A Monitoring Instrument for Resilience

Working Paper No. 96

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

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1. Objective

This document describes a monitoring instrument for efficiently tracking changes in resilience in agricultural initiatives.

Operationalizing the concept of resilience (i.e. the ability to withstand change, stresses and shocks) poses significant challenges for project managers, particularly when required for performance reporting. This monitoring instrument aims to balance the demands for tracking and reporting changes in resilience with the scarcity of time and information typical of development initiatives. The instrument can be used to inform decisions on program planning and management where the program goal is to enhance the resilience of communities, to better manage ecosystem services, and to create positive and sustainable development impacts.

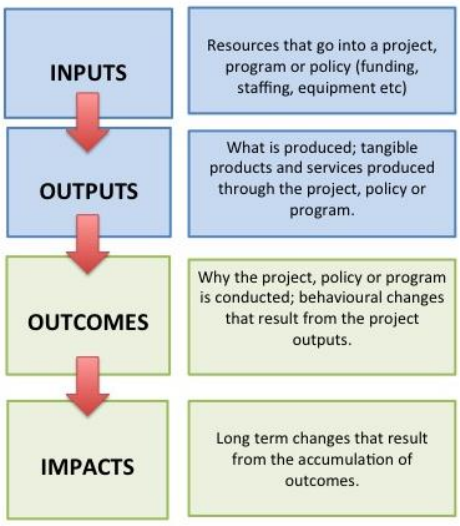
2. Background and approach

The investment in efforts to reduce vulnerability to change, stresses and shocks at various scales has been significant in recent years. In relation to climate change, this high level of investment is likely to continue into the future given both the change already 'locked' into the climate system and the limited success to date in stabilizing greenhouse gas emissions. As a result, stakeholders responsible for efforts to reduce vulnerability are increasingly interested in understanding the impact of these investments (Sanahuja 2011). More broadly, the aid effectiveness agenda has put considerable pressure on all sectors involved in development programming to empirically demonstrate their performance (GDPRD 2008). This paper describes a monitoring instrument that can track changes in resilience in agricultural systems, which will help in understanding how effective investments have been at building resilience.

The instrument offers a flexible process to support those wishing to track resilience and can accommodate the diverse meanings given to the related concepts of adaptive capacity and resilience, and the highly context-specific factors that enhance or reduce resilience. The instrument is also able to disentangle the contribution that ecosystem services make towards building resilience.

To be successful, the instrument must be embedded within the generic requirements of a monitoring and evaluation (M&E) system. The Theory of Change (TOC) is at the centre of many project-oriented M&E frameworks as it illustrates the expected contribution of project inputs towards the achievement of project impacts (Figure 1). Proposing a TOC will be a core requirement of the instrument proposed in this paper.

Figure 1. Theory of Change



(From Morra Imas, 2009 and GDPRD, 2010)

Note that while the TOC in Figure 1 illustrates the terms used in this paper, it must be recognised that this is a simplification given that change is seldom linear.

For the purposes of this monitoring instrument, a change in resilience is considered to be an outcome, rather than an impact. This is based on the argument that resilience is a useful predictor of relative impact (Brooks et al 2005, Brooks et al 2014) rather than an impact in itself; all else being equal, those systems with higher levels of resilience will be less impacted and recover faster when exposed to

change, stresses and shocks. It should be acknowledged that this offers a very linear interpretation of complex relationships between elements of the system that can vary significantly over time and space, including in their ability to attenuate impacts, and which in reality require an iterative approach to their management. However, the rationale that resilience is a predictor of such impacts is central to the logic of this monitoring instrument.

3. Overview of resilience and the related concept of adaptive capacity

The judicious use of indicators[1] is considered to be an important part of monitoring and evaluation efforts; enabling planners and practitioners to improve their efforts by adjusting processes and targets (UNFCCC 2010). However, indicators are only a single component of an M&E system and they need to be considered as part of the broader understanding of adaptation processes (Bours et al 2013).

The majority of investment into resilience to date has been in the context of climate change adaptation, so this investment offers a significant body of experience. Some reasons why the characterization of success from adaptation investments is difficult have been drawn from this experience, including the following (UNFCCC 2010):

- **The lack of agreed metrics**; as vulnerability is context and site-specific it is particularly difficult to find meaningful metrics that can be aggregated to national or global level (e.g. unlike mitigation which can be universally measured as CO2-eq).
- **The nature of adaptation**; adaptation can occur either proactively or in response to change, stresses and shocks, so both scenarios need to be accommodated in a performance framework.
- **The latency of resilience**; as resilience is a latent characteristic (i.e. it does not manifest itself prior to a change, stresses and shocks), it is difficult to be certain of the relative importance of the factors that underpin this characteristic.
- **The risk of unintended negative impacts**; referred to as 'maladaptation' in cases where an adaptation of an activity in one sector or area (e.g. coastal management) may have a negative impact in another (e.g. reducing the resilience of local fisheries).

The concept that best parallels resilience in climate change adaptation is adaptive capacity, so an understanding of the relationship between these concepts is necessary to establish an instrument that is applicable across the widest range of project contexts.

Adaptive capacity refers to the ability to adapt (Engle 2011) and useful distinctions have been made with the concept of 'coping capacity' to illustrate the concept. Adaptive capacity is generally considered to include characteristics that coping does not: permanence, transformation of structure, framework change and reform (Berman et al 2012). Adaptive capacity has parallels in sectors that pre-date a focus on climate change adaptation, such as in rural development, food security, disaster risk reduction and conservation. While these sectors typically have different institutions and fora to guide their management actions, there are potentially significant lessons that should be accommodated within a monitoring instrument.

Resilience was first used as a reflection of the "measure and persistence of systems and of their ability to absorb change and disturbance and still maintain the same relationships between populations and

[1] An indicator is a measure that is tracked systematically over time to signal important changes in a system, including progress towards an objective.

variables" (Holling 1973) with more recent interpretations adding concepts such as reorganisation, identity and feedback and the capacity to adapt and learn (Becken 2013). In the simplest terms, resilience refers to the ability to absorb and recover from change, stresses and shocks (e.g. extreme events), and it is in this form that we use the concept (Akter and Mallick 2013, Engle 2011).

There have been many efforts to operationalize these concepts within M&E frameworks. Our core requirements were that the instrument had to report on numbers of people with enhanced resilience, that it did indeed cover resilience rather than adaptive capacity, and that it includes ecosystem services that contribute to resilience. See Annex 1 for examples from others of resilience approaches and their coverage of the core requirements. Note that the DFID approach is the most comparable, but has a broader scope (focused on characterising hazard, resilience and human wellbeing impacts as opposed to just resilience) and offers a more complex approach to data collection and analysis (e.g. involving counterfactuals, control groups and use of normalised indices) (Brooks et al 2014).

One of the challenges of an approach based on resilience – or adaptive capacity – is the lack of consensus on the use of these concepts; the individual concepts are used in a variety of ways, at times contradictory (Gallopin 2006). There is a large degree of overlap in the concepts, with resilience more frequently used in some communities and adaptive capacity in others. Consistent with the approach recommended by Maru and colleagues (2014) in operationalizing a framework that links vulnerability and resilience in remote regions, this instrument accommodates both resilience and adaptive capacity, though the focus is on resilience. This requires that caution is taken to avoid areas of inconsistency. Awareness of such issues will help avoid challenges to the legitimacy of claims that are based on the application of the instrument, which may be particularly important given the vigorous way in which these words and their meanings continue to be debated.

Commonalities between adaptive capacity and resilience include:

- Both are latent characteristics (i.e. they only manifest themselves during (and after) change, stresses or shocks and impacts are unlikely to be measured in the absence of such a change, stresses or shocks) (Engle 2011).
- Both are locally-specific (i.e. their contribution to the minimisation of negative impacts is highly dependent on the local context, as with vulnerability) (Berman et al 2012).
- Both incorporate thinking around system transformation (Bennett et al 2014).
- Both are human centred (i.e. both concepts link people and ecosystems within complex adaptive systems) (Akter and Mallick 2013).

Discrepancies between adaptive capacity and resilience can include:

- More adaptive capacity is always better, but resilience can be good or bad (e.g. resilient pests) (Engle 2011).
- Adaptive capacity is a separate component from sensitivity in the IPCC vulnerability framework, while sensitivity is implicitly part of resilience (UNFCCC 2010).

4. Indicator dimensions and examples

The approach proposed within the instrument closely links Indicators of resilience to its operational definition: the ability to absorb and recover from the occurrence of change, stresses and shocks. The ultimate indicators measure the extent to which components of the system of interest are impacted and the speed of recovery of those components, in relation to the magnitude of the change, stresses or shocks. It is also important that the instrument is flexible enough to be used in varied contexts, and this is reflected in the indicator options. For example, where a project has a strong poverty angle, the

indicators could be the degree to which household assets and income are reduced by a shock and the speed by which they recover. If the focus is more at the crop plot level, perhaps one could track crop yield in relation to weather, or if the focus is at national levels, the impact of climate on GDP could be tracked.

Clearly, some variables are more resource intensive to regularly monitor, such as household income. Hence, the instrument proposes the use of proxy indicators to bring down resource requirements. Such proxy indicators will be linked to resilience, through the TOC. For example, if ecosystem-based variables are hypothesised to be key to resilience, then it is those that are selected from the 'menu' and tracked. The three indicator categories proposed below each have a 'menu' of sub-categories ("indicator dimensions") and within those there are indicator examples which are potential proxies – offering a hierarchy that links each indicator back to the locally relevant foundations of resilience through a well-defined TOC.

The proposed monitoring instrument has three indicator categories:

- **Capacity of people to adapt (People)**
- **Enhanced livelihoods and farm functioning (Livelihood and Farm Systems)**
- **Ecosystem services that foster resilience (Ecosystems)**

Nine indicator dimensions are proposed, falling into the above three categories (Table 1). A selection of these dimensions considered:

- Best practice principles for indicators for climate change adaptation;
- Characteristics of resilience;
- Sensitivity of the indicators to early change detection, such as behavioural and early-stage physical changes expected within a 5-10 year time frame.

Table 1. Hierarchy of proposed Indicators

Indicator Categories	Indicator Dimensions	Description
Increasing capacity of people to adapt	**1 - Awareness and knowledge of, and access to, locally relevant resilience-building approaches**	Level of farmer participation in awareness raising/training, demonstrated knowledge of practices that improve individual and household resilience, and/or access to practices
	2 - Commitment of leadership	Level of awareness of risks by leaders, and commitment to the planning and implementation of solutions
	3 - Capacity to learn and self-organise	Presence of processes that underpin innovation and learning
	4 - Engagement and responsive governance	Level of consultation across all relevant groups prior to decision-making and evidence of use of information from consultation
Enhanced livelihoods and farm functioning	**5 - Asset abundance**	Availability and access to human, physical and financial capital
	6 - Asset diversity	Diversity of human, physical and financial capital
	7 - Production efficiency	Indicator of inputs required per unit of production
Ecosystem services that foster resilience	**8 - Regulating Services**	Value of benefits associated with regulation of ecosystems based on ecosystem type and quality
	9 – Supporting, Provisioning and Cultural Services	Value of services, products and non-material benefits provided by ecosystems based on ecosystem type and quality

The remainder of this section offers the rationale for each indicator dimension and examples of indicators for each of the indicator dimensions. As will be explained in Section 5, users of this monitoring instrument do not have to be limited by these examples.

Indicator Category – Increasing capacity of people to adapt

INDICATOR DIMENSION	DESCRIPTION
1 - Awareness and knowledge of, and access to locally relevant resilience-building approaches	Level of farmer participation in awareness raising/training, demonstrated knowledge of practices that improve individual and household resilience, and access to practices

Rationale: Awareness and knowledge of relevant 'information and skills' is a common indicator for resilience particularly in the rural sector (Marshall et al 2010, Jones et al 2010). The rationale is that increased awareness or knowledge of an approach gives the farmer a broader toolkit from which to prepare a response to local change. This indicator dimension acknowledges that there is a continuum that begins with exposure to an idea (i.e. creating awareness) to the capacity to apply that idea in the local context (knowledge).

When selecting an indicator under this category, it is important that such awareness or knowledge relates to options that are both relevant and feasible in the local context, thus the phrase 'locally relevant'. In addition, demonstrated knowledge (i.e. observation of field application) should always be seen as a superior indicator to awareness (e.g. through participation in a workshop).

Indicator 1.1 – Number of people with increased awareness and knowledge of sustainable practices

Many projects identify specific practices which are expected to increase resilience of target groups, common for rural development programming and used by organisations such as the Global Donor Platform for Rural Development (GDPRD). An assessment of the distribution of decision-makers along the scale from awareness to adoption of these practices is a common approach to determine the success of the project.

An example from the GDPRD (2013) is '*Total number of farmers which had knowledge of a specified technology disseminated by the extension service.'*

Indicator 1.2 – Number of people who claim to have increased capacity to cope with risks

This is an Indicator of the confidence of the target group in being able to cope with experienced and perceived risks. This is useful to combine with Indicator 1.1 to determine if there is a correlation between the increased knowledge of resilience-building practices and reduced perceptions of risk.

An example from the GPDRD (2013) is "*Total number of farmers that are aware of relevant sustainable production practices*".

Indicator 1.3 – Number of people with improved hazard information

The level of awareness of reliable information on the likelihood of exposure to a given hazard may improve the resilience of a community or household.

Example: *Access to specific information services such as drought forecasts, cyclone warnings, ENSO Index or other early warning systems* (such as in DFID's ICF – Brooks et al 2014).

INDICATOR DIMENSION	DESCRIPTION
2 - Commitment of leadership	Level of awareness of risks by leaders, and commitment to the planning and implementation of solutions.

Rationale: Without diminishing the importance of local self-organisation, leadership can be an important component of resilience, and is often accompanied with allocation of resources for

assessment of risks and their management (Ford and King 2013). The 'political momentum' associated with such leadership can also offer the community access to a broader network of support, but it should be noted that such political momentum can be short lived.

Indicator 2.1 – Number of people familiar with national, subnational or landscape-level visions, strategies or plans that address sustainability

This Indicator acknowledges that adaptive capacity is influenced by the presence and quality of long-term visions and strategies at differing scales. A number of adaptation monitoring and evaluation frameworks use a comparable approach for institutional assessments.

Indicator 2.2 – Number of people in area covered by a sustainable management plan

This Indicator is an acknowledgement that planning that is consistent with the principles of sustainable development influence adaptive capacity. This may include initiatives involving certification, zoning and protected area management strategies.

This requires the development of a list of planning initiatives that are considered 'sustainable management'. As an example, USAID's Sustainable Landscape Programme (SLP) includes an indicator: *Number of biological significant hectares under improved Sustainable Natural Resource Management (SNRM) and # of regulations, policies and plans for SNRM.*

INDICATOR DIMENSION	DESCRIPTION
3 - Capacity to learn and self-organise	Presence of processes that underpin innovation and learning

Rationale: Even without well-defined internal or external leadership, a community may have characteristics that help facilitate effective self-organisation for both preparation and response to change, stresses and shocks (Marshall et al 2010, Jones et al 2010, Smit and Wandel 2006). Limitations may include greater difficulty in mobilising external support (e.g. if donors will only work directly with national-level governments), but greater local influence over local decision-making (i.e. independent of the priorities of external donors).

Indicator 3.1 – Number of people interacting with information sharing mechanisms

This Indicator acknowledges that an important part of behavioural change is the existence of mechanisms to deliver appropriate information to inform decisions of target groups. This can include government/private extension services, private, sectoral organisations and project-level engagement processes that are suitable for sharing information on resilience-building practices.

An example may be: *# of people who are receiving farmer advisories through cell phones.*

Indicator 3.2 – Number of people participating in rural development organisations, including informal groups.

In addition to the presence of mechanisms for information sharing, it is important to examine the level of engagement with those information-sharing mechanisms. This is a reflection of perceived trust, affordability and utility of those mechanisms.

An example may be: *the # of people who are members of a local agricultural cooperative.*

INDICATOR DIMENSION	DESCRIPTION
4 - Engagement and responsive governance	Level of consultation across all relevant groups prior to decision-making and evidence of use of information from consultation

Rationale: While leadership is important, the extent to which political commitments are derived from a conversation with the local communities is as important (Brooks et al 2005, Ford and King 2013, Jones et al 2010). There should also be translation of collaboratively identified needs into regulation and/or support programs.

Indicator 4.1 – Number of people participating in local planning exercises

The depth of engagement in a planning exercise can be a reflection of legitimacy and such legitimacy is an important part of adaptive capacity. This is a common Indicator in the characterisation of adaptive capacity, as seen within ACCRA (CDKN 2012).

Indicator 4.2 – Number of people with positive perceptions of government accountability and transparency

The level of trust in the government and other relevant institutions can be a reflection of the willingness to follow guidance delivered through these sources. Support through the democratic process (i.e. proportion of votes) is an example of this indicator.

Indicator Category – Enhanced livelihoods and farm functioning

INDICATOR DIMENSION	DESCRIPTION
5 - Asset abundance	Availability and access to human, physical and financial capital

Rationale: Even with all of the conditions described above, the resilience of a community may be limited by the availability of local human, physical and financial capital necessary for an appropriate response to change, stresses and shocks (Jones et al 2010, Marshall et al 2010). Without such capital, ideas can generally not be transformed into effective action.

Indicator 5.1 – Number of people able to participate in the workforce

The availability of human labour for production and associated activities is considered an important part of adaptive capacity, reflected through its use in a number of monitoring frameworks, including the Adaptive Capacity Wheel (see Annex 1).

Indicator 5.2 – Number of people accessing financial services

The access to appropriate financial services is considered an important part of the Sustainable Livelihoods Framework and also an element of adaptive capacity within monitoring frameworks. The framework used by Ford and King (2013) includes this indicator, as does the Adaptive Capacity Wheel (Gupta et al 2012).

An example from the Output Indicator Clusters under DFID's ICF program includes*: # of people accessing financial insurance services or savings groups.*

Indicator 5.3 – Number of people accessing market services

The capacity of farmers to access reliable market services can help them prepare for changes, stresses or shocks and is particularly important when dealing with non-local markets.
An example from the GDPRD is *the number of farmers which are aware of market prices.*

Indicator 5.4 – Number of people with increased farm asset base

There are a number of accepted proxies for household wealth that are in common use in rural development programming. These indicators can be considered part of adaptive capacity and include:

- Number of livestock
- Landholding size
- Land tenure status
- Distance to markets
- Security of land tenure

INDICATOR DIMENSION	DESCRIPTION
6 - Asset diversity	Diversity of human, physical and financial capital

Rationale: It is generally acknowledged that in contexts of high uncertainty, dependence on a single asset is a high risk/low resilience strategy (Wilby and Dessai 2010) so a diversity of assets is preferable and can boost resilience.

Indicator 6.1 – Number of people with new on-farm/off-farm income streams

This indicator acknowledges the role of different kinds of income streams in ensuring continued food access. Each income stream will have a level of sensitivity to change, stresses and shock based on the strength of its relationship with the parameters of those change, stresses and shocks. For example, those income streams which are less sensitive to climate variability will help to enable continued food access through climate shocks. The climate sensitivity element is used as an indicator in the Climate-Smart Agriculture (CSA) program. An example from DFID's ICF is *# of jobs from adaptation/resilience opportunities*.

Indicator 6.2 – Number of people with increased number of farm enterprises (non-financial)

This complements 6.1 by offering an Indicator of the diversity of 'things that are grown' rather than income streams. This is important in that it can distinguish between subsistence and income-generating opportunities and also stability of food access in the case of problems with formal supply chains.

INDICATOR DIMENSION	DESCRIPTION
7 - Production efficiency	Indicator of inputs required per unit of production.

Rationale: Increasing on-farm productivity can reduce the intensity of required inputs and lead to increased incomes (Marshall et al 2010). However, such improvements can be associated with expansion of production areas, and methods to assess whether such expansion undermines environmental objectives should be considered as a complementary indicator.

Indicator 7.1 – Number of people with increased efficiency of water use/product unit

This indicator is based on the assumption that more efficient use of water will make such resources available for other purposes, reduce operating costs and/or reduce sensitivity to water scarcity. As with all indicators under this indicator category, this involves the specification of a product unit that is applicable to the local operation.

An example from DFID's ICF is *the change in water use efficiency.*

Indicator 7.2 – Number of people with increased efficiency of land/product unit

This indicator is based on the assumption that more efficient use of land will make such resources available for other purposes, including for increased production or provision of ecosystem services under categories 9 and 10. This is an important component of sustainable intensification.

An example from USAID's SLP is: *% increase in yield/hectare as a result of improved production and management techniques.*

Indicator 7.3 – Number of people with increased efficiency of nutrient/product unit

This indicator is based on the assumption that more efficient use of fertiliser will make such resources available for other purposes, reduce pressure on local ecosystems, or reduce operating costs.

Indicator 7.4 – Number of people with increased efficiency of labour/product unit.

As with other indicators within this category, this indicator is based on the assumption that more efficient use of human resources will make such resources available for other purposes (either within the operation or within the broader community) and reduce operating costs. However, the impact of mechanisation on local employment is also a consideration.

Indicator Category – Ecosystem services that foster resilience

INDICATOR DIMENSION	DESCRIPTION
8 - Regulating Services	Value of benefits associated with regulation of ecosystems based on ecosystem type and quality.

Rationale: It is acknowledged that ecosystem services can play a significant role in increasing resilience of an agricultural system (Marshall et al 2010, Hannah et al 2013, Brussard et al 2010). As it is not practical to undertake detailed valuation exercises for each of the project sites, it is proposed that the valuation for each indicator is based on per-hectare benchmarks from literature, matched against the local context by using higher and lower bounds. In this category, access refers to whether the service is directly or indirectly benefitting each member of the community. It should also be noted that while it is common to quantify ecosystem services in terms of economic value, it is not compulsory under the instrument. Indicators such as '*number of people receiving improved water regulation services*' would be legitimate.

Indicator 8.1 – Number of people with access to higher value water regulation services

Water regulation services relate to the ecosystems capacity to reduce the impact of changes to quantity (including flooding and drought events) and quality (through the uptake of nutrients and

other pollutants). This can include the role for vegetation in erosion control in the context of rural development, the preservation or construction of wetlands etc.

Indicator 8.2 – Number of people with access to higher value climate regulation services

For purposes of adaptation, climate regulation principally involves impacts to the local microclimate. It is suggested that carbon sequestration services are not included in this category as the benefits are not local unless they are monetised locally (e.g. through participation in a REDD program), in which case they will be accommodated through indicator 6.1 as an income stream.

Indicator 8.3 – Number of people with access to higher value of pollination services

There is evidence that access to local pollination services can have a quantifiable impact on productivity in some contexts and changes to the ecosystem can affect the distribution, abundance and effectiveness of pollinators.

Indicator 8.4 – Number of people with access to higher value pest and predator control services

There is evidence that ecosystems can help to reduce losses from pests and predators.

INDICATOR DIMENSION	DESCRIPTION
9 – Supporting, Provisioning and Cultural Services	Value of services, products and non-material benefits provided by ecosystems, based on ecosystem type and quality.

Indicator 9.1 – Number of people with access to higher value soil formation services

This is an important, indirect ecosystem service related to rural development, and a framework that accommodates its value will be better able to consider trade-offs and synergies, including the value of soil loss.

Examples include areas with improve erosion management systems in place.

Indicator 9.2 – Number of people with access to higher value nutrient cycling services

This refers to the storage, internal cycling, processing and acquisition of nutrients, in particular N and P. This is an important, indirect ecosystem service related to rural development, and a monitoring instrument that accommodates its value will be better able to consider trade-offs and synergies. An important consideration for this indicator is that some modelling estimates the value of nutrient cycling as far in excess of food production so a focus on local service value is appropriate.

5. 'How To' – Guide for project managers

This section describes the basic steps that each project manager should follow as part of the application of the instrument. This 6-step process is designed to be compatible with whatever tools are currently being applied within the project to collect performance data. On completion of this process, the project manager will be able to confidently make a defensible statement on project performance, such as:

As a result of participation in Project A between year B and year C, 500,000 people in geographic area D have increased their resilience by increasing their awareness of relevant adaptation option E, F and G.

The following are the specific steps involved:

STEP 1. Develop the Theory of Change (TOC)

The TOC must adequately describe the activities that are expected to build resilience, and how this is expected to reduce impact from change, stresses and shocks. The TOC should also reflect the relationships amongst the various stakeholders.

The TOC should clearly describe the inter-relationships between indicators and related time dependency or temporal dimensions (e.g. improvements under indicator A should happen first before improvements under indicator B can take place etc.). The TOC should also capture potential trade-offs between different aspects of resilience that can be affected.

The TOC is necessarily diverse in terms of process and format; they typically reflect the perspectives of a range of participants, the context and type of the intervention, and the purpose for which the theory of change has been developed. To guide TOC establishment, DFID (Vogel and Stephenson 2012) have established a checklist, which has been refined to accommodate the issues of resilience and adaptive capacity as follows:

CHECKLIST 1 – Preparing a Theory of Change to Accommodate Resilience

1. **Analysis of the context**
- Does the theory of change make sense as a response to analysis of the context, the problem and the key factors that constitute resilience in the local context?
- Is there one statement that sums up the theory of change?

2. **Clear Hypotheses of Change**
- Are causal pathways well mapped in a diagram? i.e. In detail - including intermediate outcomes?
- No missing links?
- Conceptually clear - no congested boxes containing several inputs, outputs, outcomes or causal links all lumped together?
- Presenting the specifics of this research activity rather than just a generic type of intervention?
- Are the beneficiaries of the research activity well defined?
- Are assumptions made explicit (in the diagram or text) - about the causal links? Implementation? Context and external factors? The homogeneity of people within the system?
- Does the narrative highlight and describe the overall logic of the intervention and the key hypotheses which the programme is based on?

3. **Assessment of the Evidence**
- Is there a narrative assessment of the evidence for each key hypothesis?
- Is the strength of the evidence assessed?
- Does the assessment make sense given the evidence referred to?

4. **Other**
- Is the theory of change and other project documentation consistent?

If all of these conditions can be met, then it is appropriate to move to Step 2.

STEP 2. Select or create 3-5 Indicators

These indicators must:

- Be in the format: "*# of people with" awareness/knowledge/access to/use of/participation in…….*
- Be consistent with an indicator dimension under each of the three indicator categories.
- Include a short rationale for each indicator selected; and
- Satisfy the requirements of Checklist 2.

CHECKLIST 2 – Selecting Indicators to Accommodate Resilience

1 – Link to Theory of Change (TOC)

- Is the relationship between the indicator and the TOC clear?

2 – Appropriate Temporal and Spatial Scales

- Is it clear which scale the indicator is working at? (i.e. household, community, landscape, institutional and national).
- Is change in the indictor expected over the project cycle (even in the absence of a shock?)

3 – Applicability of Thresholds

- Are there thresholds that can be considered for the indicator?
- Will such thresholds be linked to a specific management decision?

4 - Efficiency

- Can the indicator make appropriate use of secondary data?
- Is a more efficient proxy indicator available*?*

5 – Double-counting

- Is there a strong causal relationship between this and any of the other indicators selected?
- Can the risk of double-counting be removed by using an alternative indicator?

6 - Learning and Knowledge

- Can progress against this indicator be validated through more rigorous approach?
- Does the indicator facilitate social learning, including flexibility for updating of indicators?

STEP 3. Method selection

The method for data collection should be clear for each indicator (i.e. preferably through the application of an existing tool involving survey, physical assessment or by project officer judgements) – This involves a detailed description or reference to the Method Column in Table 2.

Table 2 – The Monitoring Instrument Pro Forma

	Project Name:				
Indicator Categories	**Indicator Dimension**	**Indicator**	**Methods**	**Performance (Baseline) - # of people, date**	**Performance (Year x) - # of people, date**
1.People					
2.Farm Systems					
3.Ecosystem					
4……					
5……					
# of people					
Change in # of people (+ve or –ve)					

Where possible, opportunities to involve the beneficiaries of the project in the indicator selection process should be sought. Such approaches can greatly improve the legitimacy of the indicators.

STEP 4. Establish a baseline figure

This should be undertaken by using the "method" described in Table 2 for "# of people – baseline" for each indicator. Be explicit about whether the numbers of people on the different indicators are different people or the same people (i.e. whether the indicator numbers are additive or not).

STEP 5. Establish progress against baseline

By reapplying the method for each indicator, establish change from the baseline. Be explicit about whether the numbers of people on the different indicators are different people or the same people (i.e. whether the indicator numbers are additive or not).

STEP 6. Prepare statement of change

Following the completion of Table 2, a statement should be formed on the number of people that have experienced changes relevant to the IDOs.

> i.e.: "*2,500 people have improved resilience in the city of Brisbane based on increased knowledge of adaptation options from the Brisbane City adaptation project over 2010-2015*".

The wealth of experience on both indicator use and characterisation of adaptive capacity in the last 20 years has yielded a number of lessons that can guide careful selection and use of such information. Most importantly, it is not possible to develop a perfect indicator set applicable in all contexts and so the examples presented in Section 4 should be considered as an illustration of practical application of each indicator category rather than a definitive list.

Finally, while it is important that users of this tool are aware that there are a number of challenges associated with the quantification and aggregation of resilience 'performance', they should be reassured with the suggestion by Levine (2014) that linking existing good practice around analysis, assessment and monitoring to well defined decision needs will resolve many of these challenges; It is not necessary to 'reinvent the wheel' of M&E for use in the context of resilience.

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Annex 1. Review of adaptive capacity and resilience performance frameworks

As the concepts of resilience and adaptive capacity become more prominent in development planning, there is a rapidly growing body of work on the tracking of project performance in these areas; offering a timely opportunity to learn from the experiences of others (Table 3). However, the work to date is largely at the conceptual level with very little work conducted testing different approaches.

Table 3. Review of frameworks and tools for tracking resilience and adaptive capacity

Framework/Tool	Core Characteristics of Desired Instrument				Notes
	Reports on numbers of people with enhanced resilience or adaptive capacity	Covers resilience	Covers adaptive capacity	Considers ecosystem service contribution	
International Climate Fund, DFID (Brooks et al 2014)	✓	✓	-	✓	Uses changes in human wellbeing as impact indicators, and includes aggregable figures on # of people.
IFAD (Lagenda 2014)	-	✓	-	-	Recommends approaches that make use of indices and also the IFAD Multi-dimensional Poverty Assessment tool (MPAT) survey in context of resilience.
Local Adaptive Capacity Framework for ACCRA (CDKN 2012)	-	-	✓	✓	Heavily focused on local utility. Attempts to incorporate the intangible and dynamic dimensions of adaptive capacity, as well as capital and resource-based components.
Climate Smart Agriculture (FAO 2013)	✓	✓	-	-	Includes consideration of mitigation issues (i.e. not just adaptation).
Tracking Adaptive Capacity (TRAC) for GIZ (Okumu 2013)	-		✓	✓	Developed for application within the insurance industry. Applies a flexible participatory methodology – potentially more useful in detailed evaluation studies.
Global Donor Platform for Rural Development (GDPRD 2008)	✓	✓	-	-	Applies a pool of 86 indicators, 19 of which are priority indicators.

While there are elements in each of these frameworks that are relevant to the needs for tracking adaptive capacity and resilience, there are no 'off the shelf' options that are truly comprehensive; typically they cover either resilience or adaptive capacity (i.e. not both) and few offer aggregable results in terms of 'number of people', a metric often required by senior managers, and national and global policy makers.

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