focus on stakeholders who own the process (e.g. project owners, initiators, developers) and who achieve impact (e.g. partners or networks that make change). Specific tools for bringing these stakeholders together include networking workshops. Be aware of power relations and manage stakeholder engagement accordingly.
- For *System Description* – varied stakeholder perspectives are required, so involve a broad range of disciplines and expertise (e.g. science, indigenous knowledge), including people with ideas outside of the "normal" or expected. Specific tools could include interviews and surveys. Favour local knowledge over "outside" expertise. Note also that stakeholder analysis can itself contribute to the system description where stakeholders' decisions and actions are the main drivers of change.
- For *System Assessment* – stakeholders who make and implement decisions and who hold power are required, as well as the key implementers and innovators. As this stage involves making trade-offs *and decisions,* use of specific group decision-making techniques is advisable, such as social multi-criteria analysis and deliberative processes. Ensure that the decision power is shared across the full range of stakeholders, and that gender issues are included.
- For *Options and Pathways – a* diversity of stakeholders who affect and benefit from this component is required. This includes innovators, decision makers, stakeholders who own the separate options and those who collaborate with the beneficiaries. This stage involves collaboration building, and could involve specific workshop activities and processes.
- For *Learning,* which is another important component that occurs throughout RAPTA, multi-stakeholder engagement needs to work harmoniously to deliver knowledge to stakeholders and establish a learning framework throughout the project. Seamless engagement across the *Engagement and Governance*, and *Learning* components is essential for success.

3.2.4 What this component will produce

By the end of this RAPTA component it is expected that you will have:

- An understanding of your stakeholders;
- A governance structure;
- A multi-stakeholder engagement plan for each component of RAPTA; and
- Knowledge of where to find more information about multi-stakeholder engagement and governance.

Every component of RAPTA requires consideration of *Engagement and Governance*, so outputs from this component will change and grow along the RAPTA journey.

3.2.5 Resource links

Graham, J., Amos, B., & Plumptre, T. (2003). Principles for good governance in the 21st century. *Policy brief*, *15*, 1-6. Available at http://iog.ca/wp-content/uploads/2012/12/2003_August_policybrief151.pdf

IDB Guidelines on Consultation and Stakeholder Engagement in IDB Projects http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=37905629

Peréz, E. And Schultz, M. (2015). Dialogue Workshop on Assessment of Collective Action in Biodiversity Conservation.

Reed, M. S., & Stringer, L. C. (2015). Climate change and desertification: Anticipating, assessing & adapting to future change in drylands. UNCCD available at http://www.unccd.int/en/programs/Science/Conferences/Documents/3sc_unccd_impulse-report.pdf

Rockström, J. and Baptiste, B. (2013)Integrating Social-Ecological Resilience into the New Development Agenda in Colombia.

Tengö, M., Brondizio, E.S., Elmqvist, T., Malmer, P., Spierenburg, M. (2014). Connecting Diverse Knowledge Systems for Enhanced Ecosystem Governance: The Multiple Evidence Base Approach. Ambio. 2014 Sep; 43(5): 579–591.

Participants and co-author Yiheyis Maru (standing) at the UNDP-GEF Ethiopia workshop discussing ways to embed resilience in their project planning in order to meet the goal on sustainable and resilient food security by 2025.

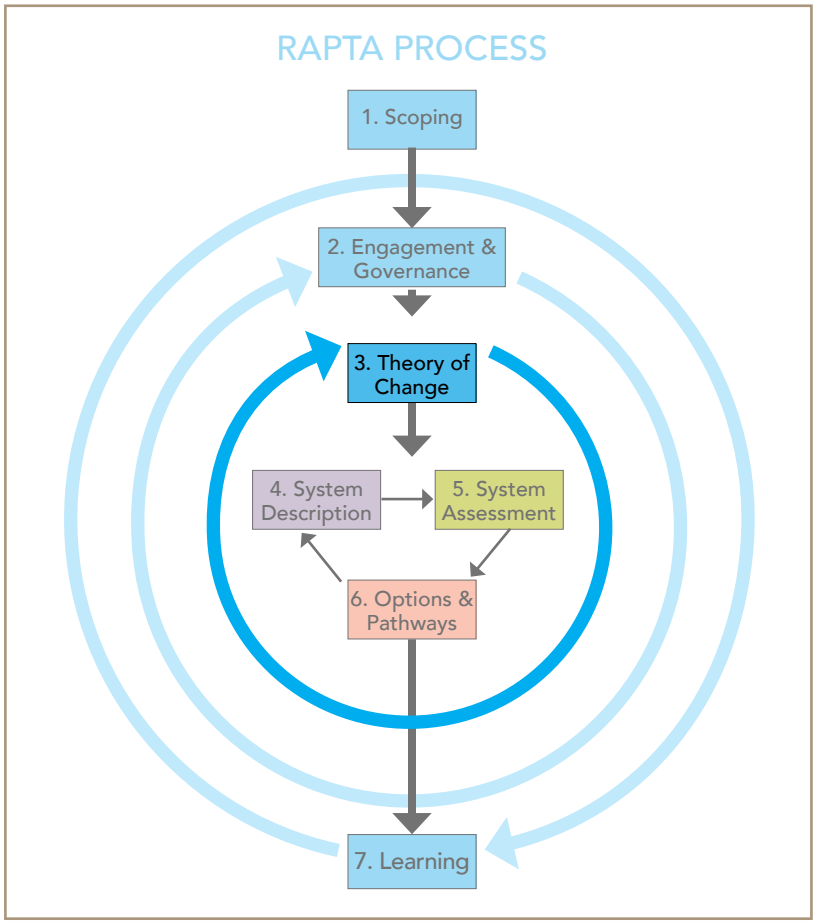
UNDP Multi-Stakeholder Engagement processes, http://www.undp.org/content/dam/aplaws/publication/en/publications/capacity-development/drivers-of-change/accountability/multi-stakeholder-engagement-processes/Engagement-Processes-cp7.pdf

UNDP 2010 A Guide to UNDP Democratic Governance Practice, found at http://www.undp.org/content/dam/aplaws/publication/en/publications/democratic-governance/dg-publications-for-website/a-guide-to-undp-democratic-governance-practice-/DG_FinalMaster2-small.pdf

UNEP online source of protocols, guides and examples of environmental governance, found at http://www.unep.org/environmentalgovernance/Tools/tabid/356/Default.aspx

UN-REDD A Draft Framework for Sharing Approaches for Better Multi-Stakeholder Participation Practices at http://www.un-redd.org/Stakeholder_Engagement/Guidelines_On_Stakeholder_Engagement/tabid/55619/Default.aspx

3.3 THEORY OF CHANGE



THEORY OF CHANGE

Step 1 Assemble key stakeholders for constructing the Theory of Change

Step 2 Explore the magnitude of change needed to reach the project goal

Step 3 Develop impact pathways to reach the project goal

Step 4 Describe how Theory of Change interacts with other components of RAPTA

Step 5 Adjust Theory of Change to capture learning from other RAPTA components

Figure 8 Steps of the Theory of Change component

3.3.1 Purpose of Theory of Change

Developing a theory of change (also known as a results chain or impact pathway) is increasingly required by GEF and other development funders. It can be used to:

- capture the **rationale** for the design and implementation of interventions
- frame the linked activities, outputs, outcomes and impacts within a **logical framework** (if required and/or relevant)
- (at the end of the project) **evaluate** the impacts, costs and benefits of projects (See Box H).

Although Theory of Change is standard practice, there are some considerations specific to its use in RAPTA. Existing methods (see Resource links at end of this section) are complemented and enhanced by RAPTA through systematic consideration of resilience, adaptation, and transformation. For example, there is more deliberate consideration of options for transformational versus incremental change. In RAPTA, *Theory of Change* is closely linked to adaptive implementation pathways (*Options and Pathways*), and both processes inform each other during the project's design and implementation. The multi-scale perspective inherent in RAPTA encourages explicit linking of goals, activities, outputs and outcomes from individual projects through to program level (e.g. Food Security IAP), organisational level (e.g. GEF) and country level. Furthermore, the *Theory of Change* matures through iterations of RAPTA in each phase of the project cycle, emphasizing testing of initial hypotheses, improvement through learning, and responsive management.

Use in phases of the project cycle

The *Theory of Change* component is usually undertaken by the initiators of the project and a few other stakeholders. It is a discrete process and yields a product which is developed, used and improved at each phase of the project cycle. It articulates the initial hypotheses about the interventions and impact

BOX H
GEF Review of Outcomes to Impact methodoloy

The GEF Independent Evaluation Office's Review of Outcomes to Impact (ROtI) methodology (GEF Evaluation Office 2009) implements *Theory of Change* for evaluation or impact assessment of GEF-supported completed projects. The ROtI methodology was developed to avoid the costly and extensive primary research required to measure the direct impact of GEF-funded projects. The ROti methodology involves:

- establishing the project's intended impact
- mapping the *Theory of Change* (i.e. the outcome–impact pathways) of the project and whether it was realistic, and
- analysing whether the indicators are tracking well to deliver the intended impact.

This *Theory of Change*-based evaluation approach is important in most projects, but especially in the case of environmental projects whose impacts occur slowly and are often difficult to measure directly (GEF Evaluation Office 2009, p. 5). RAPTA extends these concepts in its *Theory of Change* and *Learning* components.

pathways necessary for to achieve the project's goals, and states the assumptions on which goal achievement depends. These are developed and tested through the subsequent components of RAPTA. It provides a dynamic point of reference throughout a pass through RAPTA, and can inform each component. It can also be revisited once each component is completed. The *Theory of Change* is then ready to guide the next phase in the project cycle (See 2.9).

3.3.3 Steps in building the Theory of Change

Step 1 Assemble the key stakeholders for constructing the Theory of Change

The *Theory of Change* should be built by the project's likely key participants, and possibly other stakeholders (see *Engagement and Governance*). Assemble this team for the following steps.

Step 2 Explore the magnitude of change needed to reach the project goal

RAPTA is particularly focussed on identifying whether the system of concern can achieve sustainability goals with incremental changes – or whether transformation is needed. Therefore:

- Review the goals established in *Scoping* and be alert to any subsequent findings that may cause them to be revised.
- Given the provisional goals that have been set, do you consider they can be achieved through small improvements in the current system? Will major changes be needed? Or is the system itself likely to need radical transformation? These questions will be further explored and tested in *System Description* and *System Assessment* components.

Step 3 Develop impact pathways to reach the project goal

Standard approaches to *Theory of Change* generally work backwards from the goal to identify the sorts of system changes required for the goal to be achieved (See Box I).

- Construct a series of linked activities, outputs, outcomes and impacts that are necessary to effect the magnitude of change identified in Step 2. These will form a network of causal relationships that form potentially separate impact pathways. Hypotheses, assumptions and theories about the linkages between the components should be clearly articulated (e.g. how and why an outcome, for example, resilience in a food system, will be achieved through a particular impact pathway).
- The initial set of impact pathways will be devised in the *Theory of Change* in the first pass through RAPTA (in the project identification or design phases), and will be tested more rigorously through the other components (especially the *Options and Pathways* component) and subsequently revised in Step 5. The Activities, Outputs and Outcomes of the impact pathways should be clearly linked with supporting, or delivering, the actions and decisions of the implementation pathways.

BOX I

Use of term 'Pathways' in Theory of Change, and Options and Pathways components

In RAPTA, we use the term "impact pathways" for Theory of Change. We use "pathways" when referring to the adaptive implementation pathways described in the "Options and Pathways" component.

The impact pathways and (adaptive) implementation pathways both seek to achieve the project's impacts and goals. However, the terms are not completely interchangeable. Figure 9 illustrates:

Impact pathways (used in *Theory of Change*) (shown in blue in Figure 9) are:

- developed as an explicit description of the mechanisms by which an intervention will bring about, or contribute to desired impacts and goals (see Resource Links)
- underpinned by a complex set of assumptions and tacit knowledge which should be (but rarely are), captured and tested
- usually expressed in terms of a set of linked Activities, Outputs and Outcomes with respect to a funded project. These Activities, Outputs and Outcomes can be arranged into a logical framework ("log frame") for the project
- used for project planning, and often for post-hoc evaluation of project impact and benefit–cost.

Implementation pathways (used in *Options and Pathways*) (shown in purple in Figure 9):

- are developed to express the decisions and actions which form an intervention by specific actors (see Resource Links in *Options and Pathways*)
- can range from
  - simple linear decisions and actions to achieve the impacts and goals (e.g. changing fertilizer, variety and timing of sowing within a particular farming system to adapt to increased salinity or climate conditions) within the time frame of a funded project, through to
  - sets of linked, prioritized and sequenced actions and decisions, with decision triggers and thresholds that guide the timing. These usually extend beyond the life of a funded project. If they are "adaptive" pathways, then they also have active learning and revision of the pathways built into them.
- are outputs. Outcomes (grey in Figure 9) are important in terms of *planning* the implementation pathways but are generally not expressed as *part* of the implementation pathway.

The impact pathways (blue) and implementation pathways (light and dark purple) are all constructed with reference to long-term desired impacts and goals. They are expressed differently, and should inform each other throughout the life of the project.

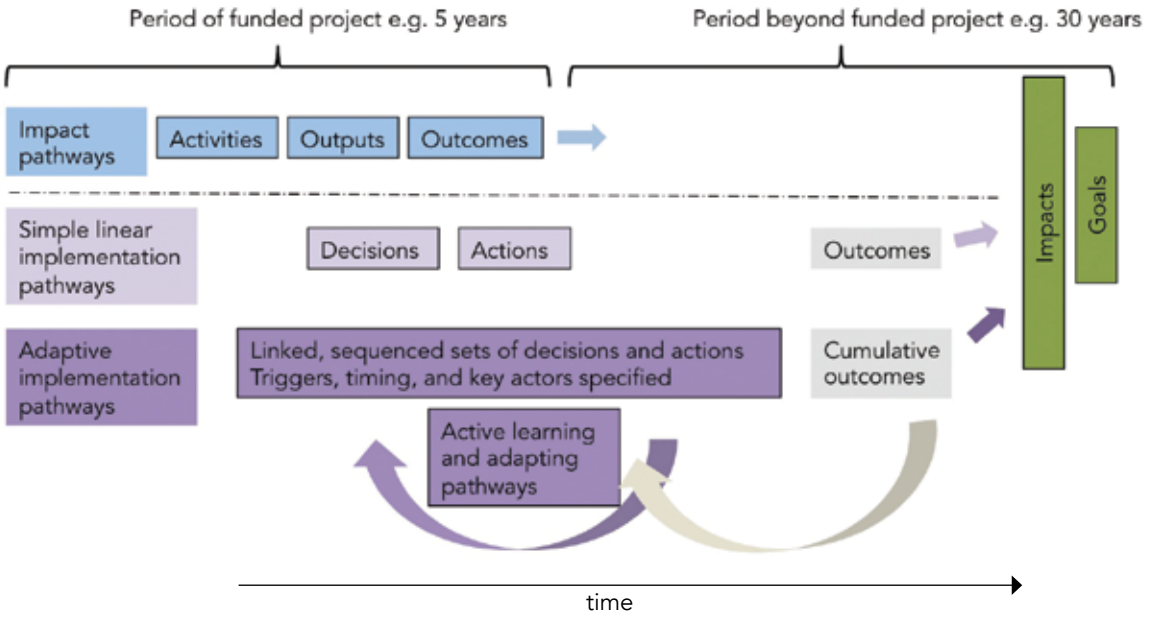


Figure 9 How impact pathways compare to implementation pathways

Step 4 Describe how *Theory of Change* interacts with the other components of RAPTA

The *Theory of Change* component is an ongoing process throughout each RAPTA pass. It links to other components as follows:

- *Scoping* provides the initial ideas for the Theory of Change, with preliminary goals and proposed interventions
- *Theory of Change and Engagement and Governance* need to be closely linked to guide the identification of key stakeholders and partnerships relevant to impact pathways
- *Theory of Change* provides the focus on desired impacts, which helps to set the boundaries on the *System Description and System Assessment* components. This in turn tests the hypotheses and assumptions underpinning impact pathways
- The *Options and Pathways* component refines the *Theory of Change* with more clearly defined descriptions of the causal relationships that link interventions to impacts
- *Theory of Change* contributes to *Learning* by identifying key outputs and outcomes that should be monitored, e.g.
    - accountability to different stakeholders may require reporting on indicators that track change expected from the intervention, and also on the efficiency and effectiveness of implementation. Other accountability indicators might cover issues such as gender, inclusivity and legitimacy, and are discussed in *Engagement and Governance*, and monitored through *Learning*.
    - attribution of impact to the intervention and to the roles of different stakeholders. In complex problems and interventions, randomized experimental trials (often considered as gold standard scientific method), may not be feasible for technical, financial, ethical and other reasons. In this case the *Theory of Change can help to inform:*
        - baseline, mid- and end-line surveys that identify what changed during the intervention (NB this may not tell you how much was due to the intervention)
        - causal process tracing to make a plausible assessment of contribution of the project.This needs to be detailed in the *Learning* component.

Step 5 Adjust Theory of Change to capture learning from other RAPTA components

- After the *Options and Pathways* component is completed, revisit *Theory of Change*. This updated theory of change then underpins the next iteration of RAPTA, in the subsequent phase of the project cycle.

3.3.4 What this component will produce

- A sharper focus on project goals: a set of hypotheses about how the goal will be achieved, represented as impact pathways of linked activities, outputs, outcomes and impacts, plus assumptions about their relationships (often this may further clarify the project goal)
- A list of key stakeholders and partnerships necessary to enact the impact pathways
- Guidance for *Engagement and Governance* and *Learning* components
- The hypothesized impact pathways will guide the *System Description*, *System Assessment*, and *Options and Pathways* components.

3.3.5 Resource links

http://au.wiley.com/WileyCDA/WileyTitle/productCd-0470478578.html

http://www.hivos.net/Hivos-Knowledge-Programme/Themes/Theory-of-Change

http://www.theoryofchange.org/what-is-theory-of-change/

http://www.aspeninstitute.org/policy-work/community-change/publications

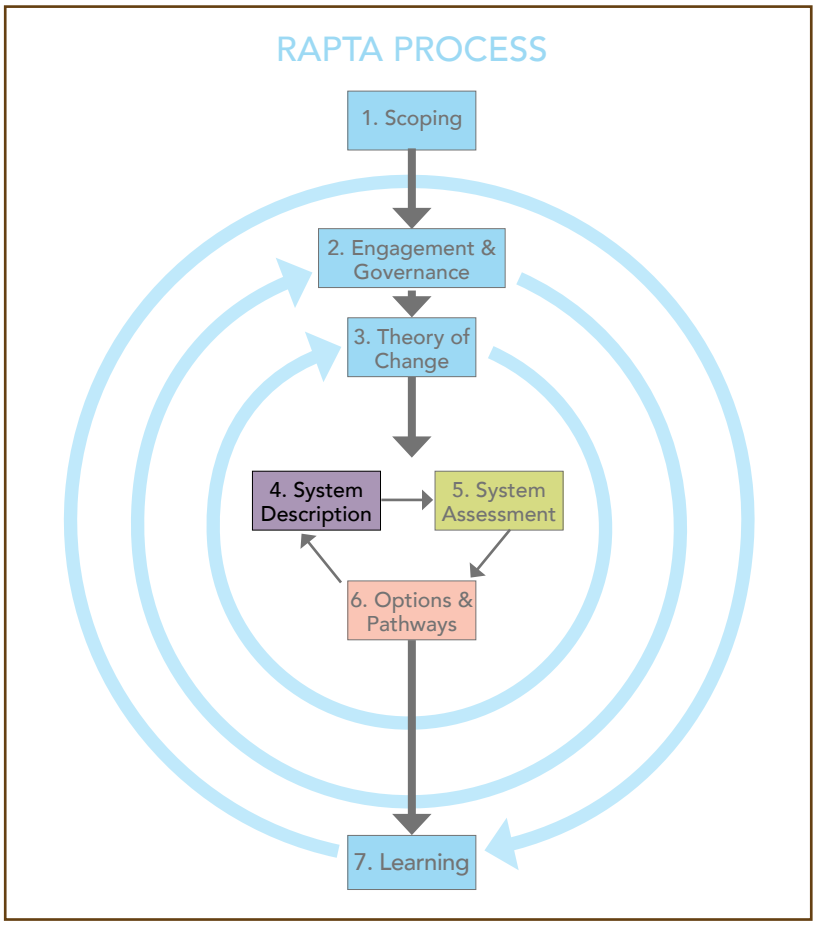
http://asiafoundation.org/in-asia/2014/12/10/can-theories-of-change-help-us-do-development-differently/

http://foodsystemsinnovation.org.au/resource/theory-change-discussion-brief

http://www.theoryofchange.org/wp-content/uploads/toco_library/pdf/UNDERSTANDINGTHEORYOFChangeSteinValtersPN.pdf

http://www.espa.ac.uk/files/espa/ESPA-Theory-of-Change-Manual-FINAL.pdf

3.4 SYSTEM DESCRIPTION



SYSTEM DESCRIPTION

Step 1 Explore stakeholders' views including what they value, what stresses they anticipate (Resilience "of what, to what?")

Step 2 Describe the social and economic aspects including institutions and governance

Step 3 Describe the biophysical aspects, focusing on key determinants of system structure and function

Step 4 Describe key social-ecological relationships of system function

Step 5 Identify interactions with scale above and below the target scale

Step 6 Synthesise conceptual models based on Steps 1 - 5

Figure 10 Steps of the System Description component

3.4.1 Purpose of *System Description*

The purpose of the *System Description* component is to develop a shared understanding of the many perspectives held among stakeholders. Multiple, conflicting perspectives of the system representing different stakeholder interests and experiences should be welcomed. In future RAPTA components, you will seek system assessment outputs and implementation pathways that are robust to unresolved, differing perspectives. This component is an opportunity to "walk in another's shoes" and learn about others' understanding of the system.

There are many examples in development projects of getting bogged down in detailed and complex descriptions of regions, and much effort may be squandered in characterizing details that may not matter in terms of achieving the project goals.

A useful system description need not be *comprehensive* – you should not try to describe everything about the system, but focus only on what is relevant to your project. Do not underestimate the challenge in judging what is relevant, and be open to changing this regularly via *Learning* and other components. For example, it may appear at first that the system description for a cropping system can be limited to descriptions of crop management decisions, rainfall and crop growth responses. However the *System Assessment* component might reveal a need to consider resilience to health[10] or transport shocks, and this in turn may require aspects of health and transport systems to be included in the system description. This is why RAPTA emphasizes iteration: it is easier to start with a simple, workable description, then revisit that description iteratively throughout the project, adapting it as needed. The steps of this component include guidance on how to keep the system description relevant and useful.

10 Health shocks, such as the Ebola crisis, can severely impact labour availability and farm productivity (e.g. http://www.bbc.com/news/business-28865434)

The initial system description could build upon the focus developed in the *Theory of Change* component. The description is not a static snapshot of what the system looks like, but rather a dynamic description of what is changing and why, the connections between system components, and significant cross-scale interactions.

The output of this component will be used in the *System Assessment* to assess system properties, such as resilience, adaptive capacity, opportunities for transformation, critical decision points and points of no return.

3.4.2 Use in the phases of project cycle

In the identification phase of a project cycle, the system description may be done by the project team as a rapid desktop assessment which can inform the initial *Theory of Change* in the subsequent design phase. A more developed system description is recommended for the project design and implementation phases of the project cycle. Once the project is in either of these phases it is very important to involve key stakeholders in creating the system description.

3.4.3 Steps to conduct the System Description

Step 1 Explore stakeholders' views of the system, including what they value and why, and what stresses they anticipate

This step clarifies what you are seeking to make resilient, and to what stresses: "Resilience of what, to what"

- Define the socioeconomic and biophysical boundaries of the system, beginning with the provisional boundaries outlined during *Scoping*. These boundaries define the scale of assessment for all other components. The boundaries are unlikely to follow neat lines on a map, and the biophysical and social-economic boundaries often do not coincide. Potential reasons include household members earning wages in cities and remitting some income to the family; livestock being taken to remote pastures when feed is scarce locally; local stream flow being controlled by a distant dam, and others. You may decide to include the city, remote pasture or dam as part of the system, or treat them as system drivers, and outside of the control of the studied system.
- Identify what people value in the system now and potentially into the future (e.g. crops and livestock marketed or consumed, reliable high quality water supply, a safe home for raising children, a choice of future livelihood options, iconic species), and the drivers that affect or might affect these valued system properties or products. Common drivers are markets and technologies, national and international policies, and climate.
- Identify the "drivers" of the system – i.e. the things that influence the system from the outside, and are not themselves influenced by the system. Common ones are markets, technologies, international policies, and climate. Climate change scenarios for the region should show potential trends and uncertainties, which can be related to potential consequences in the region.
- Identify previously-experienced or potential future "shocks" that the system may face, such as a new crop disease, a collapse in market prices, a flood, a drought, or a major policy change.
- At all steps in the *System Description* component, use the project goals and impacts, and the clarity about "resilience of what, to what" as a filter on what to include in the system description. You are not trying to describe everything in the system, but you are trying to identify system components that affect the goals and features that you care about.

Step 2 Describe the social and economic aspects, including institutions and governance of the system

- Describe the main social groups that characterise the social structure of the system, and if necessary stratify into relatively homogenous groups (e.g. by demography, access to or ownership of land).
- Describe livelihood strategies, interests and influence, as well as the underlying social and biophysical variables that support livelihoods, such as the cover of grass or dry-season fodder trees, the depth of soil on arable land, or distance to permanent water, social cohesion (iterate with Step 1, resilience "of what" above).
- Describe the pre-existing governance arrangements for the area (i.e. this is not about project governance), the extent to which power and/or decision-making is hierarchical, decentralized or polycentric, the formal and informal rules for resource access and use and the social processes and institutions for implementing them.
- Identify key decisions, decision-making organizations and individuals who are critical to implementing interventions to achieve the goals and impact pathways.
- Understand how current values, knowledge and rules (i.e. laws, policies, traditions) define the context within which decisions will be made – e.g. what may constrain or empower decision makers, and

assess the difficulty or not of changing rules if required (see Appendix B section B.4 Values Knowledge Rules).

- Identify conflict resolution processes and assess levels of public trust in the governance system, its openness to criticism, and the ability to change laws if circumstances require it.
- A complete, comprehensive, fully connected description of everything may not be as useful as several simpler descriptions that capture the key dynamics. It may be possible to assemble all such aspects of governance and social institutions into one all-encompassing system description (e.g. a large, detailed agent-based model may be useful if the project goals warrant it and the level of funding supports it), but smaller self-contained descriptions that convey important system features may be more useful, especially at the design stage. For example, you might have narrative descriptions of social dilemmas, a diagram of decision-making hierarchies and a process diagram of how disputes are mediated.

Step 3 Describe the biophysical aspects, focusing on key determinants of structure and function of system

In this step you will identify the biophysical quantities and processes that underpin the provision of whatever is valued in the system, and characterize current understanding of the biophysical dynamics. For example, if livestock production is dependent on high quality forage, which in turn can be damaged by high stocking rates, this step is where that knowledge is described.

- Identify biophysical quantities that are important and distinguish between the quantities (or "stocks") and the *rates of change* (or "flows") of these quantities. For example, there may be a high volume of groundwater, but if the rate of groundwater extraction exceeds the rate of groundwater recharge, this will affect future groundwater availability.
- When key quantities of interest are not measurable, identify indicators that serve as workable proxies for them. For example, the stock of fish in a river may not be known, but data on catch rates and effort invested can be useful indicators[11].
- Describe the main influences on key biophysical quantities. This may be in the form of a spatially resolved quantitative description (e.g. results from a global climate model or a catchment hydrological model), but the emphasis is on identifying existing descriptions and not conducting new research. If new research is needed this can be identified in future steps.

11 There are many useful sources of data and indicators being compiled that may be very useful to the Food Security IAP, including the Resilience Atlas at http://www.resilienceatlas.org

BOX J
Example of Yabello resilience studies

Example provided by UNDP working with RAPTA team

A village and household scale resilience analysis was conducted in Yabello, Ethiopia, using a tool called Community Based Resilience Analysis (CoBRA). The study aimed to understand how communities cope with the risks and shocks and build resilience. The United Nations Development Program, Dryland Development Centre (UNDP-DDC) facilitated the participatory development of this qualitative resilience assessment/analysis tool and it was introduced to Ethiopia after conducting pilot testing in Uganda and Kenya.

This CoBRA assessment was conducted in the Yabello woreda, Oromia Regional State, Ethiopia, from 9 to 27 December 2013, and was led by African Centre for Disaster Risk Management (ACDRM), the Disaster Risk Management and Food Security Sector (DRMFSS) and the Oromia Region Disaster Prevention and Preparedness Commission with the full engagement of Yabello woreda sectoral offices.

Its strengths are that it works at household and village scales, and gathers valuable information about the perceptions of the local stakeholders about the risks they face and possible interventions.

A brief analysis of the CoBRA study showed the importance of working at the scales above and below the target scale; and supplementing community perceptions with objective evidence.

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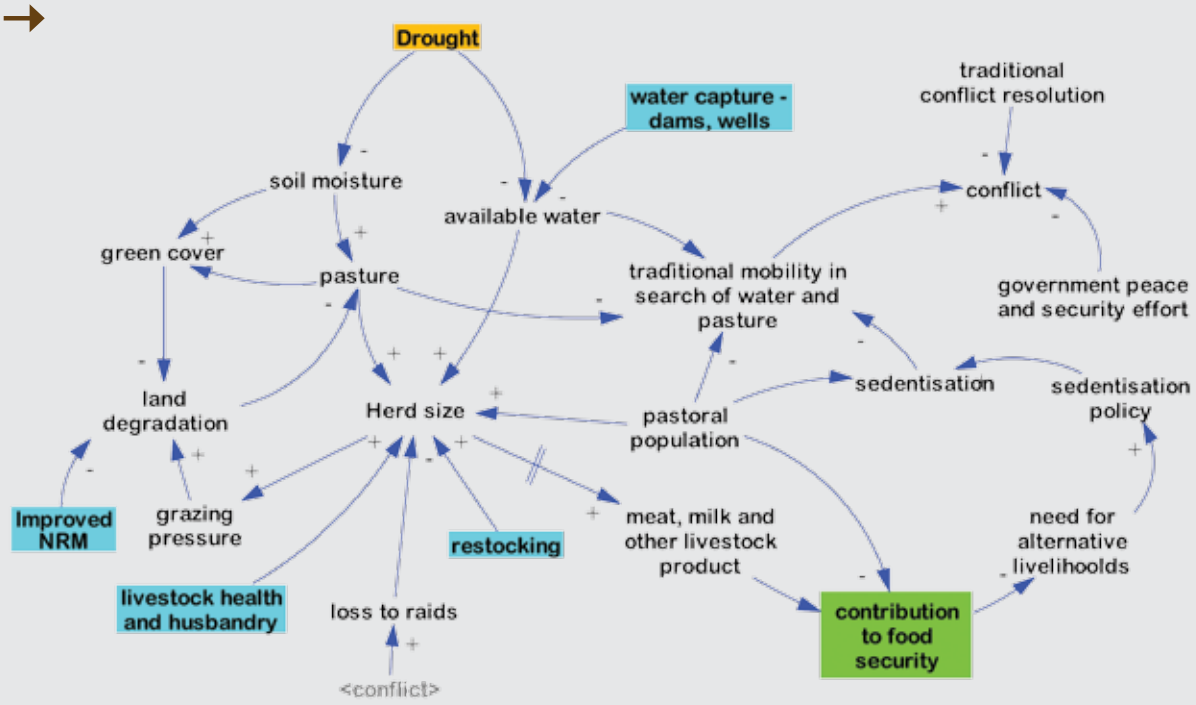


Figure 11 Preliminary causal loop diagram of the pastoral production system in Yabello

Drought (highlighted in orange) was identified as the core problem in the system. Contribution to food security (green) was the purpose or goal of the system, and improved NRM, livestock health and husbandry, water capture and re-stocking (light blue) are potential points for intervention.

The UNDP Yabello study only looked at the micro scale and at people's perceptions of resilience for food security at a household level. This information is valuable and necessary, but not sufficient to achieve sustainability and resilience for food security in the entire system, especially at different scales. For example, what happens if there is persistent drought? Or if multiple stresses increase the risk of herd size decrease or reduced water availability? How does this resonate in the entire economy?

These descriptions highlight system interconnections and their potential influence on how the consequences of future changes may play out. In this way, the descriptions integrate across sectors and scales; by focusing on how cause and effect may unfold, they provide a good foundation for assessing resilience and opportunities for adaptation and transformation.

The Yabello district food system is heavily dependent on pastoralism. Published studies show clearly that drought has a severe impact on its pastoral system. The system description has to be geared towards a problem or an opportunity, as done in the *Scoping* and refined in *Theory of Change* components. Drought increases traditional mobility, and this may lead to conflict when pastoralists move into others' zones. Although there are traditional ways of resolving these issues, it is much more difficult when drought frequency or intensity increase under climate change. It is likely that more people will become destitute and hungry, and move out of the pastoral system, losing their assets.

A causal flow diagram (Figure 11) provides an initial system description or conceptual model, and although it shows many variables and relationships, there will be only a few critical variables – including herd size, pasture and green cover which affects feed for herds, but also land degradation and water availability. The coloured boxes on the diagram show critical variables that may provide key points for intervention. These are further explored in the *System Assessment* component.

Step 4 Describe key social-ecological relationships of system function

- Describe social–ecological interactions within and between the biophysical and social-economic variables that influence the dynamics. Identify any known controlling variables – the relatively small number of variables that regulate the system through their direct effects and feedback loops (e.g. ground cover that controls soil erosion; the area of habitat required to maintain a species; social norms and laws about resource access rights and extraction levels).
- Describe the social-ecological interactions that lead to both desirable and undesirable outcomes.
- Identify whose decisions can affect these relationships, and where these interactions are mediated by governance and management. Identify who has the decision-making authority for different issues, and in particular what decisions can be made at the level of the project. This is a key aspect of system function because in later *System Assessment* or *Options and Pathways* components you may identify decisions that would have the desired effect, but the power to take them lies outside your project. This may lead to a decision to engage with those who can make those decisions effectively.

Step 5 Identify interactions with the scales above and below the scale of assessment

- Review and revise the outcomes of Steps 1 to 4 to consider significant interactions across scales. For example, how national policy response to drought influences household decision-making and, equally, there may be critical points at which household-level dynamics trigger rapid, national-level change. For example, there might be a point at which food shortages in individual households cross a threshold, leading to civil unrest and migration, which, in turn spill over into ongoing unrest and mass-migration on a far larger scale. An example of cross-scale interactions is given in Box J.

Step 6 Synthesize conceptual models, supported by evidence, from Steps 1 to 5

A conceptual model is a representation of the system used to communicate the current understanding of the system, and the assumptions underpinning that understanding. The steps in this component may generate multiple conceptual models, covering different aspects of the system. There could be a conceptualization for decision-making, and a separate conceptualization for climate and hydrology. There is no requirement for all the conceptual models to be combined into one model representing all perspectives. Rather, synthesizing multiple models may help to identify key points of intersection or interaction between the conceptualizations and draw attention to mutually inconsistent assumptions. For example, a conceptualization of climate and land-use interactions may oversimplify economic or demographic drivers of land-use change, while a conceptualization of land-use change driven only by economic drivers may exclude climate. Both conceptualizations are useful, and do not need to be combined into one conceptual model. See a further example in Box K.

- Establish a process to develop and share conceptual models of the system to foster an understanding of the different perspectives of the system among key stakeholders. There is no requirement to create one "right" system description, or even a common, shared conceptual model. There are many tools and approaches for developing and documenting a conceptual model (see resource links at end of this section), and it needs to contain core elements amenable to resilience assessment. These include:
  - drivers and shocks
  - actors
  - main resource uses
  - valued components and products of the system
  - feedback loops that amplify or stabilize change
  - controlling variables, and known or potential thresholds on the controlling variables
  - cross-scale interactions – connections and feedbacks between the scale of assessment, and those above and within that scale.
- Depending on the phase of the project cycle, the significance of the interventions and the level of funding and other resources, all conceptual models should be supported with literature, data, and evidence where possible. Conceptual models can evolve into quantitative models or even tools such as multi-stakeholder role-playing games, but this is recommended **only if** initial iterations of RAPTA in the design phase indicate that there are critical uncertainties or system linkages which warrant such investment, e.g. to identify and characterise critical thresholds, or to inform priorities where trade-offs are required (e.g. a nutrient budget can inform whether better management of fertiliser and manure is likely to have a significant impact, or a role-playing game can highlight where social norms are preventing potentially rewarding options).
- In order to be effective in other RAPTA components, conceptual models should be regularly updated,

BOX K

Example of multiple conceptual models for an agro-pastoral system in Niger

A desktop review of an agro-pastoral ecosystem in Niger revealed multiple, existing conceptual models of the system (Grigg et al., 2015). They described how the flora and fauna had evolved to be extremely resilient to droughts, floods and fire, but with increasing population and grazing pressures in recent decades, multiple interacting processes are leading to a "downward spiral of desertification". This state is both undesirable and resilient, in that it is difficult to break out of it. The processes shaping this downward spiral include:

- An unprecedented increase in population has changed land-use practices.
- Croplands have expanded and livestock populations have grown.
- Cropland expansion has led to a shortage of quality grazing for livestock in the late dry and early wet seasons, which has severely increased grazing pressure on the ranges during the growing season when livestock are excluded from croplands.
- Increased grazing pressure during the wet season (when livestock are not allowed to access cropped land) triggers changes in vegetation composition either to the benefit of short-cycle, less productive annuals or to highly productive but poorly palatable species. Both these changes result in reduced grazing resources.
- Increased cropping and reduced fallow duration:
  - Increases the risk of fragmentation and biodiversity losses
  - Decreases soil fertility by increasing nutrient loss and aggravating soil erosion
  - Increases albedo and soil crusting.
- Decline in soil fertility through reduced fallow periods affects vegetation productivity leading to less efficient use of water and sunlight.
- Livestock mobility can mitigate some of the grazing pressure on the rangelands, however barriers to that mobility are increasing, as transhumance practices depend on ongoing access to communal resources such as water points and cattle paths.

Included in these descriptions were feedback loops that contribute to the spiral of desertification.Figure 12 illustrates feedback loops that contribute to desertification in grazing and cropping systems.

There were quantitative descriptions in the form of mathematical models and nutrient budgets that represented the knowledge of nutrient dynamics between crops, livestock and households. These allowed the assessment of critical factors affecting crop nutrition and the derivation of appropriate risk indicators.

Another conceptualization considered the social dynamics and influences on household decisions. For example, strong gender-specific constraints emerge as a result of social norms and seasonal migration employment opportunities, bringing out cross-scale interactions by including the with remote employment locations at the next scale up i.e. outside of the study region.

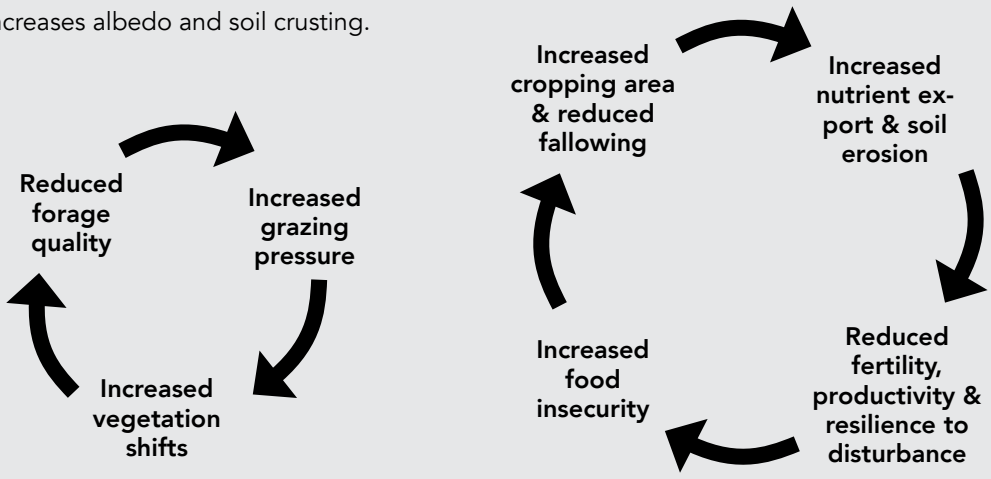


Figure 12 Descriptions of feedback loops that contribute to the spiral of desertification

shared and used to inform adaptive management and governance.

3.4.4 What this component will produce

By the end of this component you should have descriptions of the system of interest (e.g. food security system) that reflect the collective knowledge of many different stakeholders. These may be supported by data, literature, quantitative models and other forms of evidence and knowledge. These descriptions will highlight system interconnections and their potential influence on the consequences of future changes. In this way the descriptions integrate across sectors and scales, and by focusing on how cause and effect may unfold, they provide a good foundation for assessing resilience and opportunities for adaptation and transformation in the *System Assessment* component. There may be competing perceptions of the system, which should be retained if they prove irreconcilable.

3.4.5 Resource links

Grigg, N., Abel, N., O'Connell, D. & Walker, B. (2015) Resilience assessment case studies in Thailand and Niger: Case studies to accompany a discussion paper for UNCCD STAP workshop 19–21 November 2014, Sydney, Australia. Both available at: http://www.stapgef.org/the-resilience-adaptation-and-transformation-assessment-framework/

Moberg, F., Simonsen, S.H., Schultz, M., Oserblom, H., Olsson, P., Persson, A. (undated). What is resilience? An introduction to social-ecological research. www.stockholmresilience.su.se

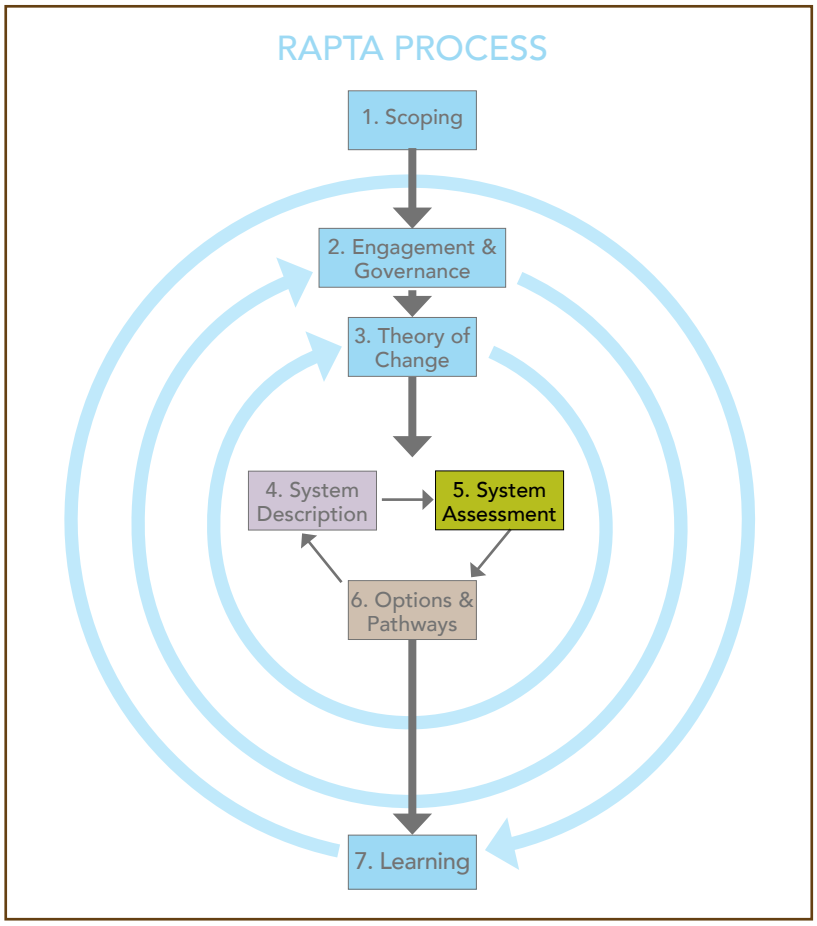
O'Connell, D., Walker, B., Abel, N., Grigg, N. (2015) The Resilience, Adaptation and Transformation Assessment Framework: From Theory to Application. CSIRO, Australia.

Resilience Alliance (2010). Assessing resilience in social–ecological systems: workbook for practitioners. Version 2.0 (http://www.resalliance.org/resilience-assessment)

Simonsen, S.H., Biggs, O., Schluter, M., Schoon, M., Bohensky, E., Cundill, G., Dakos, V., Daw, T., Kotschy, K., Leitch, A., Quinlan, A., Peterson, G., Moberg, F. (undated). Applying resilience thinking: seven principles for building resilience in social-ecological systems. www.stockholmresilience.su.se

Walker, B. H. & Salt, D. 2012. Resilience Practice: Building capacity to absorb disturbance and maintain function, Island Press, Washington, D.C., USA.

3.5 SYSTEM ASSESSMENT



SYSTEM ASSESSMENT

Step 1 Explore alternative futures)

Step 2 Assess general resilience (adaptive or coping capacity for unknown risks, trends or shocks)

Step 3 Assess specified resilience (to known risks, trends, shocks)

Step 4 Identify the potential benefits of maintaining current system identity, adapting and/or transforming the system

Step 5 Summarise resilience status and adaptation/transformation needs

Figure 13 Map of the System Assessment component, showing the steps

3.5.1 Purpose of System Assessment

In RAPTA the *System Assessment* component contains the core features of resilience thinking. This distinguishes it from other approaches, such as triple bottom line assessment or risk assessment methods. However, these and other forms of assessment (e.g. vulnerability assessment) may, if they already exist, provide a useful entry point to the component.

3.5.2 Use in phases of project cycle

The *System Assessment* will be very different in different phases of the project cycle. The assessment conducted in the project identification phase will rely on the judgement of a small subset of stakeholders. It will not be supported by a well-developed system description that reflects the interest and experience of all stakeholders. Rather, it will be a minimal assessment, developed for the purpose of contributing to the output of this phase.

The project design phase requires a more detailed *System Assessment* because it will underpin the *Options and Pathways*. In the design phase, it requires a robust *Engagement and Governance* process. In the implementation phase, there will be new insights and perhaps critical knowledge gaps which need to be filled in the *System Description* and *System Assessment* as project interventions are implemented. For this reason, in the implementation phase the *System Assessment* component provides capacity to review and learn about the system in the light of new findings.

3.5.3 Steps to conduct the System Assessment

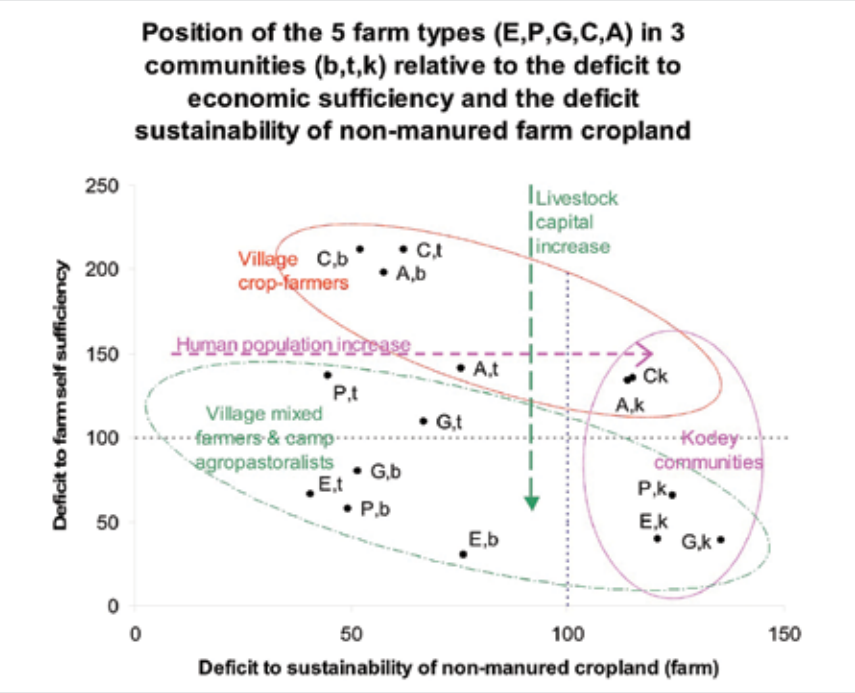
Step 1 Explore current and alternative future systems and states

There are many ways and tools for envisioning and modelling futures and scenarios, with forecasting, hindcasting etc. This can be done in simple qualitative ways, through to very theoretical, and/or

BOX L

Example: different domains in a mixed cropping system in Niger

A desktop RAPTA analysis of a mixed cropping system in Niger[12] drew on published knowledge of critical biophysical and economic thresholds that have important implications for sustainable food security. Villages had been mapped into one of four quadrants defined by their proximity to these thresholds along axes that represented an index of environmental sustainability and an index of economic sustainability (see figure below). A village in any quadrant other than the bottom left in the figure below will struggle to return to the bottom left (desirable) quadrant because once critical thresholds for environmental or economic security have been crossed there are well-identified processes that reinforce further unsustainable outcomes. These are examples of different domains of the system.



Source: Hiernaux and Ayantunde, 2004, cited by Grigg et al, 2015.

12 Grigg et al. (2015) see Resource links at end of section, citing published system conceptualisations by Hiernaux & Turner (2002) and Hiernaux & Ayandtunde (2004).

quantitative ways. There are whole fields of theory and practice in this area and it is not the intent of this report to summarize them.

A common vision is powerful but care is needed, because it may not be possible for stakeholders to agree on a common vision for the future. Even if they do, it is not wise to imply that a complex system can be intentionally and successfully "steered" to realize the agreed future. Instead, frame this step as enhancing the likelihood that the system can be better understood and navigated with improved chances of moving away from "undesired" futures, and possibly towards a range of more "desired" futures (See Box O Adaptation Pathways in Options and Pathways). Therefore, the following approaches add value:

- Ask questions about whether the system is currently in a "desirable" state. Envisage a range of characteristics of future "desirable" systems (or domains)[13], and compare them to the expected future system, based on understanding the current trajectory (which may be desirable now, but may become less desirable over time: for example, due to increasing incidence of drought due to climate change).
- Ask questions about "undesirable" futures. Sometimes it is easier for stakeholders to articulate what is undesirable as a future, or as characteristics of such a future. It is often easier to design interventions which help to avoid undesirable futures than to navigate towards desirable ones.

13 In the resilience literature these can be referred to as stability domains or regimes. See Glossary for definition of stability domain.

BOX M
Shocks, trends, disturbances

Shocks can be rapid, discrete events imposed on the system from the world around it (e.g. El Niño events or oil price spikes). Shocks can also come from slow changes or trends that are entrenched due to many factors reinforcing the change. An example could be ongoing changes in land tenure arrangements caused, for example by shifting norms in inheritance customs (e.g. daughters and sons inheriting property instead of just sons) or population increase. Another example is ongoing changes in household structure due to multiple pressures driving increased seasonal migration for off-farm work. A biophysical example is the loss of forage quality for livestock, driven by economic and environmental pressures to over-stock. In these situations there will often be a critical threshold or tipping point, beyond which the system has moved into a different domain (see Appendix B section B.3 on stability domains). Whether something is viewed as a shock, or a trend, depends on the time scale – what appears a slow trend at decadal scale can appear as a shock at millennial scale.

- Does an identified "desired" future keep options open for future decision-makers (such as maintaining a well functioning natural resource base)?
- Iterate the steps in all of the other components as appropriate, to check that any "desirable" future system is itself resilient and sustainable, and that the actions outlined, are logically consistent with reaching that state.
- Describe known and possible alternative systems (or domains) either by preference (through a planned transition), or by unintentionally passing critical points beyond which recovery is much more difficult, or impossible. For example, a planned transition could be to improve soil quality through good stewardship practices. An unintentional transition could be land salinization due to lack of knowledge about rising water tables resulting from vegetation clearing (See Box L).
- Assess whether the system as a whole, or particular social groups within it, are currently in a desired or undesired domain.

Step 2 Assess general resilience (including adaptive or coping capacity for unknown risks, trends or shocks)

General resilience is the capacity of the system to cope with a range of shocks. Some system properties, like high levels of health and education in a population, confer the ability to adapt and respond to a wide range of unexpected changes. Use this step to work with stakeholders to explore, and identify those aspects of your system that serve you well in the face of all manner of shocks and unexpected changes. You can do this in several ways:

- Ask what has conferred "coping capacity" to your system in previous times of trouble? It can be helpful to pay particular attention to what allows effective connections between scales. For example, in times of disaster do useful networks of different layers of government, community and private sector work well together? Assess the effectiveness of current and potential governance structures and functions in this context [14].
  - You may find it helpful to refer to published lists of indicators of general resilience, or adaptive capacity that have been developed in other systems (e.g. diversity, openness, reserves, feedbacks, modularity, social capital and levels of capital assets [15 16]) and assess their relevance to your system.
  - At the highest level, general resilience comes from system properties that enable quick and effective response to a wide range of shocks, and allow you to keep your options open in the face of uncertain futures.
- General resilience can also be checked by conducting multiple specified resilience assessments (Step 3). If the system is resilient to multiple specified shocks, then its general resilience can be considered high.

Step 3 Assess specified resilience (for known risks, trends or shocks)

Specified resilience assessment is about characterizing the resilience of the system to specific, known

14 For example see Krievens et al 2015, full reference in Resource Links.

15 See the approaches recommended for assessing general resilience in: Walker and Salt (2012), Walker et al 2014, full reference in Resource Links.

16 See O'Connell et al (2014) for a review of literature on resilience indicators, full reference in Resource Links.

BOX N

The RESILIENCE ATLAS and Vital Signs Monitoring System

Contributed by: Sandy Andelman and Alex Zvoleff, Conservation International

In the first 'pass' of RAPTA, you and the stakeholders will construct conceptual models of how you think the system might work, including the key thresholds that may take the system from desired to undesired states, and vice versa. The conceptual models MUST be supported by evidence and analysis. Using traditional and local knowledge sources is important, but it may not be adequate to rely only on the perception of people (as demonstrated by some of the published Yabello studies – cross-reference Yabello Box in System Description). In addition, relying on knowledge of the past is insufficient in a rapidly changing world - what has been experienced historically will not provide a robust understanding of how a system might work in the future. Therefore, a strong basis of evidence, and a robust analysis of data across scales, are critical to support and revise the System Description and System Assessment. These can come from a range of sources, including the literature, local studies, national and regional databases. In this box, we provide an example of two important data sources for the Food Security IAP, led by Conservation International: the RESILIENCE ATLAS and the Vital Signs Monitoring System.

The RESILIENCE ATLAS (http://www.RESIILIENCEATLAS.org) is a free and open online tool that integrates and analyzes over 60 existing datasets relevant to resilience assessment and adaptation planning. The Atlas includes information on climate, land cover, production systems, population distribution, and a range of indicators derived from household survey datasets at regional, national and sub-national scales (depending on availability and resolution). The Atlas includes historical and current data on climate, as well as projections for the future climate, including change in precipitation amount and timing (change in seasonality), and shifts in monthly mean temperatures. The Atlas also includes information on other potential shocks like flooding, and on land cover, land use systems, and population distribution.

The Atlas allows users, with a minimum of technical expertise, to overlay and examine datasets and conduct basic analyses within a single interface. With few exceptions, all the data in the Atlas are available for download so they can be accessed and analyzed offline if desired.

The Atlas is structured to guide users through a series of steps to help them understand where particular socio-ecological systems occur, which stressors and shocks affect them, and to then support assessment of how vulnerable particular system components (e.g. specific livelihood strategies, production systems, or ecosystems) might be to these stressors and shocks and which types of assets and capital (e.g., social, natural, financial, human, manufactured) reduce that vulnerability.

Vital Signs (http://www.vitalsigns.org) is a monitoring system that collects and integrates data on agriculture, ecosystems and human well-being across several African nations. While the Resilience Atlas is a tool for integrating existing data from a range of data sources, Vital Signs is a data collection program. Vital Signs regularly collects new data and calculates a range of key indicators, including: sustainable agriculture, water availability and quality, soil health, biodiversity, carbon stocks, climate resilience, household income, nutrition and market access.Vital Signs data allow geospatial linking of household to community level socio-economic data, with measures of the local environment and agricultural production data, helping to create an accurate picture of relationships between agriculture, nature and human well-being.

These features make the Vital Signs data unique and important. If collected regularly into the future and focused on the key variables and thresholds (as might be defined in a robust application of RAPTA), it will enable a very powerful monitoring and assessment program. If the data are regularly reviewed and assessed, Vital Signs should be able to underpin Learning about the effectiveness of any actions and interventions, which will in turn enable adaptation of the intervention options and implementation pathways. Therefore, Vital Signs, if used in combination with RAPTA, is likely to be very important for resilience assessment and developing options and pathways.

shocks. In the *System Description* component, you identified previously experienced shocks. In this step you will work with stakeholders to consider the resilience of specific parts of the system to these, and other shocks that can be anticipated. Be sure to consider trends or shocks that may be at different scales in the system (e.g. collapse in global markets for your produce, outbreaks of disease or crop failures in a small community), see Box M. Use the *System Description* to help you identify connections and vulnerabilities within the system that you may have been unaware of before, and also identify any system properties that aid in recovery (e.g. insurance mechanisms, reserves of food or fuel).

- Where possible, identify thresholds and the likelihood of them being crossed. Recognize where such thresholds may exist. However, more research may be needed to understand if there is a threshold and how close the system is to it.
- The outputs of this step include a shared understanding among all stakeholders of the kind of shocks they can expect, critical points of no return that will hamper recovery, and system properties that will promote recovery from shocks. These outputs will inform the components for designing interventions and adaptive implementation pathways. (See Box N).

Step 4 Identify the potential benefits of maintaining current system identity, adaptation and/or transformation of the system

In the previous step, you considered the risk of the system shifting into a different domain when critical points of no return are crossed (e.g. land degradation reaches such a point that recovery is not possible in the short term). Where such changes are judged inevitable due to multiple pressures, it is a cue that adaptation and/or transformation responses may be necessary for coping with these changes. In this step you will scope out the benefits of, and options for, adaptative or transformative actions.

If the system is currently satisfying stakeholders' needs and aspirations (i.e. it is in a desirable system domain) and the chance of an unwanted domain shift, or transformation, is judged to be sufficiently low for the chosen timespan and goals defined in *Scoping* and *Theory of Change*, then investing in a mix of specified and general resilience measures to maintain the domain is a prudent option (e.g. investment in insurance, reserves, communication systems for rapid, coordinated response across scales and sectors).

If the chance of an unwanted transformation, or domain shift within, the chosen timespan is judged to be high, then a realistic option is to invest in intentional transformation to a different desirable system (e.g. investment in changed cropping practices to fulfil environmental accreditation requirements of an international market to attract foreign investment). If the system is locked into an unwanted domain by, for example, land degradation, over-population or land tenure rules, and is unable to shift to a preferred domain without external intervention, then the options include seeking external investment in a shift to the desired domain – for example through land rehabilitation, land tenure reform and the establishment of new local industries – or investing in transformation to a new system.

Activities in this step include:

- Based on the findings of the previous step, work with stakeholders to evaluate the benefits and risks of undertaking actions that will build the resilience of the system, or those that will transform the system to cope with shocks while continuing to provide for the needs and aspirations of stakeholders.
- Describe the adaptive capacity, and the set of options for alternative domains, and whether the transitions are likely, given the trends in drivers and likely shocks identified. Establish whether the situation is resolvable through adaptation. This step may dovetail with the findings from other existing tools, like social impact assessment, that may have been used in the past.
- Where the situation is not resolvable through adaptation, assess whether the system can be transformed. Where, and at what scales, is transformation needed? What options exist? What is needed to build transformability?

Step 5 Summarise resilience status and adaptation/transformation needs

- Develop a text summary of the system assessment that documents the insights from Steps 1-4 , and your conclusions with respect to resilience and the need for adaptation or transformation.
- Summarise the system assessment, ready for further analysis in the *Options and Pathways* component.

3.5.4 What this component will produce

By the end of this RAPTA component it is expected that you will have:

- a system assessment that identifies potential risks or points of no return, and the key controlling influences over likely future shocks or changes
- identified opportunities for adaptation or transformation, and their benefits and risks.

3.5.5 Resource links

Food and Agriculture Organization of the United Nations (2013). Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists. (http://www.fao.org/agriculture/crops/thematic-sitemap/theme/spi/sharp/en/)

Food and Agriculture Organization of the United Nations (2015) Links to key documents, tools, projects and reports related to resilience assessment (http://www.fao.org/agriculture/crops/thematic-sitemap/theme/spi/sharp/links-and-further-publications/en/)

Grigg, N., Abel, N., O'Connell, D. & Walker, B. (2015) Resilience assessment case studies in Thailand and Niger: Case studies to accompany a discussion paper for UNCCD STAP workshop 19–21 November 2014, Sydney, Australia. Both available at: http://www.stapgef.org/the-resilience-adaptation-and-transformation-assessment-framework/

International Fund for Agricultural Development (2009). Multidimensional Poverty Assessment Tool. (http://www.ifad.org/mpat/)

Krievens, K., Baird, J., Plummer, R., Brandes, O., Curry, A., Imhof, J., Mitchell, S., Moore, M., and Gerger Swartling, A. (2015). Resilience in a watershed governance context: a primer. St. Catharines, ON: Environmental Sustainability Research Centre. Available online: http://hdl.handle.net/10464/7342

O'Connell, D., Walker, B., Abel, N., Grigg, N. (2015) The Resilience, Adaptation and Transformation Assessment Framework: From Theory to Application. CSIRO, Australia.

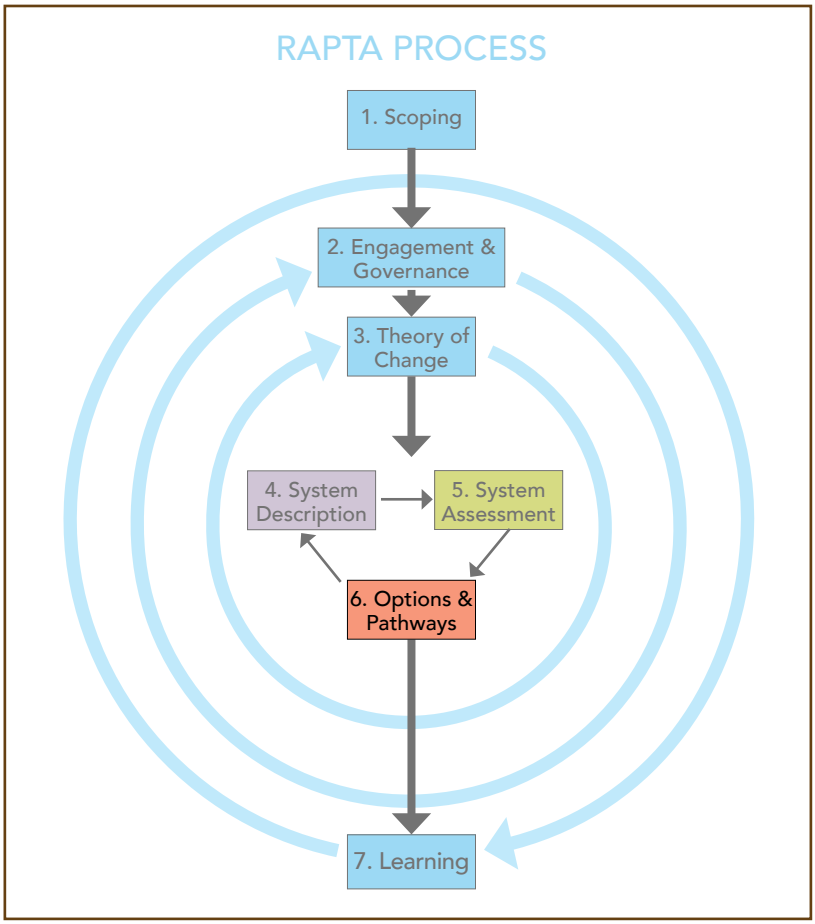
Resilience Alliance (2010). Assessing resilience in social–ecological systems: workbook for practitioners. Version 2.0 (http://www.resalliance.org/resilience-assessment)

Walker, B. H. & Salt, D. (2012). Resilience Practice: Building capacity to absorb disturbance and maintain function, Island Press, Washington, D.C.,USA.

Walker, B., Abel, N., Andreoni, F., Cape, J., Murdoch, H. and Norman, C. (2014). General Resilience: A discussion paper based on insights from a catchment management area workshop in south eastern Australia. Resilience Alliance discussion paper available at http://www. resalliance.org/bibliography/index.php/discussion-papers

Walker, B. H. & Salt, D. 2012. Resilience Practice: Building capacity to absorb disturbance and maintain function. Island Press, Washington D.C.,USA.

3.6 OPTIONS AND PATHWAYS (SHORT FOR INTERVENTION OPTIONS AND ADAPTIVE IMPLEMENTATION PATHWAYS)



OPTIONS AND PATHWAYS

Step 1 Draw on *Theory of Change, Engagement and Governance* and *System Assessment* to develop intervention options

Step 2 Build pathways for implementation of intervention options

Step 3 Devise a logical sequence for intervention options and pathways

Step 4 Set or review implementation triggers transforming the system

Step 5 Document and visualise the pathways

Step 6 Build the understanding gained from all components into an implementation plan

Step 7 Action the implementation plan, actively using the learning, and adapting the pathways over time

Figure 14 Steps of the *Options and Pathways* component

3.6.1 Purpose of Options and Pathways

In this component you identify intervention options, arrange them into a provisional order for implementation, estimate their qualitative and quantitative benefits and costs, and assemble them into an implementation plan. The plan is co-designed with key stakeholders who are involved in making decisions and taking actions. It provides the basis for a funding application and subsequent implementation. Co-designing adaptive implementation pathways is a recent field of research and this summary represents current understanding, which will improve with experience. An expanded version of this component with more examples and explanations is in Appendix C.

3.6.2 Use in phases of the project cycle

In this component you draw on *Scoping* and *Engagement and Governance* processes for goals and objectives, and from the *System Assessment* for constraints and opportunities that influence their achievement. Here you will work with stakeholders to develop intervention options and sequenced pathways for implementing them. Goals, objectives, interventions and pathways are fed back to update the *Theory of Change*, and its cause-effect assumptions on which the project impacts depend.

In the identification phase of the project cycle, you will probably not have the time and resources to focus heavily on this component though it may guide your thinking. In the project design phase, you can use the *Options and Pathways* component to full effect, to provide the basis for the implementation phase. During the project implementation phase (and beyond), adaptive implementation pathways should be adjusted in response to information from *Learning*.

3.6.3 Steps to take

Step 1 Draw on *Theory of Change*, *Multi-Stakeholder Engagement* and *Governance and System Assessment* to develop intervention options

In the previous components:

- project goals and objectives were established (*Scoping, Theory of Change)*
- drivers, trends and potential shocks were identified, controlling variables and their potential thresholds were described (*System Description*, *System Assessment)*
- general resilience (adaptive capacity) and specified resilience of the system were described (*System Assessment)*
- the desirability of the current domain was assessed (*System Assessment)*
- potential alternatives to the current domain, and the possibility of shifting to some altogether different system were explored (*System Assessment).*

System Assessment emphasized uncertainties inherent in the system and the difficulty of predicting its future behaviour or how it might respond to interventions. Resilience and pathways thinking helps us make wise and flexible decisions that acknowledge uncertainties.

Broadly, three kinds of intervention options are explored:

- some maintain short-term food security while longer-term interventions are being developed;
- others build resilience so as to avoid an unwanted threshold-crossing;
- a third type enable the system or parts of it to escape the current domain if it is unsustainable, and shift to another domain in the same or a different system.

Combinations of all three kinds of options will probably be needed at different spatial scales and at different times. Typically, this step will generate many options for intervention, and structured thinking is required to work out how to select and organize them into pathways. We cover how to do this in step 2.

Options for building the resilience of the current system

Suppose you have assessed the resilience of the project area's food security system and concluded that a strategy for incremental adaptation to enhance livelihoods is a wise course. For example, a system which is currently predominantly pastoral might be able to provide food more securely if improved management of land and water were coupled with a livestock insurance scheme.

- Explore incremental adaptation strategies by searching the literature, and by talking with stakeholders, national and international experts. Useful principles include:
  - work backward from your desired goal to identify changes that must precede its achievement. For example, if sustainable food security is the goal, it may depend on prior rehabilitation of the landscape, better integration of livestock and crops to maintain fertility, pest control, and the construction of rodent-proof storage bins. For each link in this causal network you should state the assumptions on which it depends;
  - favour interventions which prevent irreversible change to a controlling variable (e.g. soil health) over actions which merely increase output. For example, soil conservation is generally preferable to increasing the use of chemical fertilizers. By managing such a controlling variable you can have a long-term effect on its outputs (yield, in this case);
  - some interventions will influence food security only indirectly, but are necessary nevertheless e.g. building or strengthening social networks that enable other interventions to function satisfactorily, such as labour-sharing for weeding, harvest or pest control.

Options for domain shifts and transformational change

If it is clear that transformation of the social and/or natural system is necessary, it may prove difficult to develop options for a domain shift or transformational change (*System Assessment)* because of existing psychological, behavioural and institutional factors. For example, we all readily accept information that confirms what we already believe to be true, but when information challenges our beliefs and knowledge, we tend to reject it (See Values Knowledge Rules in System Description Step 2 and Appendix B Glossary and key concepts). This is true of even uncontroversial things like how to train an ox or drive a car. When established institutions and norms are questioned, such as the rules of inheritance or the social roles of men and women, most people are reluctant to consider new ways. Raising the possibility of a domain shift from a pastoral system to agro-pastoralism, or of some households transforming from pastoralism to off-farm livelihoods may prove confronting too – but fostering stakeholders' willingness to discuss such changes is a necessary precursor for developing options for transformational change.

- Explore options for transformational change, bearing in mind:
  - transformational options should be explored and developed through a process which is ethical, carefully planned and skilfully facilitated, because it is likely to generate conflict (see *Engagement and Governance Step 4);*
  - intervention options are unlikely to fall into mutually exclusive categories of "building resilience of current system", "domain shift" *or* "transforming to a new system". Such interventions may be appropriate at different times or spatial scales. For example, an option for building resilience at the regional scale could mean supporting transformational change for some households in the region (e.g. establishing non-agricultural livelihood options for some households). In this way the aim of incrementally building resilience at regional scale can include building options for transformation at a more local scale.

Some issues and approaches for overcoming psychological and behavioural barriers to change are outlined in Appendix C Promoting Thinking in new ways.

Step 2 Build Pathways for implementation of Intervention Options

An Adaptive Implementation Pathway is a strategy for grouping and sequencing the implementation of interventions, as well as identifying critical review points in the future. Some interventions should be implemented before others, some are best held in reserve, and others will be discarded or modified as circumstances change and understanding improves.

- Characterize and prioritize options (Table 1 Characterizing and prioritizing options) by asking whether each intervention:
  - is a foundation for the pathway as a whole and so should be implemented early;
  - is needed soon because some part of the system is otherwise likely to cross an unwanted threshold;
  - should be favoured because it is resilient or robust to a wide range of stresses and shocks;
  - should be implemented early because its effects are delayed;
  - is potentially necessary and effective – but not currently feasible because a prerequisite intervention is needed before it can be implemented;
  - should be avoided for as long as possible because it is unfair to some stakeholders (in the present or future) or otherwise socially divisive;
  - has co-benefits in the form of positive mitigation, adaptation and poverty alleviation outcomes;
  - should be implemented only if and when needed, because it would hinder the implementation of too many other options.
- If an option is effective but fits none of these categories, choosing it as a priority should be based on its expected net benefits (see Step 6). Options which fit under one or more of these categories can be sequenced, as discussed next.

Table 1 Characterizing and prioritizing options

Criterion	Explanation
Is it a foundational intervention?	Must be implemented if the goal is to be reached. The need for some will be obvious and these need to be implemented early on. The need for others may not become apparent until later in the project, so some funding should always be reserved for contingencies. Examples of the former include: • a food security project will need its own governance arrangements for coordinating implementation and subsequent community scale management (see *Multi-Stakeholder Engagement and Governance* Step 3). So far as possible it should build on what is already there; for example, there may already be traditional range management institutions which are highly effective • many of the priority interventions will be at household scale, but a prerequisite for food security may be a strategy at the next scale up, for example conserving the broader landscape with interventions to manage vegetation cover, water flows and soil erosion. Health and education interventions, or new roads, may also be prerequisites for food security, as might training in skills ranging from new farming practices to governance.
Is it an intervention to prevent a threshold being crossed?	In the *System Description* and *System Assessment* components you identified potential thresholds on controlling variables. Crossing some of these may be necessary for achieving food security but others may mark an irreversible shift to an unwanted domain – for example, a decline in soil depth that leaves land useless for anything except unproductive grazing, or a fall in the water table that makes water inaccessible. The sequencing of interventions that prevent the crossing of such thresholds depends on how imminent you think the danger is. It can be very difficult to identify thresholds before they are crossed, but we provide some examples of ways to deal with this issue in Appendix B: Examples of ways to help identifying interventions that prevent thresholds being crossed.
Is the intervention resilient or robust to a wide range of potential stresses or shocks?	The magnitude and type of future changes in the economy, environment and society are uncertain, and the level of uncertainty increases the further ahead we try to look. It is wise therefore to prioritize interventions that will work in the face of many types of shock or stress and under a wide range of magnitudes in the rate, scope and scale of shock or stress. For example, a bridge on a road to a market can be built to cope with the extremely large floods that might occur if future rainfall variability increases (a robust intervention). However, the investment may not be justified if extreme floods do not occur. A resilient intervention might be to build a smaller bridge which can be affordably rebuilt if destroyed by a flood. Choosing between robustness and resilience depends on local circumstances.
Will the intervention impact on other options?	It is important to keep in mind, while building the pathway, that a system might adapt initially by building resilience, but ultimately need to transform to a new system. We saw in the System Assessment component that a resilient system is one that keeps a wide range of options open for the future. Since we cannot know for certain what the future will bring, the system will be more adaptable if, wherever possible, we avoid interventions that close off future options (see Appendix B Examples of interventions that can reduce options and Appendix B Examples of ways to deal with potential conflicts between interventions). Of course there are trade-offs – such interventions may be beneficial in other ways – but these should be considered explicitly, so that options are kept open as long as possible.
Will there be a long delay between intervention and effect?	Some interventions will only begin to take effect long after implementation begins, such as planting trees, increasing skills and building social capacity for governance. Also some interventions may need to be delayed while further research into their benefits and costs is carried out, which requires significant lead time. Interventions with long lead-times should, other things being equal, be initiated before interventions with less-delayed effects.
Is the intervention necessary but not currently feasible?	Some interventions necessary for long-term food security are not immediately feasible because they are blocked by current laws or policies, or prevailing social norms and values, such as inheritance or resource access laws, norms about the roles of women, or the absence of infrastructure or educational facilities. Changing laws or policies may require prior interventions such as strengthening stakeholder relationships with politicians and public servants. Changing cultural norms may require prior investment in participatory social processes to co-develop a socially acceptable intervention. These prior interventions thus become part of the pathway and, when they are successful, the interventions that were previously blocked can be reconsidered and incorporated in the pathway too. See Appendix B Examples of factors that might currently prevent implementation.
Is it fair and will it build social cohesion?	Two premises of RAPTA are that social cohesion is a foundation for food security, and fairness is a prerequisite for cohesion. Interventions that build social cohesion should, as a rule, be implemented before those that are neutral, because cohesion facilitates other interventions which will promote food security. In general interventions with negative impacts on fairness (across locations and time) and cohesion should have the lowest priority.

Step 3 Sequence the Intervention Options and Pathways

- Choosing the initial order of implementation depends on local circumstances. Bear in mind:
  - Interventions to change values or rules that block the pathway should be initiated as soon as the blockage becomes apparent. Some will appear during the design phase, but others will crop up all along the pathway.
  - Interventions ranked high by the other criteria in Table 1 should be prioritised.
  - Interventions that should be kept as options for use later in the project only if they are critical to food security but are also unfair, not robust or not resilient to a wide range of shocks, or which close off future options.

Step 4 Set provisional implementation triggers, or review and revise previously identified triggers

- Use the provisional sequence together with your deepening understanding of the system to set implementation triggers (See Box O). These are decision points along the pathway that indicate when it is time to implement interventions that have until then been deliberately delayed. Bear in mind:
  - These trigger criteria are specific to the context of the project. They are set during the design stage, but should be revised as circumstances change.
  - Triggers are not based on calendar time. They describe the circumstances in which a proposed intervention may be needed and the date is usually uncertain.

BOX O
Examples of implementation triggers

An example of an implementation trigger is a decline in the ability of the system to adapt to the frequency or intensity of droughts. We cannot predict the year when this may occur because circumstances and climate are always changing. So, instead we choose a decision point that signals when that time is arriving. The criteria will depend on the system and your chosen interventions, but hypothetical examples are:

- the flow of a stream falls below that level at which irrigation is feasible;
- the salinity level of soil reaches a point where crops cannot grow;
- the land area per person falls to a level below which local production cannot meet local needs;
- the capacity of a community grows to a point where it is ready to adopt more complex interventions

Step 5 Document and Visualise the Pathways

There are many ways to describe pathways and visualise them which enhance communication and stimulate thinking. As with Theory of Change, there is no right or wrong way to do this, but there are some commonly-used representations (See Box P) that help make explicit the tacit knowledge and assumptions of participants, and the divergence. These maps become important objects which can facilitate structured discussion and understanding of the various perspectives and values that people have, and the different pathways they may prefer to reach common goals.[17]

- Describe the pathways in terms of changes in the system, focusing on the decisions and interventions that affect the direction of the pathway.

17 For a clear example of how different stakeholder groups with different values and agendas can be expressed using a pathways approach, see Haasnoot et al 2013, and Wise et al 2014. Full references in Resource Links

Step 6 Build the understanding gained from all components into an implementation plan

Here you use the logic of the *Theory of Change and* the knowledge gained about the system and its stakeholders from other components to develop an implementation plan that is adaptable to changing circumstances. So far you will have chosen some interventions and placed them in a provisional order for implementation.

Initial funding for implementation will cover only the first few years of the project, but the adaptive implementation pathway extends well beyond the project and often decades into the future. Nevertheless, it is wise to have the whole pathway provisionally mapped out because this avoids lock-in from irreversible choices early in the pathway, ensures future options are maintained if not increased and promotes the early adoption of options with long lead times (i.e. those with upfront costs and delayed benefits). The

long-term role of the *Theory of Change* component is therefore to guide the project through its early, funded phase, and then to provide the basis for the next, yet-to-be-funded phase of the project.

- Choose methods for formal evaluation which are appropriate for the stakeholders, applicable with available skills, acceptable to funders and compatible with the *Engagement and Governance* and *Learning* components.
- Estimate the benefits and costs of interventions, so that you can assemble them into an implementation plan, and estimate funding needs. Suggestions for estimating the benefits and costs of pathways are given in Appendix C Examples of ways to estimate benefits and costs of pathways.

Step 7 Action the implementation plan, actively using the learning and adapting the pathways over time

The provisional order of implementation – and often the options themselves – will change in the future as the pathway is adapted to unexpected setbacks, growing knowledge and new opportunities: funding

BOX P
Example of ways to visualise and describe pathways

It is useful to have both a mental model of how the system may change, which relates to the *System Description* and *System Assessment*, and a representation of possible decisions, which the project may follow to achieve these changes Figure 15 illustrates the former, and Figure 16 the latter.

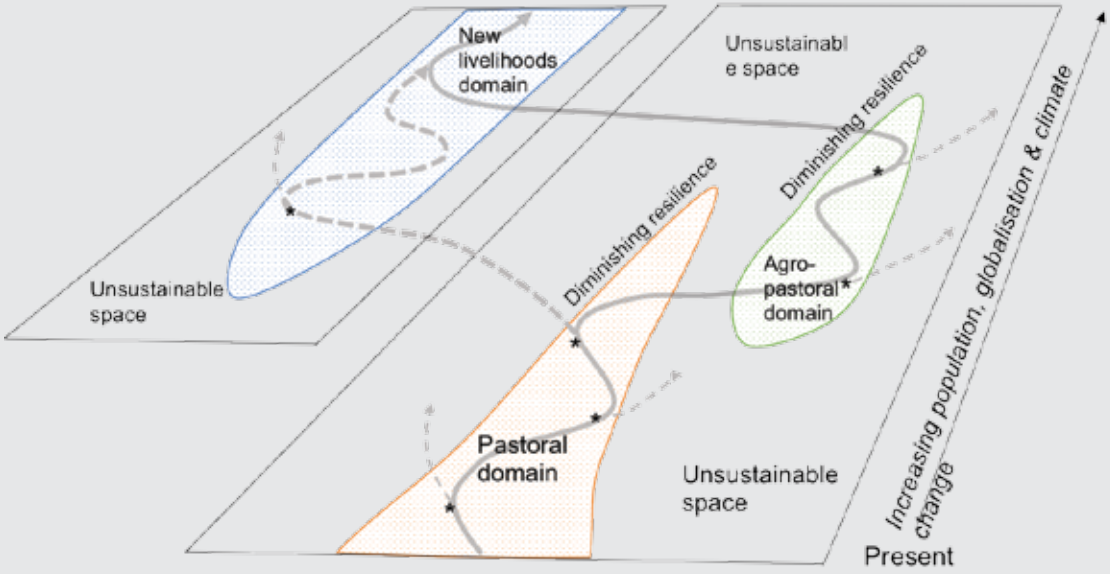


Figure 15 A hypothetical pathway showing how the system might change

In **Figure 15**, the thick solid line is a sustainable path from the perspective of today. Implementation triggers and decision points are marked. Narrow dotted arrows show undesirable paths if the wrong decisions are taken (e.g. the decision context will not allow the better choice, the existence of a threshold or the system's proximity to it is not known, a prerequisite or delayed effect intervention begins too late, or the implementation triggers are wrong etc.) The actual path is unpredictable because we do not know when circumstances will change. The heavy dotted line illustrates this. It may be that by the time this decision point is reached, it is deemed better to transform directly to a new system domain in which a significant part of livelihoods depend on non-agricultural income from local small businesses, wildlife, cultural tourism or from urban jobs, although from today's perspective this does not seem desirable. The example is not intended to represent potential pathways for any real area, as developing these would require stakeholder engagement.

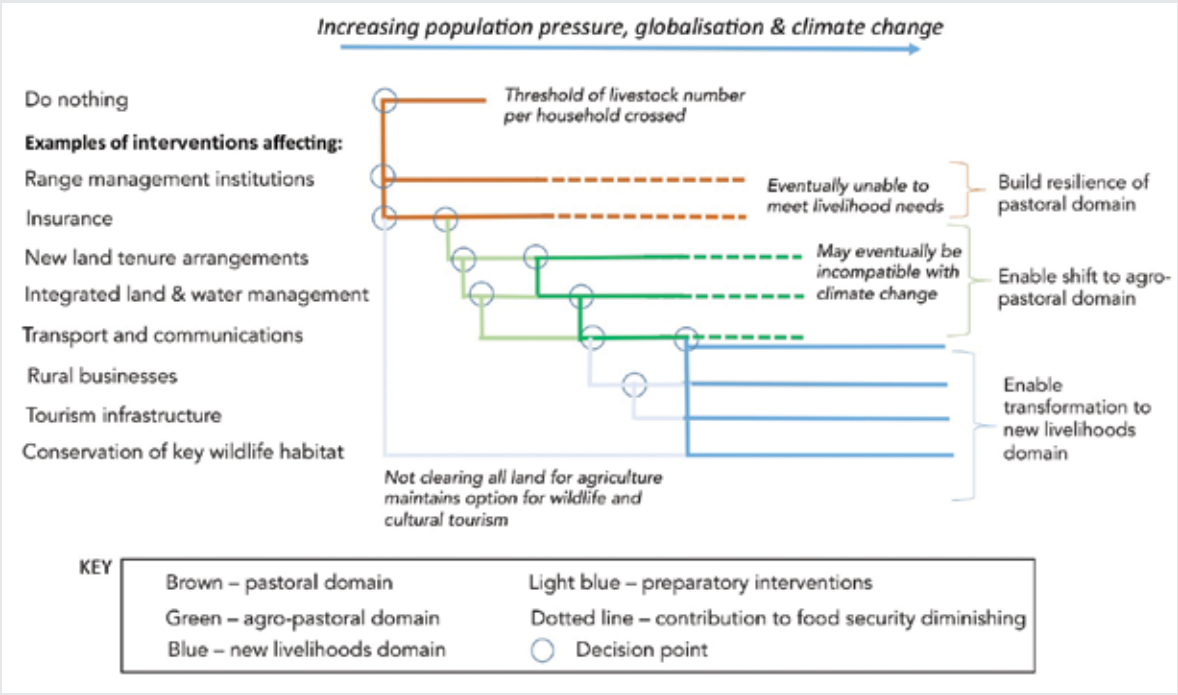


Figure 16 A hypothetical example illustrating a way of representing a set of possible future decision pathways

The example in Figure 16 is not intended to represent pathways for a real area, as developing these requires stakeholder engagement. Instead, it helps identify alternative decision sequences into the future from the perspective of today. One marks a currently preferred pathway but updates it as the future unfolds. Circles mark points where a decision is made to intervene in response to a change in circumstances (e.g. an increase in drought frequency or intensity or the appearance of a new opportunity). Brown lines are examples of interventions to maintain the resilience of food security in the current pastoral domain. If pastoralism is not expected to continue to supply sufficient food reliably, the decision is made to help some households to move into agro-pastoralism. The pale green lines in the figure illustrate that the decision should allow sufficient lead time to change land tenure, set up landscape-scale land management and build infrastructure. Many households may already be transforming to agro-pastoralism anyway, but such interventions can make this easier and the mixed farming systems more productive. In time, climate change and population increase may reduce the ability of agro-pastoralism to support the community. That may combine with the growth of non-agricultural work opportunities in tourism or local businesses. An early decision to set aside some key wildlife habitat may pay off as wildlife becomes a basis for tourism. Transformation to a new type of rural system will be enabled by investments in transport, communications and tourism infrastructure. If the climate changes more quickly than expected, it may be necessary to re-assess and move directly to the transformed system sooner than intended.

will change; drought or flood can disrupt plans; costs and prices may change unexpectedly; crop, livestock or human diseases may afflict stakeholders; new remedies may be found; government priorities may shift and key stakeholders may leave. Also, the project will implement some interventions which remove blockages to other potential interventions, some of which then join the implementation sequence as they become feasible.

The implementation of interventions often reveals gaps in our understanding of the system, such as the existence of unexpected thresholds and threshold interactions, or stakeholder consultations proving inadequate.

- Re-iterate select components of RAPTA, tied strongly to the *Learning component,* feed back into the *Theory of Change* component, and revise

decision points, implementation triggers, and the interventions themselves as appropriate.

Though funding for the project may end after a few years, a successful pathway has already included interventions focused on developing sustainable finance.

- Establish governance, *Learning*, monitoring and assessment systems, resource-use and generation patterns and practices, and a self-sufficient community which can adapt the pathway to diverse and unexpected shocks far into the future. A key part of adaptability is developing effective *Learning* that enables knowledge of the system to grow in parallel with environmental and socioeconomic changes. This may prove the most important part of the project, and it may result in major shifts in the pathway as it adapts to circumstances that were not imagined when the project began.

3.6.5 What you will have by the end of this component

By the end of this component you will have worked with stakeholders to develop options for intervention and arranged them into a provisional order for implementation. This includes selecting the preferred set and estimated their benefits and costs. You will also have shown how benefits and costs are distributed among stakeholders and developed criteria that indicate when conditions are right for implementing particular interventions.

3.6.6 Resource links

This section is based on an unpublished paper:

Abel, Nick, Russell M. Wise, Matthew Colloff, Brian Walker, James Butler, Paul Ryan, Chris Norman, Art Langston, J. Marty Anderies, Russell Gorddard, Michael Dunlop, Deborah O'Connell. Building resilient pathways to transformation when no-one is in charge: insights from Australia's Murray-Darling Basin. In review for Ecology and Society. A full list of references for this paper is found in Appendix B.

Haasnoot, M., Kwakkel, J.H., Walker, W.E., ter Maat, J. (2013) Dynamic adaptive policy pathways: A method for crafting robust decisions for a deeply uncertain world. Global Environmental Change 23, 485–498.

Maru, Y.T. and D.M. Stafford Smith (2014) GEC special edition–Reframing adaptation pathways. GEC, 28, 322-324. http://www.sciencedirect.com/science/article/pii/S0959378014001307

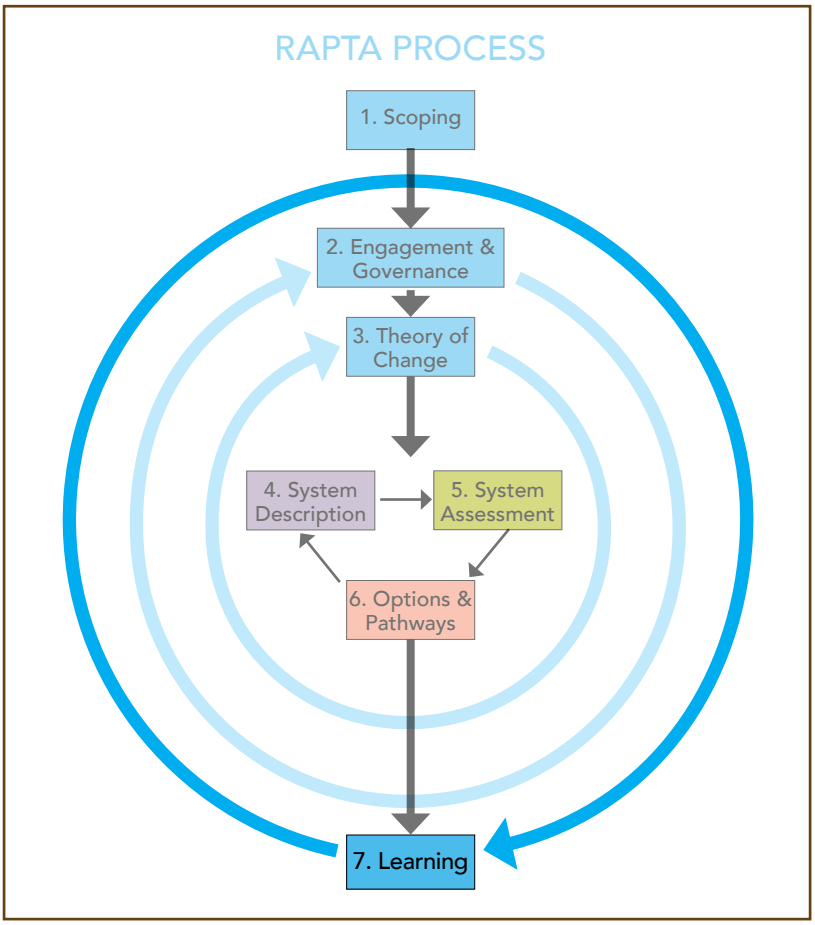
Siebentritt, M and D.M. Stafford Smith (to be released early 2016). A Users' Guide to Applied Adaptation Pathways. Seed Consulting Services http://www.seedcs.com.au/

Wise, R.M., I. Fazey, M. Stafford Smith, S.E. Park, H.C. Eakin, E.R.M. Archer Van Garderen and B. Campbell. 2014. Reconceptualising adaptation to climate change as part of pathways of change and response. Global Environmental Change 28:325–336. http://dx.doi.org/10.1016/j.gloenvcha.2013.12.002

The *Theory of Change* was used at the UNDP-GEF Ethiopia workshop to scope the different impact pathways which are necessary, and sufficient to meet the goal. The Theory of Change was used as a large wall diagram that was added to throughout the workshop, and that triggered important discussions amongst participants. This diagram is only partially completed after a two-day workshop, and should be revisited and updated after each component of RAPTA is conducted.

Photo Credit: Deborah O'Connell

3.7 LEARNING (SHORT FOR MONITORING & ASSESSMENT, LEARNING AND KNOWLEDGE MANAGEMENT)



LEARNING (MONITORING& ASSESSMENT, LEARNING, KNOWLEDGE MANAGEMENT)

Step 1 Understand why learning is important in RAPTA

Step 2 Identify the kind of learning environment needed for your project and context

Step 3 Specify project needs that *Learning* will meet, informed by other components

Step 4 Select the appropriate learning tools and methods to meet the specified needs

Step 5 Ensure adequate resourcing for Learning activities across all phases of the project cycle

Figure 17 Steps of the Learning (Monitoring & Assessment, Learning, Knowledge Management) component

3.7.1 Purpose of Learning

This section explains the *Learning* (short for *Monitoring & Assessment, Learning and Knowledge Management)* component, including the multiple objectives of *Learning* and possible tools for achieving them. RAPTA is deliberately designed to foster monitoring, assessment, and learning for all stakeholders involved and is intended to be a flexible, iterative process. Regular evaluation and reflection throughout the project is critical to enhancing understanding about the complexities of the system in which the project is embedded and for supporting the project managers and key stakeholders in making the most appropriate changes and adjustments to achieve meaningful impacts. Because many of the participants involved in undertaking RAPTA are themselves essential elements of the system under consideration [18], their engagement in *Learning* is essential to encourage self-assessment and awareness of their own roles and influence over future actions.

However, an effective *Learning* process depends on establishing a governance framework (e.g. project management, stakeholder engagement) which encourages methods and processes for appropriate monitoring and assessment, has the mechanisms to collate and manage information, and is responsive to the messages that this provides. This "feedback loop" enables project managers, stakeholders and beneficiaries to track and adjust project progress, monitor and assess project outcomes, reflect on successes and failures and potentially adapt and refine future iterations of RAPTA.

18 The participants include government policymakers, NGOs, vulnerable community members, and others. See Engagement and Governance component.

Learning serves four objectives:

- **To foster critical reflection and innovation.** In broad terms, learning is an explicit process which challenges stakeholders' accepted wisdom and understanding by providing new information or knowledge. This is a fundamental way to build human capital, but there are different approaches to achieving it. A popular method is "social learning", defined as "knowledge-sharing, joint learning and knowledge co-creation between diverse stakeholders around a shared purpose, taking learning and behavioural change beyond the individual to networks and systems." If effective, social learning generates shared ways to gain knowledge that lead to changes in development practice.
- **To enable monitoring and assessment.** Monitoring and assessment (M&A) is critical to support learning and adaptive management of the project. It is also increasingly required as an explicit component and objective of projects. M&A helps to:
  - **Confirm or revise Theory of Change and assess progress along impact pathways.** It does this by designing indicators based on key outputs, outcomes, impacts and underlying assumptions defined by the Theory of Change component, so project managers and stakeholders can reflect on progress and identify possible barriers or emerging enabling factors, and thus revisit and adapt the Theory of Change and its impact pathways. Equally, such assessments can be undertaken after a project's end to aid planning of the next iteration.
  - **Report to funders**: GEF projects require a results-based assessment, with agreed milestones and/or outputs which must be monitored, recorded and reported to the donor, and can be informed by the *Theory of Change*. The GEF Independent Evaluation Office recommends application of theory of change. This form of monitoring ensures accountability by the project implementers to the donors.
- **To guide and organize knowledge management. Knowledge management** is essential to record and organize information that informs M&A (e.g. outputs for submission as milestones), and provides evaluation materials that can inform learning processes. Essentially, knowledge management harnesses all the relevant outputs and materials required to deliver the *Learning* component. However, to avoid this becoming a bottleneck, the objective and role of knowledge management must be clearly defined in a M&A plan. Also, knowledge management may handle controversial material, and therefore needs to be governed ethically and with sensitivity.
- **To inform design and strategy of future funding programs.**

3.7.2 Use in phases of project cycle

Learning should be considered at every stage of the project cycle. It is relevant in project design, when the processes to effectively capture and utilise learning are developed; during implementation, when these processes are implemented to guide the project; and in the post-project phase, when *Learning* will inform future activities and underpin the sustainability of the project interventions, to ensure the intended outcomes.

Learning connects the various components of RAPTA. It is applied in an iterative manner so that it informs adaptive management across the project design and implementation. Stakeholders' engagement in learning is important so they are able to define their roles and responsibilities and gain an understanding of their potential influence over future actions. Learning will also require effective governance arrangements that support monitoring and assessment and processes that enable new knowledge and information to influence adaptive management. *System Description*, *System Assessment* and *Options and Pathways* will be most effective when they are influenced by a learning process and plan that underpins iteration and refinement throughout the project phases.

3.7.3 Steps to take to design and conduct the *Learning*

Step 1 Understand why learning is important in RAPTA

No matter how thorough and detailed the knowledge base generated through the RAPTA process, it can only ever be a partial representation of the system. It is impossible to fully understand and predict how complex social–ecological systems will change over time. So there will always be knowledge gaps in the RAPTA process and many assumptions that must be made in the *Theory of Change* component. Hence RAPTA should be viewed as an evolving process, where knowledge is developed, applied, tested and reviewed again, in a continuous learning cycle. This starts with the preparation to undertake RAPTA and evolves continuously as it serves its purposes.

RAPTA's focus on learning is what sets it apart from traditional approaches to project development and

implementation. It is this focus that breaks the cycle of business-as-usual investment which does so little to fundamentally change the dynamics of complex systems. However, achieving this requires a strong commitment to a learning culture.

Step 2 Identify the kind of learning environment needed for your project and context

The approaches and tools used to support learning in RAPTA vary depending on the context of your project and the kind of learning environment that is most suitable and feasible. The following questions help to define this:

- Which learning tools and techniques have worked or not worked in your past projects?
- What is the best way that project governance can support these learning tools in your context?
- What considerations should be taken into account (e.g. cultural norms and practices, differences in social status, gender, geographical distances, knowledge management, literacy)?

Step 3 Specify the project needs that Learning will meet

Once the necessary learning environment has been clarified, a plan covering all aspects of the monitoring and assessment, learning and knowledge management should be designed.

- For each component of RAPTA, plan the *Learning* needs. The following questions will help:
  - What type and level of learning is required to achieve the project goals, and to draw out the most useful insights from each RAPTA component?
  - What kind of changes do you want to measure?
  - Who are you reporting the information to, and why?

Step 4 Select the appropriate Learning tools and methods to meet the specified needs

There are many tools and methods that can be used for M&A and knowledge management, and which are easily accessible on the internet. As with *Engagement and Governance,* there is no single "best" toolkit. Which is most suitable depends on:

- Availability of resources;
- Time constraints;
- Flexibility of choice (some funders require specific M&A tools to be used);
- Purpose or objective.

It is also important to note that the project team will have to periodically assess whether the tools and methods being used in the *Learning* component are actually useful, in terms of the objectives outlined above. Thus, it is important to have a range of tools and methods available. Box Q illustrates the SHARP tool, an example of a participatory tool for assessing climate resilience of smallholder farmers, while Box R describes an approach to project evaluation. Other examples are provided in Appendix C.

In selecting approaches and methods, it is important to also consider the following questions:

- What sort of data and information are needed to support collective reflection and to track and measure project progress, outputs and outcomes as indicated by *Theory of Change*?
- Who should be involved in the reflection as well as the collection and synthesis of information?
- What institutional mechanisms are in place to help ensure that results of reflection, monitoring, adaptive management of the project and assessment findings are considered in the design of the next generation of projects?
- How will the information be collected, recorded, stored and made available?
- When, how and in what form will the information be shared?

Some answers to these questions may be determined by the monitoring and assessment needs of the funders. For example, some funders may prioritise certain information and may have their own reporting templates that need to be filled out.

Step 5 Ensure adequate resourcing for Learning activities across all phases of the project cycle (including the legacy phase).

Monitoring and assessment and knowledge management are frequently neglected in projects, and treated only as a necessity for reporting to project funders, often at project completion. A common rule of thumb is that 10 to 15% of a project budget should be devoted to standard monitoring and assessment. However, if the broader intent of generating learning and reflection that can challenge business-as-usual project design and management is to be achieved, more significant resourcing is required. Ideally, at least one team member should be assigned responsibility for *Learning,* and they should have prior experience, or be trained in appropriate tools and techniques. Rather than being isolated as a specialist, this team member should be closely involved in

all RAPTA components and activities. The project governance structure should also embrace and promote the *Learning* component and support the role of the team member responsible for Learning, throughout the project. Ideally, the project will stimulate a learning culture and establish processes that continue after the project is complete.

3.7.4 What this component will produce

By the end of this step of RAPTA it is expected that the user will be able to:

- Identify the objectives for a *Learning* plan which should be linked to the Theory of Change and impact pathways
- Design a plan for collating information, knowledge management and communication
- Select the tools and approaches that best support the *Learning* plan in the local context
- Fully resource the *Learning* component throughout the RAPTA pass.

3.7.5 Resource links

https://ccafs.cgiar.org/research-highlight/making-it-real-social-learning-practice#.Vl2j0aO4bX5

http://km.contentthatmoves.com/

http://fao.org/fileadmin/user_upload/knowledge/docs/ABC_of_KM.pdf

http://www.ukcip.org.uk/wp-content/PDFs/SEA-Change-UKCIP-MandE-review-2nd-edition.pdf

https://netmap.wordpress.com/tag/international-development-2/

BOX Q
Learning for and by smallholder stakeholders

Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists (SHARP)
Contributed by the Food and Agriculture Organization of the United Nations (FAO)

Background
The SHARP tool was developed to address the needs of smallholder farmers and pastoralists to assess their climate resilience at the level of individual households and communities.

The tool has a strong scientific grounding. It was designed following a thorough assessment of existing literature on climate resilience and through significant consultation with experts in many fields of study. SHARP assesses the resilience of agro-ecosystems on the basis of 13 indicators developed by Cabell and Oelofse (2012). At the same time, a key feature of SHARP is that it allows one to capture the needs and views of those most affected by the impacts of climate change – smallholder farmers and pastoralists themselves.

The type of assessment SHARP offers is extremely flexible and can be adapted to different project needs and objectives. It is undertaken through an interactive, participatory survey administered through a dedicated tablet application. The survey is composed of 54 questions that span five aspects of agro-ecosystems that directly affect climate resilience – agricultural practices, governance, environmental, social and economic aspects. It combines a self-assessment with a more quantitative assessment of resilience.

SHARP records information, is highly flexible and provides immediate results: several people can be interviewed at the same time and in a participatory manner – individually or in group settings – and data collected can be easily shared. In addition, the application automatically generates a final report containing a preliminary analysis of data collected (offline) – and offers the possibility to compare in real time the scoring and highlight the best or worst components of the farming or pastoral system in terms of climate resilience in order to engender discussions while in the field. The final aim is

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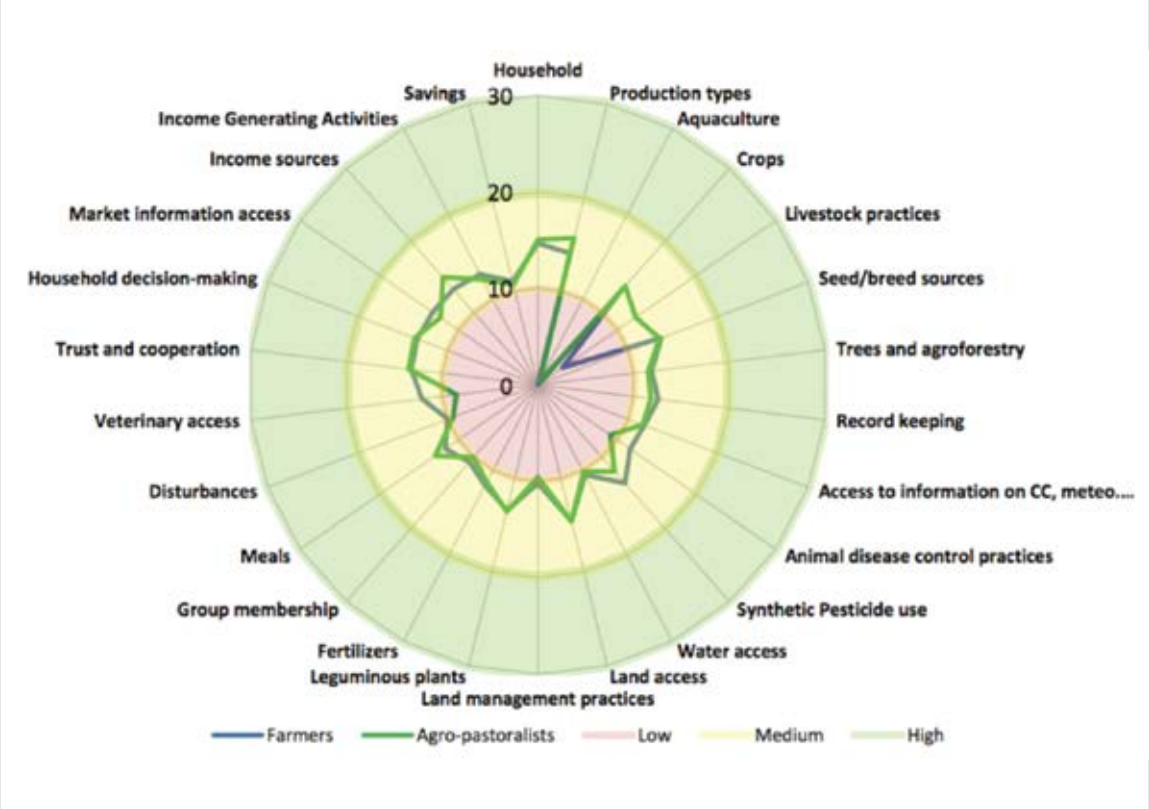


Figure 18 Sample SHARP survey results from Tonji, South Sudan, showing average resilience disaggregated by agricultural practices. The red, yellow and gree shaded rings represent low, moderate and high levels of resilience

to provide communities with a toolbox of options for improving their resilience to climate change. Rather than a top down imposition of practices to adopt, this method will allow individuals and communities to discuss in a participatory way and pick the practices that best suit their needs.

SHARP has been tested and implemented in several countries within the framework of GEF-funded Climate Change Adaptation (CCA) projects in sub-Saharan Africa.

Contacts and resources:

Email: SHARP@FAO.org

Web: www.fao.org/in-action/sharp

Background document: www.fao.org/3/a-i4495e.pdf

Android tablet application:

https://play.google.com/store/apps/details?id=org.fao.sharp

Agro-ecosystem indicators framework:

Cabell, J. F., and M. Oelofse. 2012. An indicator framework for assessing agroecosystem resilience. Ecology and Society 17(1): 18. http://dx.doi.org/10.5751/ES-04666-170118

Stakeholders using the SHARP tool.

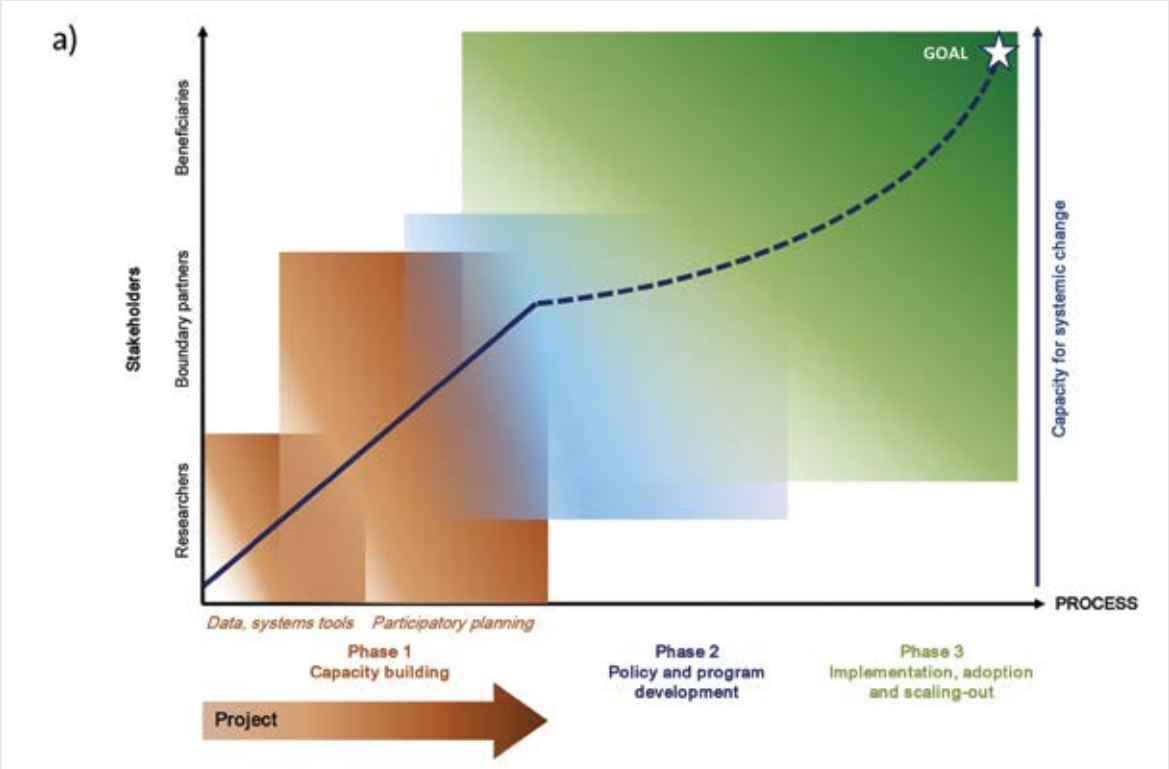
BOX R

An approach to learning for project developers and donors: learning about the impacts of the project over time

Monitoring progress along impact pathways: In a project which aimed to build a multi-stakeholder approach to climate adaptation in rural Indonesia, indicators were developed to reflect progress along the impact pathway (Figure 19). The impact pathway was designed with three sequential phases:

- Phase 1 was within the project's control and aimed to build the capacity of the research team to undertake systems analysis and participatory planning.
- This enabled Phase 2, when collaborative boundary partners involved in the participatory planning developed policies and programs for adaptation.
- In turn, this led to Phase 3, where implementation and adoption of the policies and programs were intended to reach the ultimate goal of reducing the vulnerability of rural communities.

There was an assumed trajectory of cumulative capacity for systemic change among stakeholders through the three phases, and indicators were designed to measure changes in this capacity. Interviews were carried out with the research team and other stakeholders at the project end, and interviewees were asked to give scores for the indicators. Results indicated that capacity-building had been strong in Phase 1, with leadership, trust, new knowledge and social networks emerging. There was also early evidence of outcomes in Phase 2 (management plans, new resources and projects) and impacts in Phase 3. The weakest indicator was institutional changes, suggesting that more action was needed to alter policies and social structures which would otherwise constrain future attainment of the project goal. The results of this evaluation were used by the research team to design the subsequent phase of the project.



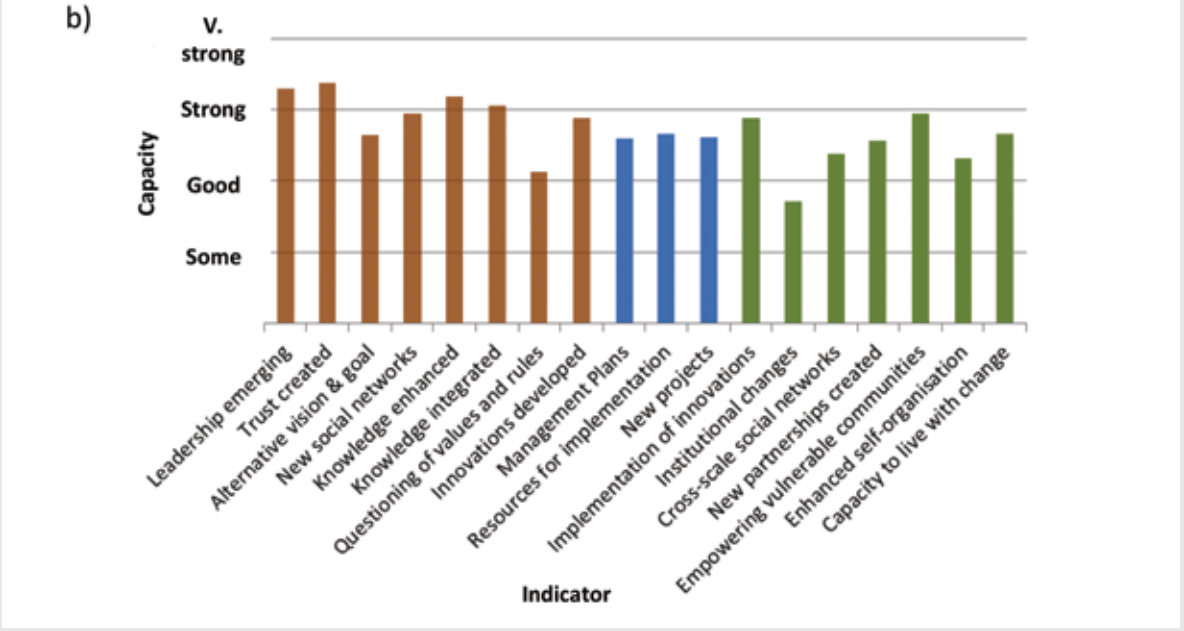


Figure 19 Example of a) a three-phase project designed to build stakeholder capacity for systemic change and b) indicators and their scores measured after the project's completion

Adapted from Butler, J.R.A., Suadnya, W., Yanuartati, Y., Meharg, S., Wise, R.M., Sutaryono, Y. & Duggan, K. in review. Priming adaptation pathways through adaptive co-management: design and evaluation in developing countries. Climate Risk Management.

4

HOW TO USE RAPTA IN THE GEF PROJECT CYCLE

In this chapter we provide more specific guidelines on how to use RAPTA in the GEF project cycle. The GEF project cycle is divided into three phases: project identification, project design, and project implementation. RAPTA can be applied in all three phases.

4.1 OVERVIEW

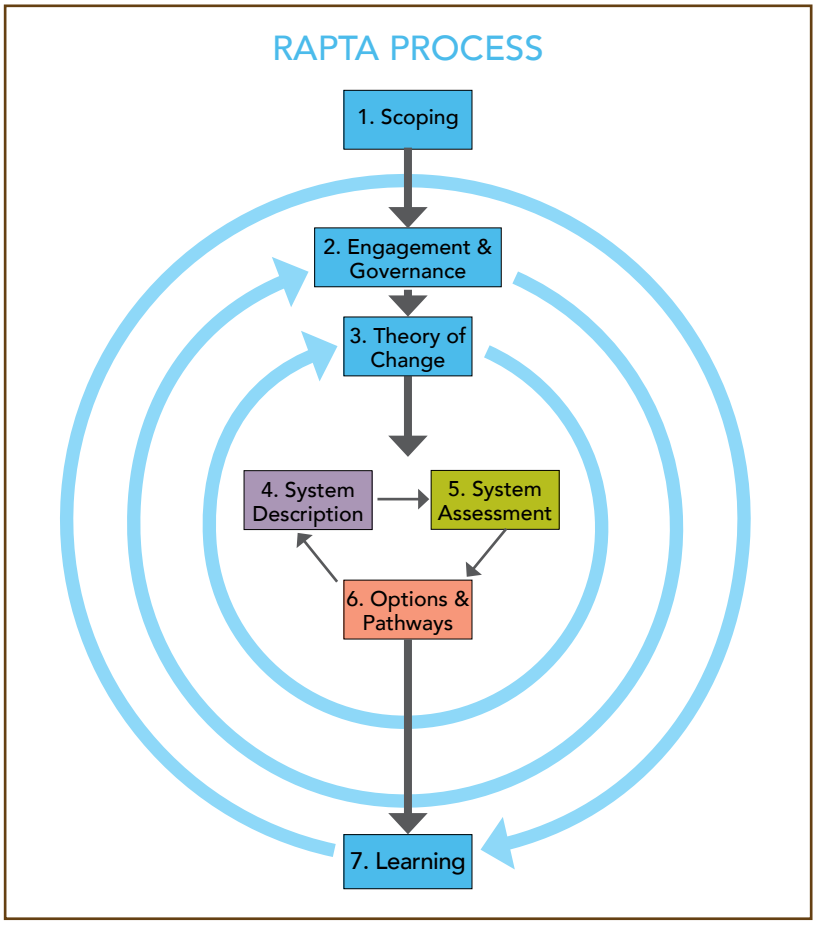


Figure 20 Diagram representing a RAPTA pass, showing the RAPTA components, the iterative nature of interactions between components, and the embracing nature of the Engagement and Governance and Learning component

The GEF project cycle has three distinct phases: project identification, project design, and project implementation. As explained in previous sections, RAPTA processes are iterative and cyclical. We refer to a "RAPTA pass" as one iteration through the RAPTA process (Figure 20).

RAPTA can be applied at different phases in a project, with each RAPTA pass tailored to meet the needs of that phase. Successive RAPTA passes can have differing levels of detail and stakeholder involvement and produce different outputs according to different project phases. An overview of the use of the RAPTA process in these project phases is given in Figure 21. The size of the RAPTA "symbol" in each phase indicates the level of detail (e.g. desktop exercise in Phase 1 versus full multi-stakeholder engagement process in phases 2, 3, and 4). The stakeholders included in each stage vary, and this is represented in the lower panel of Figure 21. For example, at the very early phase of project identification, a pass through RAPTA could be a desktop exercise coordinated by one person in a couple of weeks, involving only a narrow subset of stakeholders. The outputs of the RAPTA process are different in each phase, again reflecting the needs of the project phase.

A goal of IAP projects is to build capacity for systemic change. We use the word "capacity" to mean human capital (i.e. knowledge and skills) and social capital (i.e. leadership, trust, partnerships and social networks) of stakeholders, plus the *Learning* processes and supporting institutional architecture (e.g. committees, governance structures) necessary to build these capitals and catalyse innovation and collective action. These attributes are recognized in the scientific literature on resilience and transformation as being critical to understanding a complex system (like food security), and to tackle issues at different scales of that system in order to proactively generate change. Very often, the issues requiring action are the underlying systemic "roots" of a problem, rather than the superficial "symptoms". Recognizing and tackling the roots of a complex problem requires the

input of different knowledge types, and therefore the engagement of multiple stakeholders. Hence combining multiple stakeholders' resources and agency through Learning and collaboration, particularly across different scales of a system, is a key attribute of capacity-building for systemic change.

Figure 21 represents this assumption by including a vertical axis indicating capacity for systemic change. Each pass through RAPTA builds this capacity cumulatively, enabling deeper and more comprehensive *Learning* in the next cycle with a broader range of stakeholders. The cumulative engagement of stakeholders from different scales (global to local) deliberately encourages the formation of social networks and the integration of knowledge and resources across these scales through the activities of each iterative pass of RAPTA. Note, however, that building capacity for systemic change does not mean that the project will prescribe or enforce systemic change. Rather, the project will build capacity for stakeholders to understand the options, and to act on them *if they wish to*. RAPTA fosters an ability across stakeholders to understand issues, trade-offs, intervention points and routes to impact, and creates innovations and connections. In other words, the project does what it can to develop tools and capacity for systemic change, but does not necessarily execute that option.

Using RAPTA across all project phases creates the opportunity to integrate across project scales

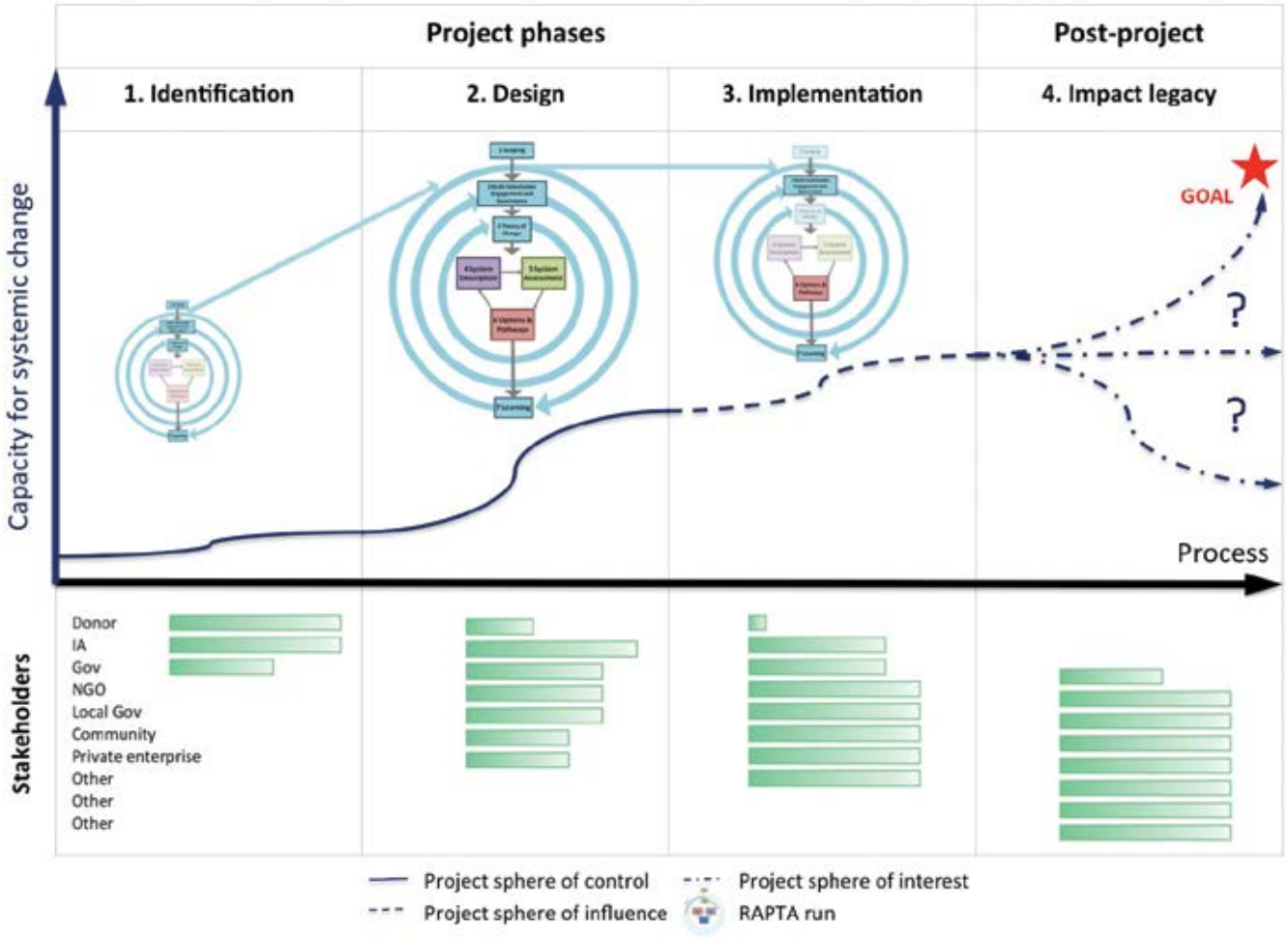


Figure 21 The RAPTA process in the phases of a GEF project, showing the cumulative capacity for systemic change, the cross-scale engagement of stakeholders (reflected by the length of bars and intensity of shading), outputs, outcomes and impacts

(e.g. IAP regional component, individual country projects, local on-ground activities), develop an integrated understanding of the food security system and include new partners who will build options for mainstreaming the results beyond the project's lifetime.

Table 2 Requirements to be provided to GEF, and where they are produced in applying RAPTA

GEF requirement	Project phase	RAPTA components that contribute to this requirement
PIF	1	*Scoping, Theory of Change* are the major focus; other components need preliminary consideration to generate project concept.
ProDoc	2	*Theory of Change, Options and Pathways*
Log Frame	2	*Theory of Change, Options and Pathways*
Knowledge Management	3	*Learning*
Theory of Change	4	*Theory of Change* (with details provided by most other RAPTA components)
Requirements for the FSIAP		
Qu 1: Resilience of what?	2	*System description*
Qu 2: Resilience to what?	2	*System description*
Qu 3: What are the key determinants/characteristics in the targeted system?	2	*System assessment*
Qu 4: How is the project expected to influence key determinants?	2	*Theory of Change, Options and Pathways*
Qu 5: How will key determinants be monitored?	2	*Learning*

4.2 PHASE 1: PROJECT IDENTIFICATION

The project identification phase is the first stage in developing a GEF project and its output is an 8-page Project Identification Form (PIF; Figure 21). This establishes the project background and context, policy and institutional frameworks, goals of the project, relevant stakeholders, gender-specific considerations, risks to the project, and knowledge management. RAPTA can be used to generate these GEF requirements (Table 1) and produce additional outputs helpful for later stages (e.g. clarity on the project governance framework, identification of stakeholders and monitoring and assessment plan for Phase 2). The stakeholders involved in this phase are typically the donor, the implementing agency, some of the proponents of the project from government and other key stakeholders. As indicated previously, in this phase a pass through RAPTA could be simple desktop exercise. A PIF can be developed without using RAPTA, but we suggest that even a quick and simple pass through RAPTA will lead to a more coherent PIF. A key element is establishing an appropriate governance structure and theory of change that can foster open stakeholder collaboration and *Learning*. Being within the project's sphere of control, this process will generate new Learning and networks among the few global- to national-scale stakeholders involved, so generating an initial lift in capacity for systemic change (Figure 21).

Table 3 The RAPTA components, activities and outputs mapped to requirements for Phase 1 Project Identification. Darker font on column 3 signifies greatest relevance[19]

RAPTA component	Description	Outputs: Component of PIF
Scoping	The primary RAPTA activity in this phase	**1. Project description: Problem, root causes, and barriers to be addressed; baseline activities; proposed alternative scenario; expected outcomes, global environmental benefits** 2. Stakeholders: stakeholders and their roles during the project preparation 3. Gender equality and women's empowerment **5. Coordination: GEF-financed activities or other initiatives** **6. National priorities** 7. Knowledge management: approach for the project; and other relevant projects and initiatives to learn from
Theory of Change	Develop explicit Theory of Change for the project, informed by other RAPTA components	**1. Project description: Problem, root causes, and barriers to be addressed; baseline activities; proposed alternative scenario; expected outcomes and components, global environmental benefits** 2. Stakeholders: stakeholders and their roles during the project preparation 3. Gender equality and women's empowerment: differences, needs roles and priorities for men and women **7. Knowledge management: management approach for the project; relevant projects and initiatives to learn from**
Engagement and Governance	Limited stakeholder engagement in this phase (e.g. donor, implementing agency and government only) Develop plan for stakeholder engagement in Phase 2 (including identification of key stakeholders and requirements such as gender-specific considerations)	1. Project description: Problem, root causes, and barriers to be addressed; proposed alternative scenario; expected outcomes and project component **2. Stakeholders** **3. Gender equality and women's empowerment: differences, needs roles and priorities for men and women**
System Description	High-level desktop review only Initial conceptual model of system. Low level of detail	**1. Project description: Problem, root causes, global environmental benefits** 2. Stakeholders
System Assessment	High-level desktop review only Initial identification of possible alternative states, key controlling variables, any need for transformation Low level of detail	**1. Project description: Problem, root causes, and barriers to be addressed; global environmental benefits** 4. Risks: social and environmental risks to be addressed, and measures to address these risks
Options and Pathways	High-level desktop review only Initial identification of potential intervention options and implementation pathways. Low level of detail	**1. Project description: barriers to be addressed; proposed alternative scenario; expected outcomes and components**
Learning	High-level desktop review only Develop Learning plan for Phase 2	**7. Knowledge management: management approach for the project; relevant projects and initiatives to learn from**

19 The numbering is consistent with the GEF PIF template for full-sized projects, September 2015: https://www.thegef.org/gef/guidelines_templates

4.3 PHASE 2: PROJECT DESIGN

The project design phase is typically 18 months for GEF projects, however is much shorter (less than 12 months) for IAP projects. This is the stage where elements of the PIF are ground-truthed and expanded with more rigorous detail. It is a good opportunity for the project team to coordinate at least one detailed pass through RAPTA, with considerable iteration and *Learning* to be embedded in that cycle. The final output of this phase is the Project Document (ProDoc), but it is accompanied by other outputs that readily carry over into the implementation phase, including the identification of drivers, system thresholds, intervention options, barriers and innovations and a well-developed Theory of Change. In this phase the project actively engages stakeholders from across the global (i.e. donor) to local (i.e. community) scales. This provides an opportunity for generating extensive cross-scale networks and the integration of multiple knowledge types and sources, plus the empowerment of marginalized communities and groups, including women. Consequently, through the production of the ProDoc there is a significant step-change in capacity for systemic change (Figure 21).

Table 4 The RAPTA components, activities and outputs from Phase 2 project design

RAPTA component	Description	Outputs: Project document
Scoping	Review to identify any change to scope	1. Revised (as needed) description of: a) project scope, scale, location; b) goals and interventions; c) previous work in the area and how the project will complement, or replace, it; d) the governance structure; e) stakeholders and their respective roles in the project
Theory of Change	A primary RAPTA activity in this phase. Either review and revise the Theory of Change developed in Phase 1, or if none was developed in Phase 1 conduct an initial Theory of Change that will be developed more fully in other RAPTA components	An initial Theory of Change for the project at the start of the design phase, and a mature, fully developed *Theory of Change* at the completion of all RAPTA components In the project document, the outputs will be: 1. A clear description of the goal based on discussions/findings about the magnitude of change that is required to reach the goal 2. A set of hypotheses about how the goal will be achieved by mapping impact pathways that link activities/outputs/outcomes/impacts + description of assumptions about these relationships 3. A description of the stakeholders/partnerships needed to carry out the impact-pathways, along with initial guidance of their rules of engagement
Engagement and Governance	Revise any stakeholder engagement plan developed in Phase 1, or develop new plan for multi-stakeholder engagement, and implement to ensure stakeholder inclusion in project design Develop stakeholder engagement plan for Phase 3	Stakeholder inclusion in, and ownership of, project design Stakeholder engagement and governance plan for Phase 3
System Description	A primary RAPTA activity in this phase. Elicit system descriptions through multi-stakeholder processes.	Based on collective knowledge from stakeholders, an explicit system description and conceptual model(s) that contains core elements of a resilience assessment, such as: system drivers and shocks, main resource uses, valued components and products of the system, controlling variables of these valued component and products and description of their thresholds, cross-scale interactions, feedback loops, non-linear interactions, and others (see system description section in the report)

System Assessment	A primary RAPTA activity in this phase. Work with multi-stakeholder processes to identify possible alternative states, key controlling variables, any need for system adaptation and/or transformation.	Detailed resilience assessment, including risks/points of no return Opportunities for adaptation and/or transformation, and the cost and benefits of these options
Options and Pathways	A primary RAPTA activity in this phase. Work with multi-stakeholder processes to identify possible threats, root causes, barriers, intervention options, innovations and implementation pathways to be described in ProDoc	Intervention options and implementation pathways for implementation in Phase 3. Project Log Frame
Learning	Revise any MALKM plan developed in Phase 1, or develop new MALKM plan for Phase 2 Use outputs of RAPTA components to elicit key indicators for monitoring and assessment Develop MALKM plan for Phase 3	Outputs for M&A reporting MALKM plan for Phase 3

4.4 PHASE 3: PROJECT IMPLEMENTATION

The project implementation phase embarks on the Implementation Pathways established in the project design phase (Table). This is the only phase where Implementation Pathways are acted upon and it provides the richest opportunity for monitoring, *Learning* and capacity-building for systemic change.

Furthermore, interventions identified via RAPTA in Phase 2 could include the implementation of adaptive management or *Learning* mechanisms (see Box Q) and RAPTA is also a suitable framework for implementing them. Successive passes through RAPTA can be embedded within Phase 3 to analyse and monitor system changes iteratively at multiple scales (e.g. national, regional and local). In doing so the potential for further capacity-building is considerable because the process maintains the legacy of Phases 1 and 2, and further link the stakeholders already engaged with those involved at a regional and local scale in Phase 3 (Figure 21). The inclusion of RAPTA in Phase 3 is recommended because it is at the implementation phase that the systemic, root causes of problems can be tackled. It is a chance to break away from business-as-usual approaches and implement truly novel systems that are capable of learning and adapting. Richer detail on the *Options and Pathways* component can be found in section 3.6. Without the inclusion of the leaders and champions generated by the RAPTA processes in Phases 1 and 2 it is possible that options and innovations to tackle systemic problems will not be fully applied, and the inertia of business-as-usual will persist.

Table 5 The RAPTA components, activities and outputs suggested for Phase 3 project implementation

RAPTA component	Description	Outputs
Scoping	Review to identify any change to scope	Revised scoping, if relevant
Theory of Change	Review and revise Theory of Change developed in Phase 2 and, if implementation is at different sites/scales, develop Theory of Change for each	Revised and more detailed Theory of Change for the project On-ground work plan(s) and budgets informed by Intervention Options and Implementation Pathways developed in Phase 2
Engagement and Governance	Implement stakeholder engagement plan developed in Phase 2	Multi-stakeholder platform ensuring inclusion in and ownership of project implementation
System Description	Periodically review and revise system description developed in Phase 2	Revised explicit system conceptual model(s)
System Assessment	Periodically review and revise system assessment developed in Phase 2	Revised resilience assessment

Options and Pathways	A primary RAPTA activity in this phase. Work with multi-stakeholder processes to ensure on-ground actions consistent with implementation pathways	Project outputs and outcomes meeting project requirements for: "scaling up", cross-scale integration and mainstreamed capacity for beyond the project
Learning	A primary RAPTA activity in this phase. Revise and implement Learning plan developed Phase 2	Outputs for Learning reporting (e.g. indicators elicited by RAPTA in Phases 1 and 2, RAPTA meta-indicators for quality of stakeholder engagement, quality of assessment process)

4.5 PHASE 4: POST-PROJECT

A precondition for GEF funding is that the beneficiary country is already heavily invested in the project goal, while GEF's objective in funding projects is to ensure that their actions and impacts will be sustained beyond the life of the project. Any enduring system change and ultimate achievement of the project goal will depend upon maintaining and mobilizing the stakeholder capacity established in earlier phases. This may be evidenced by new institutions, policies, funding and partnerships, and enhanced human and ecosystem well-being.

This phase remains within the project's sphere of interest but outside its sphere of control and influence (Figure 21). As emphasized in Section 3.1, the intention of the RAPTA process is to build capacity for systemic change – but not to prescribe or enforce this. Hence, it is possible that stakeholders will choose not to implement change, and the outcomes from Phases 1, 2 and 3 will recede. As a consequence, the knowledge, processes and networks established in these phases will also unravel with time and with them, stakeholders' capacity for change will recede. While not an objective of RAPTA, periodic evaluation in Phase 4 is useful to assess the long-term impacts of the project, and the reasons for the ultimate trajectory of stakeholders' capacity. Such *Learning* provides valuable insights for the future design of similar programs based on a multi-stakeholder RAPTA process.

The GEF investment builds on an existing baseline of activities by ministries and agencies, which demonstrate an existing interest and investment in the project idea. The GEF seeks to unlock barriers (e.g. capacity, markets, etc.) to that idea being realized at scale and so ensure global environmental benefits. The importance of RAPTA in this case is to help the project design and monitor implementation pathways to unlock barriers and increase likelihood of sustained impact beyond the project.

APPENDICES

05

APPENDIX A
BACKGROUND TO DEVELOPING THE RAPTA GUIDELINES

The Scientific Technical Advisory Panel (STAP) of the Global Environment Facility (GEF), responding to the GEF's growing interest in assessing resilience and a request from the UNCCD Secretariat, commissioned the Commonwealth Scientific and Industrial Research Organisation (CSIRO) to identify an indicator of the resilience of agro-ecosystems that can be applied at national level by the Parties to the UNCCD and used in the GEF's projects and programs. It was intended to complement the current UNCCD indicators and be relevant to the UNFCCC and the CBD as a measure of land-based adaptation and ecosystem resilience, respectively. The effort supports integration in reporting to the Conventions, and enhances the recognition of the central role of the land in supporting sustainable development.

O'Connell et al. (2015) reviewed the conceptual basis of resilience assessment and proposed the Resilience, Adaptation Pathways and Transformation Assessment (RAPTA), as an approach to the assessment of resilience as well as the related concepts of adaptation and transformation. The first version of the RAPTA was presented at the 2015 UNCCD Science Conference as the RATA Framework Version1.[20]

RAPTA was reviewed by experts from the GEF, the Rio Conventions, development agencies and research institutions, including experts in natural and social sciences and economics. Reviewers determined that the RAPTA approach has the capacity to support the Sustainable Development Goals and capture synergies across the Rio Conventions in areas of common interest in the management of human/ecological systems. The review process led to suggestions for refinements and the identification of elements that require further elaboration. It was recognized that co-development and testing with stakeholders in an applied setting is required before the RAPTA framework is ready for implementation and that simple guidelines for use are required.

The GEF has indicated interest in applying RAPTA in their programs and projects. The Integrated Approach Pilot (IAP) on "Sustainability and Resilience for Food Security in Sub-Saharan Africa" (Food Security IAP), approved by the GEF Council in June 2015, had an immediate need for methods to assess and report resilience. The Program Framework Document for the Food Security IAP refers to the use of RAPTA for monitoring and assessment.

The CSIRO and collaborators were commissioned by the STAP to deliver a short project (September to November 2015) to develop guidelines for RAPTA, to enable its application in the design phase of the Food Security IAP. The project aims to:

- understand the IAP program/project design, and how RAPTA can meet the needs and objectives of project developers
- introduce the IAP countries and GEF agencies to the underlying theory and application behind RAPTA and assist them with RAPTA implementation
- produce, in consultation with the key collaborators, guidelines for RAPTA, which can be used to support their project planning.

The RAPTA requires further piloting and testing beyond the development of these guidelines.

20 Further information: The first version of the RAPTA was called the RATA and was published in these reports:
Technical Report: O'Connell, D., Walker, B., Abel, N., Grigg, N. (2015) The Resilience, Adaptation and Transformation Assessment Framework: From Theory to Application. CSIRO, Australia.
Accompanying Case Study Report: Grigg, N., Abel, N., O'Connell, D. & Walker, B. (2015) Resilience assessment case studies in Thailand and Niger: Case studies to accompany a discussion paper for UNCCD STAP workshop 19–21 November 2014, Sydney, Australia.
Both available at: http://www.stapgef.org/the-resilience-adaptation-and-transformation-assessment-framework/

APPENDIX B GLOSSARY AND KEY CONCEPTS

B.1 GLOSSARY

Table 6 Terms used in this report

Term	Definition
Adaptive capacity (Adaptability)	The capacity of actors in a system to respond to shocks and to trends and (if known) the proximity of the state of the system to a threshold, and so to influence resilience. See General resilience.
Adaptation	This contested term has many variants (see B.2 below). In this report we use it in a way that is consistent with the social-ecological literature. It refers to the process of change that enables a system to maintain its identity, so that it is better able to cope with trends and shocks, or to reduce vulnerability to disturbance. We apply the term in this report to intentional actions by people, making the most of windows of opportunity.
Adaptive Implementation pathways	See Implementation pathways.
Adaptive governance	Institutional and political frameworks designed to adapt to changing relationships in society and between society and ecosystems.
Agro-ecosystem	Agro-ecosystems are one type of social-ecological system (SES): "An ecosystem managed with the intention of producing, distributing, and consuming food, fuel, and fibre. Its boundaries encompass the physical space dedicated to production, as well as the resources, infrastructure, markets, institutions, and people that are dedicated to bringing food to the plate, fibre to the factory, and fuel to the hearth. The aggregate ecosystem operates simultaneously at multiple nested scales and hierarchies, from the field to the globe."
Component	A specific set of activities in RAPTA that are described as a self-consistent group of steps. They can be ongoing processes (e.g. Multi-stakeholder Engagement) that are used within other components such as the System Description component. Each component in RAPTA is interrelated with others, as specific aims, and outputs.
Controlling variable	A variable that is underlying or shaping change in the system. For example, CO_2 concentration is a controlling variable for climate and ocean acidification. A controlling variable may not be of interest or concern in its own right, but because other variables of concern are affected by it. A controlling variable may change in a slow, predictable way (e.g. a rising groundwater table), but the impacts of that change may not be smooth and may exhibit threshold effects. For example, once saline groundwater rises to within a certain distance of the soil surface, capillary action draws it to the surface creating saline topsoil that can prevail even if the water table falls again. In this case, the controlling variable (groundwater level) changes smoothly, but the rapid response in soil fertility amounts to a rapid, effectively irreversible, shock to land use options.
Decision context	The specific combination of Values, Knowledge and Rules within which any given decision is made. See section on Values, Knowledge, Rules below table.
Domain (Stability domains)	The term "domain" is used to reflect the underlying concept that in any social–ecological system there can be multiple "stability domains". Each domain has a different set of functions, structure, feedbacks and identity. Domains are separated by thresholds that mark a critical change in feedbacks, and once a threshold is crossed the changes in feedbacks work to keep the system in the alternate domain. See section B.3 below.
Domain shift	A change in the state of a system from one stability domain to another. See Domain.
Feedback loop	A chain of cause and effect forms a loop that can either amplify or dampen the effects of change. For example, poverty can be reinforced by feedback loops (e.g. poverty leads to poor health which leads to unemployment which leads to greater poverty).
Autonomous transformation	An imposed transformation of a social-ecological system that is not initiated and guided deliberately by the actors. This is also known as unintentional or forced transformation. See also transformation.
General resilience	Capacity of the system to cope with a diverse range of shocks and disturbances. There are some system properties, such as high levels of health and education in a population, that confer a good ability to adapt and respond to a wide range of unexpected changes. It is sometimes referred to as "coping capacity" or "adaptive capacity". Further discussion in Walker et al. (2014).

Governance	Governance emerges from the interactions of many actors including government, the private sector and not-for profit organizations, at levels ranging from international to local. It includes not only laws and regulations but also negotiation, mediation, conflict resolution, elections, public consultations, protests, markets, online platforms for peer-to-peer exchange (e.g. Airbnb) and other decision-making processes. Governance can be formally institutionalized or, equally important, "expressed through subtle norms of interaction or even more indirectly by influencing the agendas and shaping the contexts in which actors contest decisions and determine access to resources" (Krievens et al., 2015).
System Identity	System identify is characterised by the system structure, feedbacks and function. For a system to retain its identity in the face of disturbance it means that the system reorganises to keep performing in the same way (Walker and Salt 2012).
Impact Pathways	Is the explicit articulation of the mechanisms by which an intervention will bring or contribute to desired changes and desired impact. (See Box I in section 3.3.3 Step 3)
Implementation pathways (Adaptive Implementation Pathways)	Implementation pathways are sequences of alternative sets of prioritized decisions and actions to achieve desired impacts. Adaptive implementation pathways are informed by learning, and continually updated with improved understanding of interactions between scenarios of change, decision lifetimes, and social and ecological thresholds. (See Box I in section 3.3.3 Step 3)
Institution	A set of rules and norms that guide how people within societies live, work, and interact. Formal institutions consist of codified rules such as constitutions, organized markets and property rights. Informal institutions consist of the rules which express social and behavioural norms of an individual, family, community, or society.
Intentional transformation	The deliberate transformation of a system to one with different defining variables and therefore a different identity (e.g. a new way of making a living), initiated and guided by the actors. See also transformation.
Intervention	Is the term used to describe any action that is planned or made in the system. It is used specifically in a sequence of other actions such that a pathway is formed. In addition, there are times where one such action is so important that no other changes in the system can occur without this specific action, these are termed fundamental interventions. Interventions can be at any part of the SES, such as: governance, changes in rules, laws, etc.; changes in recommended or required management practices; capacity-building, including education and information flows; development of social networks, institutions, support groups; economic/financial, financial aid; incentives and disincentives.
Learning	Learning is the explicit process of challenging stakeholders' accepted wisdom and understanding through new information or knowledge. This is a fundamental objective of building human capital but there are different ways to achieve it. A favoured method is "social learning", defined as *"knowledge-sharing, joint learning and knowledge co-creation between diverse stakeholders around a shared purpose, taking learning and behavioural change beyond the individual to networks and systems."*
Learning environment or Learning culture	The process and structures used in RAPTA to enact the type of learning desired. Is the set of organizational values, processes, and practices that encourage individuals—and an organization as a whole—to change their way of thinking through; knowledge, competence, and performance or to learn.
Learning	Monitoring, Assessment, Learning, Knowledge Management – the final component of the RAPTA framework
Meta-indicators	Proposed indicators that report the outputs of the RAPTA assessment. These cover the extent of application of RAPTA, the quality of application, and summarise the resilience assessment, providing broad guidance on the types of actions or interventions that may be appropriate given the results of the assessment; quantifying the coverage of assessment to provide information on how widely RAPTA has been applied across the scales of interest; and the quality of the assessment to indicate the robustness and replicability of the process. The meta-indicators are proposed in O'Connell et al (2015)2. They are not dealt with in detail in this these guidelines because further work is required to develop them.

Multi-stakeholder Engagement	A (structured) process used to ensure participation on a specific issue and based on a set of principles, sometimes inspired by the rights-based approach to development (i.e. freedom of association, the right to participate in political processes and freedom of opinion, speech and expression). The process aims to ensure participatory equity, accountability and transparency and to develop partnerships and networks among different stakeholders. Specific tools and approaches can be found in UNDP (2006) and DiFD (2002).
Project cycle	The cycle of project development spanning inception, design, delivery or implementation and aftermath or legacy. This generic approach is more refined for GEF projects which include identification, design, implementation and impact legacy.
RAPTA	Resilience, Adaptation Pathways and Transformation Assessment (RAPTA) is an integrated assessment process to guide management and monitoring of complex social–ecological systems. It has broad application in supporting project planning and implementation for sustainable land management and other social–ecological systems.
Resilience	Resilience is a property of a social–ecological system. It refers the ability of a system to absorb shocks, such as drought, but reorganise so as to retain the same functions, structure, and feedbacks (ie the same identity). Resilience is neither good nor bad – a system could be in an undesirable state but still be resilient to shocks, such as, a grassland that has been invaded by unpalatable shrubs. This contested term has many other definitions, as discussed in the literature (e.g. Adger, 2000; Barrett & Constas, 2014; Manyena, 2006; Mastern et al., 1990; McCann, 2000).
Social–ecological system (SES)	Interacting system of ecosystems and human society with reciprocal feedback and interdependence. The concept emphasizes the humans-in-nature perspective.
Specified resilience	Resilience of particular parts of a system to identified disturbances "of what, to what?" i.e. where their potential future occurrence is known or suspected, though the timing and magnitude may be unknown.
Stakeholders	A stakeholder is any entity with a declared or conceivable interest or stake in a system. The range of relevant stakeholders to consider varies according to the complexity, issue, area and the type of intervention proposed. Stakeholders can be individuals, organizations or informal groups.
Stakeholder Analysis	A methodology used to understand stakeholders. It takes various forms but usually incorporates understanding four attributes: 1) the stakeholders' position on the issue;2) the level of influence (power) they hold; 3) the level of interest they have in the specific intervention; and, 4) the group/coalition to which they belong or are linked.
Sustainability and Sustainable Development	Sustainability is a contested term used in a "universalist sense" encompassing the notions that the planet and its people endure in perpetuity, while maintaining health, prosperity and well-being. This is commonly translated into a concept of three interdependent "pillars" of sustainability, i.e. maintaining environmental, social and economic health. Sustainable development is "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). There is increasing recognition that in order for human goals to be met, prerequisite ecosystem functions must be maintained.
System	See Social-Ecological System (SES)
Scenarios or Futures	Narratives that describes a possible future, by identifying characteristic features, significant events, actors and mechanisms. A set of scenarios that bracket the range of possible futures is a useful tool for examining the kinds of processes and dynamics that could lead to a SES developing along particular trajectories.
Threshold (aka critical transition)	The point at which a relatively small change or disturbance in external conditions causes a rapid change in an system.
Transformability	Transformability is the capacity for a system to be transformed to a different system. See Transformation.
Transformation	A system change to a new identity.
Transition	The course of the trajectory from one domain of a system to another, or from one kind of system to another (i.e. a transformational change).

B.2 RESILIENCE, ADAPTATION AND TRANSFORMATION – A ROUGH TAXONOMY OF TERMS USED DIFFERENTLY BY DIFFERENT COMMUNITIES OF PRACTICE

Different communities of practice use the terms resilience, adaptation and transformation differently, and this can lead to some dissonance.

A rough taxonomy of the use of these terms by some communities of practice is shown in Figure 22. The community of practice around social-ecological resilience has a clear definition around system identity (as defined by controlling variables, feedbacks and thresholds), and views the term "adaptation" as changes which maintain system identity even though the domain or "regime" may be different. A change to a different system identity is labelled a transformation. The system identity at a higher scale may be maintained by transformation at lower scale and thus the concepts are coherent within a multi-scale lens. Resilience is seen as a system property, neither good, nor bad.

Some communities of practice, especially those stemming from climate adaptation, use the terms differently. They interpret "maintenance of system identity" as "staying the same". Because the climate is changing, their view is that the ecological system "staying the same" is not within the realms of plausible options, and that therefore adaptation is the only way forward. There is no clear distinction of when the system changes and becomes a different one (transformation). There is more focus on trends and incremental change. The terms "incremental adaptation" and "transformational adaptation" are more recently used.

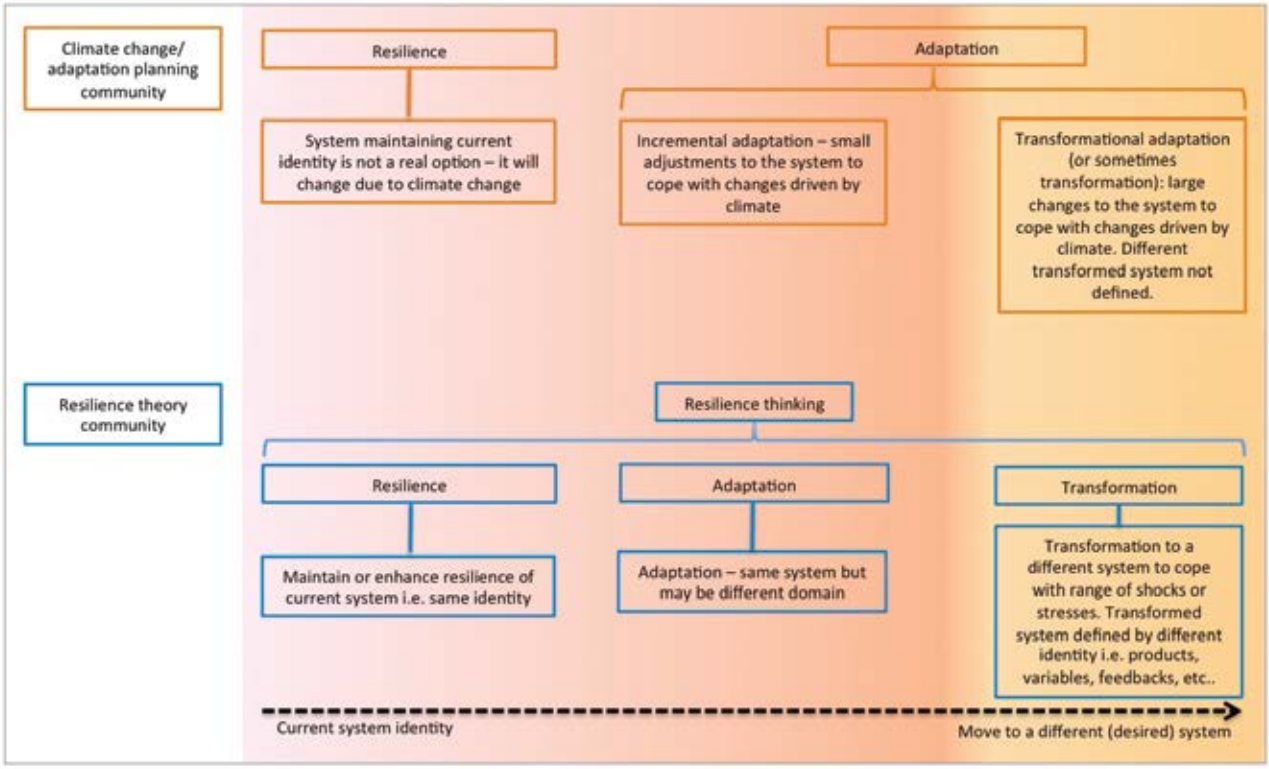


Figure 22 Perceptions of the concepts of Resilience, Adaptation and Transformation

B.3 STABILITY DOMAINS

The term "domain" is used to reflect the underlying concept that in any social–ecological system there can be multiple "stability domains". Each domain has a different set of functions, structure, feedbacks and identity. Domains are separated by thresholds that mark a critical change in feedbacks. Once a threshold is crossed the changes in feedbacks work to keep the system in the alternate domain. This is also known as "regime" in the resilience literature, but we have used the term "domain" in this report due to the negative connotations in the common usage of "regime".

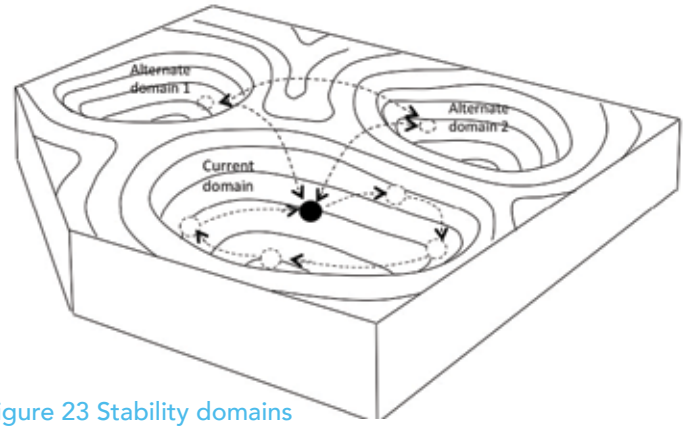


Figure 23 Stability domains

B.4 DECISION CONTEXT AND THE VALUES-KNOWLEDGE-RULES "LENS"

Decisions are always made within a particular context. One way to understand this is to use a Values-Knowledge-Rules "lens"[21]

To make a decision:

- you need some **knowledge** about the likely outcomes of decisions and interventions (Knowledge)
- enough people must **want** the outcome (Values)
- the decision must be **allowable** (Rules).

The prevailing set of Values, Knowledge and Rules defines the context in which decisions are made. The overlapping space in the middle metaphorically holds the options are that are available to a decision maker. It is relatively easy to make an intervention that falls within this space. When decisions are needed that are not consistent with the current decision context, interventions are needed to change the context.

Values, rules and knowledge interact with each other. Increased knowledge can drive changes in values, a shift in values can create social pressure to change the rules and a decision that had been blocked may become feasible.

Using the Values-Knowledge-Rules lens can enable you, and stakeholders to:

- articulate the *values, knowledge and rules* that decision makers use now
- identify how decision processes and options can be constrained by exclusion of certain forms of knowledge, values or rules
- recognize societal structures and processes that maintain constraints on decision-making
- develop strategies and agency to overcome these constraints.

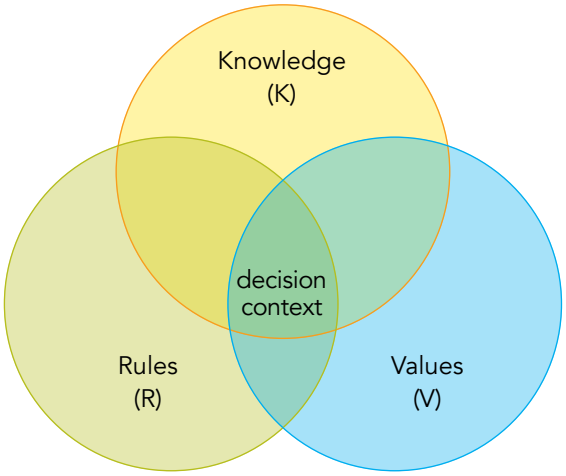


Figure 24 Values, Knowledge and Rules lens to characterize the decision context

21 Contributed by the Enabling Adaptation Pathways team at CSIRO Land and Water, based on Gorddard, R., Colloff, M.J., Wise, R.M., Ware, D., Dunlop, M., 2016. Values, rules and knowledge: Adaptation as change in the decision context. Environmental Science & Policy 57, 60–69. doi:10.1016/j.envsci.2015.12.004

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APPENDIX C
SUPPLEMENT TO SECTION 3.6. INTERVENTION OPTIONS AND PATHWAYS

HOW TO PROMOTE NEW WAYS OF THINKING

Encouraging stakeholders to think in new ways can be risky but the motivation for using risky techniques is that you have already identified strong benefits from transformation, or else a high likelihood of unwanted consequences without transformation. It is important to have local knowledge about the cultural context, because when a radical idea runs counter to current values, beliefs and knowledge, stakeholders can become alienated and resist change. You are in effect asking participants to risk their relationships with the rest of their society by departing from widely accepted beliefs, practices and norms. Simply telling stakeholders about the costs of not transforming is rarely effective. In general, participants need to come to recognize this for themselves, accept it, then be willing to explore radical options that may lie outside their current skills and knowledge and are not necessarily consistent with their cultural norms. A facilitator working in such circumstances needs a good understanding of local culture and practices, sensitivity to the feelings and beliefs of participants and a willingness to take risks, coupled with an ability to change the participatory approach according to participants' moods.

It is also important to understand the potential effects of an option on the distribution of benefits and costs. For example, a shift from the production of milk for domestic consumption to the commercial sale of meat animals can potentially reduce women's control over children's nutrition as well as make them more dependent on cashflow from their men. A shift from subsistence to cash cropping can have similar effects. Recognizing who will be winners and losers from change enables the project to consider how to make the transformation process fair.

Before exploring radical options, the multi-stakeholder engagement process should already be well-established and accepted, and the facilitator(s) trusted by participants. You can probe key processes of food production and system resilience and as before, question evidence and query assumptions. The emphasis should now be on seeking innovative options and moving away from habitual solutions to problems. It is not about incremental modification of current practices, but a jump away from them. This does not happen automatically and the facilitator should actively disrupt habitual thought patterns. It can be useful to change a common practice and then examine whether the consequences of doing so are necessarily bad. For example, you could ask what might happen if instead of trying to save most animals during a drought, the weakest are sold for slaughter, turned into blood and bone meal in a mobile processor and later fed to stock as a nutritional supplement. Many of these suggestions will be unwise, some will encounter resistance from those benefiting from the current system (often those with relative wealth or power), some options will be silly, but some will not, and the aim is to get enough radical ideas to increase the chances of some being fruitful.

WAYS TO IDENTIFY INTERVENTIONS THAT PREVENT THRESHOLDS BEING CROSSED

It is often difficult to identify thresholds before they are crossed. The Resilience Alliance has a database of thresholds which have been explored [22], and methods for estimating "thresholds of potential concern" before they are reached [23]. You can also use simple subjective probabilities to sequence interventions that prevent thresholds being crossed.

In this hypothetical example, controlling variables with thresholds A, B, C and D have been identified. All four are at risk of being driven across a threshold by a shock. An intervention option has been proposed for each to prevent this. You can use subjective or modelled estimates of the likelihood of each threshold being crossed within different time horizons to sequence the interventions according to their relative urgency. After examining the table below we would sequence the interventions in the order B, D, C, A.

22 Resilience Alliance and Santa Fe Institute. 2004. Thresholds and alternate states in ecological and social-ecological systems. Resilience Alliance. (Online.) URL: http://www.resalliance.org/index.php/thresholds_database.

23 For example, see VAN WILGEN, B., BIGGS, H., POTGIETER, A.. Fire management and research in the Kruger National Park, with suggestions on the detection of thresholds of potential concern. **Koedoe**, North America, 41, jul. 1998. Available at: <http://www.koedoe.co.za/index.php/koedoe/article/view/248>. Date accessed: 18 Dec. 2015.

In Section 2.5 you also explored linkages among the controlling variables. When connections are strong, crossing one threshold could cause others to be crossed, with severe consequences. These linkages also need to be considered when sequencing threshold-avoiding interventions.

Table 7 The subjective probability of when a threshold is likely to be crossed

	Time-horizon within which threshold may be crossed (years)			
Likelihood of crossing threshold	5	10	15	20
Unlikely	C	A		
Possible	D	C	A	
Likely	B	D	C	A

In a hypothetical system A might be soil depth, B the social network that underpins communal range management, C the minimal level of ground cover needed to regulate soil loss and D the minimum number of animals per household needed to sustain the community.

Examples of interventions that can reduce options

- Allowing traditional arrangements for cooperative management of land or water to lapse in favour of individualistic production.
- Adoption of a more productive cattle breed and allowing the decline of small-stock, camels and the traditional cattle breed.
- Building long-term fixed infrastructure rather than movable and adaptable constructions.
- Installing powerful pumps that make water available to some individuals but exceed long-term recharge rates and permanently lower the water table.
- Clearing trees to plant crops.
- Abandoning all traditional crop varieties in favour of high-yield hybrids.
- Becoming dependent on the vagaries of a small number of input or product markets at the expense of traditional bartering systems.

WAYS TO DEAL WITH POTENTIAL CONFLICTS BETWEEN INTERVENTIONS

An interactions matrix is a useful way to explore potential conflicts between interventions. Preferably stakeholders would be involved through the *Multi-Stakeholder Engagement and Governance Component*. Interventions are arrayed against each other on vertical and horizontal axes of the matrix, and in consultation with stakeholders, synergies or conflicts among interventions are noted in the cells of the matrix. For example, if interventions A and B are synergistic, note this in the green A / B box, but if they conflict, note this in the red B/A box.

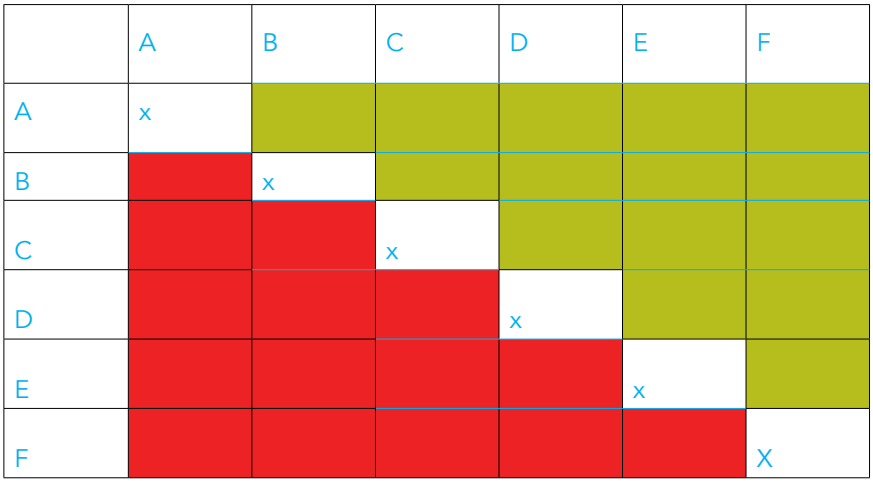

Figure 25 Matrix of interventions.

An example of a conflict is an intervention to pump groundwater for irrigated crop production that lowers water levels in wells. An example of a synergy is the integration of livestock and crop production that enhances soil fertility and improves livestock nutrition. The matrix is designed to show only direct interactions, but secondary and higher order effects should also be considered.

FACTORS THAT MAY HINDER IMPLEMENTATION

- Livestock inheritance rules.
- Drought relief policies that discourage farmers from producing a reliable supply of food.
- Unequal and unfair access to information, markets, resources, education and health services.
- Lack of treatment for a local animal disease.
- Poor infrastructure (transport, communications).
- Low capacity and education levels.
- Corruption.
- Lack of resource-use rights.
- Cultural sensitivity about tasks undertaken by women.

WAYS TO ESTIMATE BENEFITS AND COSTS OF PATHWAYS

Cost–benefit analysis is a common method for appraising development projects, policies or programs. Principles for guiding its use include:

- the analysis should compare net social benefits with and without the project, as well as before and after it, so an estimate is needed of the possible trajectory without the project;
- the cost–benefit analysis should be developed in close consultation with stakeholders through the *Multi-Stakeholder Engagement and Governance* component;
- benefits and costs are not usually distributed equally among households or between genders. It is important to show this in the analysis, and how that may change over time;
- benefits and costs can be economic, social or environmental and encompass a diversity of values, many of which are not amenable to monetization;
- many important benefits cannot be quantified – governance capacity for example. It is important not to assume that quantified benefits are automatically more important than qualitative ones.

We propose these additional principles when applying cost–benefit analysis to pathways:

- the pathway as a whole should have an expected net social benefit, but a net social loss may be acceptable during the early years provided the local community does not bear it;
- analyse only the first few years of a project, because subsequent uncertainty is likely to make a formal analysis misleading. This does not matter when only the first few years of the pathway will be funded initially. If the community does not achieve its goals with the first tranche of funding, we expect the pathway to be funded again until self-sufficiency is achieved;
- inevitably some interventions will not be implemented when planned and some new interventions will be implemented instead, so a generous amount needs to be allocated for contingencies;
- interventions are subject to great risk and uncertainty. Risk assessments are based on statistical data and the interactions of climatic with societal changes have not yet generated the statistical data we need to quantify risk in a conventional engineering way. Thus, it may be wiser to apply subjective probabilities than to use out dated statistics;
- systems subject to threshold changes can display very large and often irreversible changes in benefits and costs if thresholds are crossed. It is wise therefore to make clear and prominent statements within the cost–benefit document about the consequences of crossing a threshold.

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APPENDIX D LEARNING EXAMPLES

Table 8 Examples of potential Learning tools and methods

PRIMARY LEARNING OBJECTIVE	TOOLS/ METHODS	WHAT IS IT?	HOW DO YOU DO IT?
Accountability*	Interviews	• Interviews are structured discussions with people • They are very effective in capturing impacts that cannot be quantified, or only with difficulty • They also document processes that lead to impacts, by eliciting information about what aspects of a project worked or didn't, why, and how those led to positive (or negative) changes • Interviews are an effective method for helping produce qualitative (narrative) statements of impact.	• Interviews can be carried out one-to-one or in the form of group discussions or focus groups • Questions for interviews can be developed using the project Theory of Change as a guide. For example: "How has participating in the project influenced the productivity of your farm?" • Direct quotes from the interviews can be used as evidence to support your Theory of Change outcome and impact statements • Semi-quantitative measures of outcomes and impacts can also be collated. For example, "15 out of the 30 farmers interviewed (50%), stated that the project improved their sense of well-being".
Accountability*	Most Significant Change (MSC) stories	A qualitative, participatory methodology focused on capturing project participants' stories of significant change or impact.	• Involves collecting and documenting stories from a range of participants. • Each story represents the storyteller's interpretation of impact. • These stories are then collated and then reviewed and discussed by participants in a participatory, systematic and transparent manner. • This process leads to a collective agreement on what have been the most significant changes, or impacts, of a project or program.
	Success stories	• A narrative-based, qualitative technique that has been used extensively by international donor agencies and NGOs to demonstrate the non-quantifiable, non-monetized impacts of their programs and projects. • The primary aim of writing up these stories is to provide examples of good work that has led to positive changes in the eyes of the people affected by them. • In final form, Success Stories are similar to short, concise human interest stories published by newspapers and magazines.	• Success Stories focus on capturing and communicating positive impacts and experiences. • They involve writing short accounts that include a human interest angle to illustrate how a project has improved people's lives or made a difference in the host country and "results to back the claim to success" (USAID no date). • There are no specified data-collection method underpinning the development of Success Stories but interviews are mainly used.
	Monitoring Impact Pathways progress	• This method was used in a project which aimed to build a multi-stakeholder approach to climate adaptation in rural Indonesia • It uses indicators that are mapped against different parts and phases of the projects Impact Pathway	• The Impact Pathway (or a Theory of Change) is designed. • Indicators are developed focusing on measure changes along the impact pathway. • Interviews are carried out with the research team and other stakeholders at the project end, and interviewees were asked to give scores for the indicators.
LEARNING**	Rubrics	• These are effective for both accountability purposes (measuring outcomes and impacts) and for Learning and adaptive management (because they also focus on why things worked/aren't working).	

* Tools and methods that collate quantitative and/or qualitative evidence of progress towards project outcomes and/or impacts as outlined in the project *Theory of Change*.

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** Tools and methods that are well suited for capturing information around the "why?" (if the project is making progress, why is it? If not, why not?) and for using as a mechanism for reflection and *Learning* within the project team and with key stakeholders.

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