ADAPTATION AND RESILIENCE LEARNING FROM THE KENYA STARCK+ PROGRAMME

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StARCK+

Strengthening Adaptation and Resilience to Climate Change in Kenya Plus

CONTENTS

ACKNOWLEDGMENTS

As part of its learning mandate, DAI contracted Garama 3C Ltd to undertake a 30-day learning assignment between September and December 2016, with a focus on adaptation and resilience, across the StARCK+ portfolio (i.e. across all six StARCK+ components). This report is the outcome of that learning assignment, which was undertaken by Nick Brooks (the Consultant).

The Consultant was accompanied in the field variously by Joab Osumba, Nancy Omolo and Noelle O'Brien from the StARCK+ programme, who facilitated the fieldwork in general and provided valuable contextual information. In this report, the 'learning team' refers to the Consultant and the relevant accompanying StARCK+ colleague. Individual field visits were arranged by the StARCK+ partners responsible for managing the relevant programme components. Staff from the StARCK+ partners and their local partner organisations accompanied the learning team on specific site visits. The Consultant would like to express thanks to these colleagues, and to programme beneficiaries, who accommodated a number of field visits and added value to the learning exercise. Thanks are also due to colleagues from the StARCK+ management team and the programme partners who provided feedback on drafts of this report, suggested additions, and corrected errors. Any errors that remain are the responsibility of the Consultant.

EXECUTIVE SUMMARY

This report details the results of a learning assignment conducted for the Strengthening Adaptation and Resilience to Climate Change in Kenya Plus (StARCK+) programme (2013-2017), funded under the UK's International Climate Fund (ICF) through the Department for International Development (DFID). StARCK+ aims to support adaptation and resilience to climate change in Kenya, via the scaling up of private sector innovation and investment in low carbon and adaptation products, services and assets, and through support to civil society and technical support to the Government of Kenya.

Four components of StARCK+ support individual organisations and private sector entities to deliver resilience and adaptation results on the ground. ACT! Seeks to achieve this by working with local communities and organisations, while KCIC and REACT seek to support climate friendly practices, products and business through partnerships with individual private enterprises. The Climate Smart Agriculture (CSA) component of FICCF is promoting the commercialisation of climate-resilient crops in Western Kenya. Between them, these components support 56 separate initiatives focused on resilience and adaptation.

Some two thirds of these initiatives involve activities that directly address, or are likely to improve resilience to, historically familiar climate variability and related hazards, and thus represent good practice regardless of climate change. An example is the on-farm processing of fruit using solar driers supported by KCIC in partnership with Azuri, which increases storage times, reduces wastage, and adds value. Another is the use of post-harvest storage bags, supported by REACT in partnership with Bell Industries, which reduces post-harvest losses and improves food security and incomes. Most of these initiatives have the potential to improve resilience to emerging or anticipated changes in climate as well as historical variability. However, only a handful of initiatives include activities that can be said to directly target the impacts of climate change. These include measures such as short-cycle crops to adapt to shorter growing seasons, supported by ACT! in partnership with HAK and MAZIDO. Some initiatives have the potential to deliver benefits through transformational adaptation, in which practices or systems that are failing because of climate change are replaced with new ones better suited to new climatic conditions. The most prominent example of this is the Tosheka initiative (supported by REACT) that supports farmers in Makueni to raise caterpillars for silk production based on the indigenous, drought resistant castor plant. This provides an alternative to cotton production which has been practiced historically, but which has become less productive as rainfall variability has increased.

About a third of the 56 initiatives across ACT!, KCIC, REACT and FICCF-CSA focus on capacity building, policy influencing, and general livelihood strengthening through measures that do not address climate risks but instead focus on productivity and market access (e.g. Nyangora banana processing supported by ACT!). These activities do not, in themselves, deliver improved resilience or adaptation; for this to occur, capacity needs to be translated into action, policies need to be well-designed and effectively implemented, and increased incomes need to be invested in resilience and adaptation actions. Nonetheless, these initiatives are important as they create the conditions in which resilience can be enhanced and adaptation pursued.

The FICCF-CSA initiatives around cassava and sorghum may be viewed as transformational adaptation, as they are creating new value chains around drought-resistant crops that, while they have been grown locally for many years, have not been produced commercially. These are replacing, or have the potential to replace, less drought-tolerant crops, principally maize and barley. The FICCF dairy initiative is likely to improve the resilience of input chains through a transition to higher nutrient, high-fibre grasses and legumes that are more drought resistant than fodder maize.

The County Adaptation Funds (CAFs) and associated activities supported by ADA, and TA to the Government of Kenya, play a critical role in the creation of enabling environments. These components work to mainstream climate change into governance, planning and budgeting at the national and county levels. The Isiolo CAF is a striking example of where an enabling environment created by changes in governance at the national and county levels (decentralisation and the establishment of county-level adaptation governance mechanisms) has led to increased resilience on the ground, by placing governance of natural resources in the hands of pastoralist communities and backing this up with policies and legislation that empower these communities to enforce regulations around natural resource management. This represents a major 'transformational' impact of the StARCK+ programme that delivers resilience benefits through qualitative changes in governance at large spatial scales (i.e. county-wide, for multiple counties).

The following general lessons can be drawn from the learning around the StARCK+ activities:

1. The StARCK+ portfolio appears to be delivering considerable benefits in terms of capacity development, the creation of enabling environments, the delivery of livelihood benefits, and improvements in resilience and adaptation at the local level. This is being achieved through partnerships with community organisations, government, non-state actors, and the private sector. A key factor in StARCK+'s success has been its 'embeddedness' in the national and sub-national contexts, and its strong partnerships with a variety of stakeholders at multiple scales, including local organisations that already had good relations with beneficiary communities and other partners. The management of programme components and projects by Kenyan organisations, and the building on these organisations' existing activities, has helped deliver results on the ground.

2. StARCK+ provides an excellent opportunity for further learning regarding the relationship between resilience to historical climate variability and adaptation to climate change. Some two thirds of the initiatives supported on the ground by StARCK+ include measures to make people more resilient to risks that exist in the absence of climate change, that coincidentally also have the potential to directly help people cope better with climate change impacts. However, only a handful can be said to explicitly and deliberately target the impacts of climate change. Screening of initiatives to determine whether they identify and address specific climate change impacts could improve the effectiveness of adaptation interventions.

3. StARCK+ provides useful examples of how to channel adaptation finance via the private sector, and a number of its private sector initiatives appear to be delivering real resilience and adaptation benefits (e.g. FICCF-CSA, Tosheka), with more delivering general livelihood benefits that are likely to increase resilience. The private sector can support adaptation by developing value chains based on climate-resilient production, and support transitions to such production through mechanisms such as contract farming that enable private firms to deliver necessary inputs to producers (including the poor and vulnerable), and cover the costs of these through sales following aggregation or processing. Tosheka is an excellent example of private-sector led adaptation.

4. Private sector value chain development needs to be complemented by wider support for the development of markets in climate-resilient commodities and their derivatives, through appropriate policy environments. Much of the adaptation observed across the StARCK+ portfolio has been driven as much by markets as by climate change impacts.

5. The County Adaptation Funds represent novel mechanisms for the delivery of decentralised climate finance to local communities, who can use these funds to prioritise adaptation and resilience investments through participatory processes, based on predictable budgets. This approach appears to be delivering real resilience benefits and could be emulated widely elsewhere within and outside of Kenya.

6. More needs to be done to improve the availability of locally relevant climate information, including observational records. This is necessary to understand whether innovations on the ground really represent adaptation to (experienced) climate change, and to address contradictory narratives about observed changes in climatic conditions and extremes from different stakeholders. There is a tendency among stakeholders to ascribe changes in environmental conditions to climate change, and to describe changes in livelihood practices in terms of adaptation, even where the justification for this is questionable.

7. Renewable energy initiatives often have ancillary adaptation and resilience benefits, such as: allowing the more efficient rearing of chicks in association with the installation of jikos; the improvement of soil quality through the addition of slurry produced by biogas digesters; and reductions in deforestation that slow erosion, maintain ecosystem health, sustain groundwater resources, and reduce flood risk.

8. However, more needs to be done to ensure that adaptation and mitigation are complementary. While renewable energy initiatives often have positive resilience benefits, instances were observed in which resilience and adaptation initiatives led to greater use of non-renewable energy, including diesel generators for preserving fish, and the use of fuel wood for on-farm processing of crops (which also resulted in exposure to indoor air pollution). Resilience and adaptation initiatives should be screened to assess their potential impacts on energy use, emissions and health. These initiatives should mainstream low-carbon development better than they appear to be doing at present.

9. Adaptation and resilience results are currently captured by reporting the number of people supported to cope with the effects of climate change, against International Climate Fund (ICF) Key Performance Indicator (KPI) 1. This measures project and programme outputs, and there is no guarantee that support will translate into resilience or adaptation outcomes. These outcomes might be captured by assessing the numbers of people receiving support, emulating those receiving support, or otherwise influenced by an intervention, whose behaviour or circumstances change in a way that makes them more resilient to climate variability and change, as mandated by ICF KPI 4 (numbers of people with improved resilience as a result of support). This would involve identifying and tracking the factors that help people anticipate, avoid, plan for, cope with, recover from and adapt to evolving climate stresses and shocks, through the use of participatory and other processes. Indicators of resilience might include access to certain assets and resources, and the extent to which people have taken up and sustained practices supported by interventions.

10. Reporting of the more systemic impacts of StARCK+ can be captured by the ICF KPIs on climate change mainstreaming (KPI 13) and transformational change (KPI 15), applied at the programme level, with reference to the national and county scales. The ICF indicator on institutional knowledge (KPI 14) is not appropriate for StARCK+ programme-level reporting, as it address knowledge within individual institutions that cannot realistically be generalised across the programme.

1. BACKGROUND TO THIS REPORT

1.1 STRUCTURE AND COMPONENTS OF THE STARCK+ PROGRAMME

The Strengthening Adaptation and Resilience to Climate Change in Kenya Plus (StARCK+) programme (2013-2017), funded under the UK's International Climate Fund (ICF), aims to support adaptation and resilience to climate change in Kenya, via the scaling up of private sector innovation and investment in low carbon and adaptation products, services and assets, and through support to civil society and technical support to the Government of Kenya. StARCK+ results are delivered through the following six components:

(i) Funding to the REACT window of the African Enterprise Challenge Fund (AECF);
(ii) Funding to the Kenya Climate Innovation Centre (KCIC);
(iii) Support to civil society through Act, Change, Transform! (ACT!);
(iv) Supporting the development of County Adaptation Funds (CAFs);
(v) The Finance Innovation for Climate Change Fund (FICCF);
(vi) Technical Assistance (TA) to the Government of Kenya (GoK) for the development and implementation of Kenya's National Climate Change Action Plan (NCCAP).

Component (i) will be managed by KPMG until April 2017, after which it will transfer to AGRA AECF.

Component (ii) was originally an initiative of the World Bank's Climate Technology Program, infoDev, and was initially managed by a consortium led by PWC; this has evolved into a Kenyan organisation funded by the United Kingdom's UKAid and the Danish Ministry of Foreign Affairs.

Components (i) and (ii) consist of finance for the private sector (grant and/or repayable grants).

Component (iii) is a Kenyan not-for-profit, non-governmental organisation which has mainstreamed climate change into their Environment and Natural Resources Management Programme. ACT! provides grants to civil society organisations.

Component (iv) is managed by the Adaptation Consortium (ADA), consisting of Christian Aid, ADS-Eastern (in Kitui and Makueni), the International Institute for Environment and Development (IIED) with RAP (in Isiolo), WomanKind Kenya (in Garissa), Arid Lands Development Focus (ALDEF) (in Wajir), the UK Meteorological Office (UKMO), and the Kenya Meteorological Department (KMD).

Components (v) and (vi) are being delivered by the DMI consortium, comprising DAI, Matrix Development Consultants and the International Institute for Sustainable Development (IISD).

The FICCF provides grants to Climate Care, the Kenya Association of Manufacturers (KAM), the United Nations (UN), and a number of microfinance institutions involved in a climate smart agriculture (CSA) initiative (ECLOF, Inuka, Century, Rafiki). ACRE provides weather information via SMS under the FICCF-CSA initiative.

The Technical Assistance component provides flexible technical assistance to the Government of Kenya to support the implementation of Kenya's National Climate Change Action Plan.

The DMI consortium also serves a coordination and learning role across the six StARCK+ components.

1.2 THE LEARNING ASSIGNMENT

The main aims of the assignment were to:

1. identify whether, and to what extent, activities supported by StARCK+ can be said to be promoting adaptation and enhancing resilience to climate change and variability;
2. assess how public, private and civil society interventions and interactions are or are not delivering adaptation and resilience benefits;
3. support StARCK+ partners in their reporting against relevant UK International Climate Fund Key Performance Indicators (KPIs) and other indicators (see below), and in developing learning narratives around the results measured by these indicators;
4. document learning around adaptation and resilience to inform the planning and design of future interventions, to ensure that such interventions are more robust and effective.

The learning assignment involved the following activities:

1. desk review of documentation provided by StARCK+ and its partners managing the six components of the programme;
2. interviews in Nairobi with StARCK+ partners and some of the organisations and businesses they support;
3. meetings with local organisations implementing projects supported by the StARCK+ partners both in Nairobi and in the field;
4. interviews in the field with project beneficiaries and clients of the StARCK+ private sector partners (Table 1).

StARCK+ supports the delivery of both resilience/adaptation and mitigation/low-carbon benefits. The latter are addressed through initiatives focused on renewable energy, tree planting and land rehabilitation. Through this combination of actions, StARCK+ recognises that both mitigation and adaptation are vital to address climate change. The learning assignment described in this report focuses on resilience and adaptation interventions and results. Climate change mitigation through low-carbon development and renewable energy under StARCK+ is the focus of a separate learning assignment. Nonetheless, this report recognises that resilience and adaptation actions may also deliver mitigation benefits, and vice versa, and considers links between adaptation and mitigation, and the 'ancillary adaptation benefits' of mitigation activities, where appropriate.

The report opens with a general discussion of resilience and adaptation, and their relationship to development. This is followed by a section detailing the resilience and adaptation learning around each of the six StARCK+ components, based on the activities listed above. A discussion of reporting frameworks and indicators is then followed by a synthesis that brings together the adaptation and resilience learning across the StARCK+ components, along with the learning around reporting.

Table 1. Projects/activities visited in the field during September and November 2016.

Partner	Project/client	Location	Date	Summary
ACT!	SUPPA	Nakuru	22.11.16	Visit to SUPPA office and Bahati Community Forest Association
ACT!	TILT	Nyahuru	22.11.16	Visit to field office and 3 beneficiaries (biogas, jikos, fish farming)
ADA	Kinna Vetinary station	Kinna	24.11.16	Joined with Tanzanian delegation to learn about CAF; meeting community elders
FICCF (CSA)	ECLOF	Embu	29.09.16	Visit to dairy and 3 farms
FICCF (CSA)	Cassava growers	Homa Bay	21.11.16	Meetings with 3 farmers at 2 sites
FICCF (CSA)	CAD Sorghum aggregator	Kisumu	21.11.16	Meeting with Philip
KCIC	Future Pump	Kendu Bay	21.11.16	Visit to demonstration farm
REACT	Takaful	Isiolo	25.11.16	Visit to Turkana village (Chumbieri) to meet with small group of insurance clients
REACT	Tosheka	Makueni	28.11.16	Visit to field office and 2 silk farmers

2. CONTEXT: DEVELOPMENT, ADAPTATION AND RESILIENCE

2.1 RELATIONSHIP BETWEEN ADAPTATION AND RESILIENCE

The United Nations Development Programme's 2007/2008 Human Development Report stated that climate change "calls into question the Enlightenment principle that human progress will make the future look better than the past". This statement neatly encapsulates the potential of climate change to undermine and even reverse historical and anticipated development gains, with an associated deterioration in human wellbeing. It also reminds us that adaptation is a means to an end, namely better development outcomes and sustained or improved human wellbeing in the face of climate change. Adaptation thus contributes to better development in a context of climate change. Conversely, 'regular' development interventions (i.e. ones that do not explicitly address climate change or adaptation) may also help people adapt to worsening climatic conditions by improving their access to certain resources that help them cope better with intensifying climate stresses and shocks. However, regular development interventions may be 'maladaptive' if they inadvertently increase the exposure or vulnerability of populations, and the systems on which they depend, to climate change. Examples of such maladaptation might include policies that encourage the concentration of populations and infrastructure in high-risk areas such as low-lying coastal zones or river flood plains, and the expansion of agriculture into marginal areas at risk from climatic desiccation. The former directly increases the exposure of people and infrastructure to hazards such as sea-level rise, storm surges and flooding resulting from runoff and overtopping. The latter increases the dependence of people and the economy on agriculture that is at increasing risk of disruption or catastrophic collapse, and has a precedent in the late 20th century Sahel (Heyd and Brooks 2009; Brooks 2012).

While adaptation and development are closely related, they can be viewed as distinct processes. Effective adaptation should help deliver better development, and effective development must consider and, where appropriate, incorporate adaptation.

2.2 ASSESSING THE SUCCESS OF ADAPTATION

Ultimately, the success or failure of adaptation will be demonstrated by whether governments and other stakeholders achieve their development goals, and whether human wellbeing improves, despite accelerating climate change and the intensification of climate *hazards*. These hazards include short-term manifestations of climate change and variability such as droughts, heat waves, heavy rainfall, storm surges, and associated floods, as well as longer-term manifestations such as sea-level rise, increases in average temperatures, and trends towards generally drier or wetter conditions. Climate change has the potential to significantly increase disaster risk, and to result in the establishment of new climatic conditions that may be outside the range of historical

Box 1. The role of climate information in assessing adaptation success

The use of climate information to 'contextualise' results based on standard development and wellbeing metrics is critical if we are to develop narratives around adaptation and resilience. For example, interventions to improve agricultural performance in drylands might be followed by measured improvements in agricultural productivity and household incomes. However, if these improvements occur over a period during which there are no significant climate hazards (e.g. droughts or periods of heavy rainfall), all they tell us is that agricultural livelihoods have become more successful under conditions of low or no climatic stress. This may constitute a development 'success' in the short term, but these results tell us nothing about adaptation or resilience to climate variability and change. For them to do so, we would need to be able to show similar improvements (or even merely that productivity had been stabilised) over a period during which significant climatic stresses or shocks were experienced, that would normally be associated with declining agricultural productivity and incomes. To convincingly demonstrate adaptation to climate change, we would need to demonstrate improved development outcomes (relative to a historical or moving 'counterfactual' baseline) over a period during which climate hazards were intensifying.

Climate information can also help us to estimate the extent to which an intervention has helped people or systems to adapt or become more resilient, by comparing the effects of similar climate hazards (e.g. droughts or episodes of intense rainfall) before and after an intervention. Where such an approach is taken, climate information will be important to characterise the hazards being compared, to ensure that we are comparing 'like with like.' Such an approach would be complemented by beneficiary narratives that could inform us about the extent to which an intervention contributed to any reduction in losses, and how the intervention contributed to better development outcomes in the face of climate hazards.

The generation of information on relevant climate hazards thus plays a critical role in any attempts to monitor the success of actions intended to help people adapt to climate change, or improve their resilience to climate hazards in general. Identifying and filling gaps in the availability of relevant climate information is therefore an important activity for any intervention that seeks to deliver adaptation or resilience benefits, as well as for any body tasked with the long-term monitoring of adaptation or resilience.

experience, calling into question the viability of existing systems and practices (e.g. agricultural systems, livelihood practices, and patterns of production and consumption).

The most obvious way of determining whether adaptation is successful is to use standard development and wellbeing metrics that capture how climate-sensitive aspects of development performance and human wellbeing are evolving, interpreted in the context of climate data/information, to see whether development is 'on track' despite worsening climatic conditions (e.g. in the form of more frequent and severe droughts and heat extremes coupled with an increase in the intensity of the heaviest rainfall events) (Brooks 2014). The use of climate data and information is critical to such an approach, as it tells us whether climate hazards are behaving within the range of historical experience, ameliorating, or intensifying. This basic contextual information is necessary if we are to say anything about the success of adaptation based on standard development and wellbeing metrics (Box 1).

Nonetheless, using development and wellbeing metrics to assess the effectiveness of adaptation actions is potentially very challenging, for the following reasons:

1. Improved development performance and human wellbeing are the ultimate (desired) impacts of adaptation interventions. However, these impacts might be quite far 'downstream' from the activities and outputs of an intervention, and there is a high chance that they will not be realised over an intervention's lifetime, or over the period during which an intervention's performance is being assessed.

2. Even if (1) above does not apply, there may be few, or no, significant climate hazards over the period during which the success of adaptation measures is being evaluated. In such cases, improvements in human wellbeing tell us about development performance under unchallenging climatic conditions, but tell us nothing about adaptation. It is possible that any measured improvements will vanish in the face of climate stresses or shocks.

3. Related to (2) above, it may be impractical to monitor outcomes/impacts over timescales long enough to include episodes of climate stress or shock, against which adaptation performance can be measured. This is very likely in the context of M&E of individual programmes.

4. In a very likely scenario, in which climate hazards intensify and development performance fails to improve, or deteriorates, we need to use some sort of 'counterfactual' scenario or moving baseline to ask whether things would have been even worse without the adaptation interventions being assessed. A lack of observable improvement in human wellbeing does not necessarily mean that adaptation has failed entirely.

Ultimately, we will need to ask whether adaptation has delivered its intended impacts of better development performance and improved human wellbeing. However, this may be beyond the scope of an individual intervention, and is probably best approached through longer-term monitoring programmes undertaken independently of individual projects and programmes, perhaps by research organisations or government agencies, and using regularly collected data from national databases. Climate information will have a vital role to play here (Box 1).

If we cannot measure the ultimate impacts of adaptation interventions in the form of human wellbeing, we can at least ask whether these interventions have changed people's circumstances such that they are better equipped to deal with climate hazards when they do occur. This can be approached by identifying the attributes, characteristics, resources and capacities that make people less vulnerable, or more resilient, to specific climate hazards such as drought and rainfall variability. This is the approach taken in the large body of literature on vulnerability to climate change, and in the emerging literature on climate change resilience. While there are many definitions of resilience (and vulnerability), the guidance on measuring whether resilience has improved that has been produced for the UK's International Climate Fund (ICF KPI 4)[1] adopts a working definition of resilience as consisting of a set of factors that make people and systems better able to ***anticipate, avoid, plan for, cope with, recover from, and adapt to evolving climate stresses and shocks*** (climate hazards).

Recognising that resilience is highly context specific is critical – before we can understand resilience in any given situation we need to ask ourselves the following question: "The resilience of whom/what (exposed population system), to what (hazard), with respect to what effects (losses, damages), over what timescale?" The methodology for reporting against ICF KPI 4 advocates the use of participatory approaches to identify the factors that make people resilient (or not) to specific climate (change) hazards, and the development of indicators to represent how these factors change over time. These factors may include particular types of assets, access to certain resources, institutional and environmental factors that facilitate or constrain certain behaviours, socio-economic status, and other attributes and aspects of capacity that prevent or enable coping or adaptation.

The KPI 4 guidance recommends measuring resilience at the outcome level, on the grounds that the above factors can be influenced on relatively short timescales, and measured even in the absence of climate stresses and shocks. For example, if evidence from past shocks identifies amount of savings as a key determinant of resilience (e.g. those with more savings can invest in alternative strategies and/or recover more quickly), an intervention might seek to establish farmer savings groups. A measure of output (KPI 1) might be the number of people enrolled in savings groups. However,

[1] This guidance was developed for reporting against ICF Key Performance Indicator No. 4 (KPI 4): Number of people whose resilience has been improved as a result of [ICF] project support.

enrolment may not automatically translate into higher savings, or savings that are sufficient to cope with the next drought. In addition, it is possible that people will make other detrimental sacrifices in order to meet their payments into the savings fund, that will make them less resilient (e.g. foregoing meals, taking children out of school). In this example, the KPI 1 output measure of numbers enrolled would be complemented by a KPI 4 outcome measure that might combine amount of savings (perhaps with respect to a specific threshold) with some measure intended to determine whether savings had been made at the expense of other vital activities.

Participatory approaches will be central to the measurement of resilience, given its specificity to context and variation across different beneficiary groups. Such approaches also allow the gathering of information on the extent to which a particular programme has contributed to improvements in resilience, and also on contextual factors affecting resilience that might be outside the influence of a programme. Participatory approaches can also begin to address measurement at the impact level, by soliciting information on the consequences of climate hazards before and after an intervention. If resilience indicators accurately reflect realities on the ground, they should predict how the effects of particular climate shocks and stresses are likely to evolve (e.g. who is likely to be affected most and least in the event of a given shock or stress). In this way, development/wellbeing data can, in principle and over time, be triangulated against resilience indicators to test the validity of the latter.

While the terms 'adaptation' and 'resilience' are often used interchangeably, adaptation might involve recognising that existing systems or practices are (or will be) unsustainable as a result of climate change, and replacing them with other systems or practices. Adapting through fundamental changes to existing systems, or by replacing them altogether, is often referred to as 'transformational adaptation', which contrasts with 'incremental adaptation' that is based largely on deploying already familiar measures to 'protect' existing systems and practices from the effects of climate change (IPCC 2014: 1758).

3. THE LEARNING APPROACH

StARCK+ supports a wide range of activities, ranging in scale from the local to the national, with different partners taking different approaches and employing different mechanisms. For example, KCIC and REACT focus on supporting businesses to develop 'climate friendly' products and services, whereas ACT! focuses on work with communities via local partners, and ADA addresses county-level policy environments. Any learning around the issues of adaptation and resilience must recognise this diversity of activities and approaches across the StARCK+ portfolio, meaning that somewhat different approaches to learning might be required for the different StARCK+ components.

The range of activities supported by StARCK+ was assessed through a desk review of documentation provided by the various StARCK+ partners. As a consequence of its diverse portfolio and the nature of its delivery mechanisms (working with community based organisations), ACT! supports the widest range of activities. The ACT! portfolio was therefore used as the main basis for identifying different types of activity supported under the StARCK+ programme. The review of ACT! and wider StARCK+ partner documentation indicated that the activities supported by StARCK+ can be placed in six broad categories, which are detailed in Table 2.

The first two of these categories, **capacity building** (1) and **policy influencing/advocacy** (2) represent activities that lay the foundation for adaptation and improved resilience, but do not guarantee these outcomes. Capacity building includes activities such as training (including on how to manage initiatives and report on them, as well as in business development), awareness raising and sensitisation (e.g. through workshops, community forums, radio broadcasts); the

Table 2. Categories of activity via which StARCK+ activities might deliver adaptation and resilience benefits.

Category	Example activities		Nature of resilience/ adaptation benefits
1. Capacity building	• Training • Supporting/establishing community groups or networks • Improving people's access to information	• Awareness raising • Working with institutions to improve the way they address climate related risks • Building links between communities and government institutions	Indirect, downstream
2. Policy influencing, advocacy	• Technical assistance to government for development of strategies, policies and plans • Support to communities and other stakeholders to improve their lobbying or advocacy capabilities	• Technical assistance at the sub-national level (e.g. County) • Establishment of mechanisms for greater participation in decision-making, particularly community input to policy making	Indirect, downstream
3. General livelihood strengthening and support	• Linking producers to processers, distributors • Commercialisation of existing products • Other mechanisms to improve access to markets	• Value addition (e.g. on-farm processing) • Improvements to post-harvest storage • Short-term support during periods of stress (cash, animals, feed, seed, etc.)	Indirect, downstream, uncertain Potential for direct benefits if climate risks explicitly addressed (but then would fall under 6 below)
4. Livelihood diversification or substitution	• Piloting new livelihood options • Technical assistance for adoption of new activities • Increasing number/diversity of crops, income streams	• Diversification into non-agricultural activities • Substituting existing activities with ones that are more productive/profitable	Indirect, downstream, uncertain
5. Conservation/ rehabilitation of natural resources	• Tree planting/reforestation • Establishment of protected areas • River bank rehabilitation/protection	• Rehabilitation of water sources • Pasture management • Soil & water conservation • Crop rotation, fallowing	Mixture of indirect, downstream, and (in some instances) direct
6. Addressing specific climate-related risks	• Adoption of drought resistant crops and livestock • Shift to crops requiring shorter growing seasons • Diversification into more resilient livelihood activities (bees, poultry, etc.)	• Shift to non-seasonal crops such as cassava • Crop and livestock insurance, including weather-index based insurance • Use of short and long range forecasts to inform agricultural scheduling	Direct

Box 2: Transformational adaptation and transformational change

The IPCC defines transformational adaptation as adaptation that "changes the fundamental attributes of a system in response to climate and its effects", and contrasts it with incremental adaptation consisting of "actions where the central aim is to maintain the essence and integrity of a system or process at a given site".

The general aim of incremental adaptation is to preserve the status quo and maintain 'business-as-usual' through the protection or 'climate proofing' of existing systems and practices. In contrast, transformational adaptation involves radically changing or replacing these systems and practices with new ones that are viable under changed climatic conditions.

Transformational adaptation will be necessary where climate change means existing systems are likely be become unviable, due to the crossing of critical thresholds beyond which they cannot be sustained. However, these thresholds are not fixed, and will depend on management regimes and how viability is defined (e.g. in terms of frequency of production failures, or thresholds of economic returns).

Transformational adaptation might be delayed or even avoided through appropriate incremental adaptation actions; it will be needed where such measures are no longer feasible due to cost, resource constraints, or the crossing of 'hard' thresholds beyond which certain activities are simply not possible. Examples of transformational adaptation include the relocation of coastal settlements threatened by sea-level rise, shifts from intensive cropping to extensive grazing, migration and the adoption of wage labour where climate change means agricultural livelihoods are no longer viable, shifts from aquatic to forest-based livelihoods where lakes dry up and are replaced by forest (e.g. Djoudi et al 2013). For a more detailed discussion of transformational adaptation see Brooks 2017. The term 'transformational adaptation' is often used alongside, or interchangeably with, 'transformational change'. However, transformational change has a broader meaning, referring to fundamental, systemic and/or large-scale changes in systems, contexts, processes and behaviours in general, that are not necessarily related to climate change.

The UK's International Climate Fund, through which StARCK+ is financed, has developed a Key Performance Indicator (KPI 15) to assess the extent to which ICF programmes are likely to have a transformational impact. This defines transformational change as change that catalyses further change, based on criteria including replicability, scale, sustainability, local ownership, and others (see Section 5 of this report for a discussion of KPI 15). For example, transformational changes in governance might produce an environment more conducive to effective adaptation decision-making (e.g. community identification, prioritisation and implementation of adaptation actions).

Transformational changes in the availability of finance might enable more adaptation actions to be funded, or catalyse a large-scale transition to renewable energy. The latter might also require transformational changes in energy policy.

Transformational changes in awareness of climate change risks and response options might trigger action on climate change as a result of public demand. Such transformational changes in awareness, finance, and governance might result in — indeed might be prerequisites for — effective responses to climate change that include both incremental and transformational adaptation actions.

establishment or strengthening of community groups and networks; improving communications between communities and government (e.g. at the county or ward level); improving people's ability to access information; and working with institutions to help them address climate risks. Policy influencing might be direct (e.g. working on policy development) or indirect (e.g. supporting people to influence policies that affect them through community or business advocacy).

The adaptation and resilience benefits of these mechanisms can be viewed as indirect and 'downstream': greater awareness of climate change risks, access to information, stronger networks and better communications will not automatically lead to adaptation actions, they simply mean they are more likely. However, they are still dependent on the decisions people make, and these will be influenced by a host of factors, not just considerations of climate change risks. Nonetheless, these activities are essential to the creation of enabling environments for adaptation and resilience building. The success of such activities can, at least to a certain extent in some contexts, be assessed using the indicators developed under the IIED *Tracking Adaptation and Measuring Development* (TAMD) framework, which address institutional capacity for addressing climate change adaptation, and include indicators relating to participation and stakeholder awareness (Brooks et al. 2013).

The second two categories, **general livelihood strengthening** (3) and **substitution/diversification** (4) may promote adaptation and enhance resilience, but again this is not a given. Livelihood strengthening as defined here includes activities designed to make *existing livelihood activities* more productive and/or profitable, for example through improved farm inputs, value addition (e.g. through on-farm processing) and improved access to markets. These activities should improve incomes and may allow people to start saving or increase their existing savings. Savings or additional income might be used to help people cope with or recover from shocks, or they might be invested in adaptation or measures that otherwise build resilience to intensifying climate hazards. However, extra income and savings might not be used in these ways, and might even be invested in assets and activities that are more vulnerable to climate stresses and shocks (Box 2). Whether livelihood strengthening delivers adaptation and resilience benefits will depend on (i) the resilience of the livelihood activities targeted (adding value to an already resilient livelihood activity will confer considerable adaptation and resilience

Box 3: Maladaptation

The OCED (2009) defines maladaptation as "… business-as-usual development which, by overlooking climate change impacts, inadvertently increases exposure and/or vulnerability to climate change. Maladaptation could also include actions undertaken to adapt to climate impacts that do not succeed in reducing vulnerability but increase it instead."

Examples of maladaptation include:

- Development of flood plains and low-lying coastal areas that increases the number of people and the value of assets exposed to intensifying hazards.
- Expansion of agriculture into marginal areas that are likely to become unproductive as a result of climate change.
- Expansion of irrigation that cannot be sustained due to a decline in available water resources resulting from climate change.
- Increased economic dependence on other resources that may cease to be available as a result of climate change (e.g. agriculture in marginal zones, increase reliance on at-risk fisheries, tourism predicated on threatened cultural or ecological resources).
- Development of hydro-power in areas where declines in streamflow are likely to compromise the operation of hydro-power plants.
- Construction of hard coastal defences that cut off sediment supply to other areas, increasing erosion and flood risk in these areas.

Certain policies may be maladaptive for some groups and not others. For example, even where agricultural expansion is sustainable under climate change it might result in the loss of dry-season grazing for pastoralists, undermining their ability to cope with and adapt to drought i.e. increasing their vulnerability to drought.

benefits, while adding value to an activity that is not resilient may increase risk), (ii) the extent to which livelihood strengthening includes measures that directly address climate risks (see below), and (iii) how any additional income from improved livelihoods is used. An example is the purchasing of bananas from growers by Nyangora Banana Processing, supported by KCIC. This provides a reliable market for growers, and is likely to increase their incomes and reduce post-harvest losses resulting from difficulties getting bananas to market. The existence of a reliable income may mean that farmers are more likely to invest in other activities that deliver livelihood or other benefits (e.g. education). They may invest in climate resilient products or activities. However, it is difficult to identify any tangible adaptation benefits, or to see how access to a market makes them more resilient to climate stresses and shocks, beyond generally improving their financial circumstances.

Similar arguments hold for livelihood substitution/diversification involving the introduction of *new livelihood activities*. If the livelihood options being introduced are more resilient than those they are complementing or replacing, then this approach will confer resilience/adaptation benefits. However, it is conceivable that resilient but low-productivity livelihood options will be replaced with high-productivity but less resilient options, improving productivity in the short term but undermining resilience and potentially driving maladaptation (Box 3) in the longer term. An example is the replacement of low-productivity extensive pastoralism with higher productivity settled agriculture in semi-arid areas, as happened in the Sahel in the 1950s and 1960s (Heyd and Brooks 2009; Brooks 2012). However, most of the new livelihood activities promoted under StARCK+ seem likely to confer adaptation and/or resilience benefits.

The fifth category of activity, **conservation/rehabilitation of natural resources** (5) may confer resilience benefits on human populations by making the natural systems in which they are embedded and on which they depend more resilient to climate stresses and shocks. These benefits may be indirect and downstream of an intervention, for example where a reduction in charcoal consumption resulting from uptake of renewable energy translates into reduced deforestation, slowing or reversing trends of increasing runoff, erosion and flood risk. However, benefits may also be direct, for example where an intervention supports the rehabilitation of water pans used by pastoralists, or better management of grazing land on which herders' livelihoods depend.

The final category, **addressing specific climate-related risks** (6) is associated with the clearest pathways to demonstrable, direct adaptation and resilience benefits. Activities in this category involve actions taken with the explicit intention of reducing risks associated with specific climate hazards such as drought and rainfall variability, which may be intensifying as a result of climate change. Within this category, we might distinguish between the following three kinds of actions:

i. General actions taken to *improve the resilience of existing systems to familiar climate hazards* such as drought and rainfall variability. While these actions might make agricultural systems better able to accommodate an intensification of climate hazards, they would confer benefits even in the absence of climate change. They might therefore be described as "good development" practice that address the "**adaptation deficit**," a term describing the gap between current practice and what is sustainable (Burton and May 2004), or the gap between current practice and what is desirable in order to optimise productivity and minimise losses in a sustainable manner under current or historically familiar conditions. Examples of such actions include soil and water conservation measures, the use of seasonal and short-term forecasts, and crop or livestock insurance. Whether such actions constitute actual adaptation is arguable, given that they are sensible even in the absence of climate change. However, they can be confidently described as actions likely to improve resilience to climate hazards, with the caveat that

increased resilience may still be overwhelmed by hazards of sufficient magnitude.

ii. Actions taken to *enable existing systems to accommodate an intensification of otherwise familiar climate hazards*, that would not be necessary in the absence of climate change. These "**incremental adaptation**" actions principally serve to preserve existing systems in the face of climate change by expanding the 'coping range' of these systems. An example might be the introduction of drip irrigation to sustain previously rain-fed crops as a result of lower or more erratic rainfall or higher temperatures and evapotranspiration, provided such irrigation is sustainable. The adoption of faster growing crop strains in response to shorter growing seasons is another example.

iii. *Fundamental changes to systems or practices that are not viable under climate change*, and/or where "incremental" adaptation is impractical (e.g. due to prohibitive costs or the magnitude and/or rapidity of climate change). These so-called "**transformational adaptation**" responses might include shifts from one crop or cropping system to a different one, shifts from rain-fed crops to extensive livestock grazing, geographical shifts in production (Box 2), and migration out of areas in which production is becoming less viable to take up alternative livelihoods in other locations. Transformational adaptation is different to transformational change, which describes more general systematic and/or large-scale changes in people's circumstances or livelihood strategies, policy regimes, institutional behaviours, and development contexts.

Studies of "adaptation" interventions at large indicate that the majority of these involve actions to address the existing adaptation deficit, or that focus on incremental adaptation measures (Kates et al. 2012; Wise et al. 2014; Chung Tiam Fook 2015).

In practice, the boundaries between the above three kinds of adaptation action (addressing the adaptation deficit, incremental adaptation, and transformational adaptation), and indeed between the six categories of activities as defined in Table 2, may be somewhat fuzzy. However, these typologies provide us with a useful framework for thinking about resilience and adaptation, and the extent to which StARCK+ activities are delivering, or are likely to deliver, resilience and adaptation benefits. In the following sections, this framework is used to interrogate the resilience and adaptation outcomes of the various StARCK+ components, and to develop tentative resilience and adaptation narratives around the activities of these components. For the StARCK+ components that support individual projects on the ground with stated adaptation or resilience building purposes, activities under these projects are mapped on the framework to assess the extent to which they can be said to be delivering actual resilience-building and adaptation outcomes.

To conclude this discussion of resilience and adaptation, it is worth considering the issue of thresholds, or whether the measures supported by an intervention are sufficient to address the hazards faced. For example, the rehabilitation of water pans, or expansion in their capacity, is likely to increase the resilience of those using them due to an increase in the availability of water. However, if a rehabilitated pan provides water for a longer period than it did previously but still dries up towards the end of the dry season in drought years, the extent to which it increases resilience might be questioned. If irrigation provides water for only part of the period during which it is required during a severe drought, crops might still fail. Such features need to supply adequate amounts of water throughout periods during which it is needed, rather than simply incrementally increase water availability. Similarly, more drought resistant crops and practices need to be sufficiently resilient to cope with the intensity of droughts in the foreseeable future; even a drought resistant crop might be overwhelmed if a drought is of sufficient duration and magnitude. It is therefore important to verify apparent resilience and adaptation gains against periods of stress where possible.

Risks of maladaptation also need to be considered (Box 3). For example, while the introduction or expansion of irrigation may seem an obvious adaptation measure, it must be sustainable in the face of climate change that, in many locations, is likely to reduce water availability, including runoff and groundwater recharge. If irrigation increases dependence on irrigated crops but is not sustainable, or increases water use beyond sustainable thresholds (including in dry periods), it may be maladaptive. The expansion of agriculture into marginal areas that may become drier as a result of climate change is another example of maladaptation (Heyd and Brooks 2009). Changes in livestock systems could potentially be maladaptive if they involve more intensive or destructive grazing in areas under stress from climate change. However, all of these maladaptation risks are highly contextual, and depend on management regimes and the nature of local changes in climate, environment and resource availability. These issues are relevant to some StARCK+ initiatives, for example those involving irrigation, the expansion of livestock ownership, and changes in the types of livestock kept.

4. RESULTS OF THE LEARNING FOR INDIVIDUAL STARCK+ COMPONENTS

4.1 LEARNING FROM ACT!

Act, Change, Transform (ACT!) is a Kenyan NGO that implemented the four-year Changieni Rasili Mail (CRM) programme to support non-state actors to improve their capacities and to enhance the voice of Kenyan citizens. The CRM facility delivered grants and supported capacity building, networking and advocacy activities in five thematic areas including climate change. The CRM programme was funded by the Governments of Sweden and the UK, with DFID funding 26 (out of 81) initiatives via the ICF. All these 26 projects were complete by March 2015, and each was subject to an end-of-project evaluation. These evaluations were summarised in a desk review, which forms the basis for the overall ACT! portfolio analysis presented here. Two projects (SUPPA and TILT, see below, Table 3 and Annex 1) were visited in the field. A further six projects were represented at a meeting held in Nairobi on 17 November 2016, in which resilience and adaptation issues were discussed with project representatives.

Most of the 26 DFID-funded initiatives (plus SUPPA[2]) involve capacity building activities that include training and awareness raising. Many of them seek to increase communities' voice, building their capacity for advocacy and lobbying. This is often coupled with activities that bring community representatives together with representatives of local government or other actors involved in the formulation of policy and legislation. Many initiatives address planning, for example seeking to integrate or mainstream climate change and related issues into planning processes at the local or county level. The establishment of new organisations to address community development and vulnerability through community planning and coordinated lobbying is common. These capacity building activities represent steps towards creating enabling environments in which meaningful action to address climate change can be taken. However, they do not necessarily *in themselves* make communities more resilient. For this to happen, capacity needs to be translated into actions, for example changes in behaviour that reduces risks associated with climate change and variability, and changes in policies that remove barriers to adaptation.

Beyond capacity building and institutional actions, the 26 initiatives (plus SUPPA) encompass a variety of specific livelihood measures aimed at addressing poverty, agricultural performance, and community and environmental vulnerability to climate stresses and shocks. These include tree planting, landscape rehabilitation, natural resource management (including pasture management), livestock management, water management (including harvesting and storage), disaster risk reduction (DRR) and early warning systems (EWS), livelihood diversification, agricultural innovation including climate smart agriculture (CSA), clean energy, and direct livelihood assistance (e.g. provision of seeds, work, etc.).

The desk review provides a summary of each project and the activities associated with it. Annex 1 of this report contains condensed versions of these project summaries, and lists the activities identified in the desk review for each project. Table 3 maps the activities associated with each project onto the six categories identified in Table 2 above. This mapping is likely to be conservative, as it is based solely on the project descriptions in the desk review of the project evaluations. Any project activities not mentioned in this review will be omitted from the mapping in Table 3.

Table 3. Activities under the 26 DFID-funded ACT! projects described in the desk review of project evaluations (plus SUPPA, which is not discussed in this desk review), mapped onto the six categories of activity identified in Section 5 of this report. Activities addressing specific climate related risks are further divided into those that address the current adaptation deficit, those that represent incremental adaptation measures, and those that represent transformational adaptation measures (see Section 5 of main text). Brackets indicate lower confidence about the nature of the activities, for example where it is not clear whether these activities have been implemented/realised, or have simply been the subject of training or advocacy. More detailed descriptions of the projects, using the same numbering system to identify projects, along with lists of activities under each project, are provided in Annex 1. Note that the assessment of SUPPA (project 27) is based on field visits undertaken as part of the learning assignment.

Project	Capacity building	Policy influencing	L/hood support, strengthening	Diversification/ substitution	Conservation, env. rehab., NRM	Directly addressing specific climate risks		
						Adaptation Deficit	Incremental	Transfor-mational
1. TILT	✓	✓	✓		✓	✓	(✓)	(✓)
2. BIFORAD (sandalwood)	✓			✓	✓		(✓)	(✓)
3. EPAG-K (Pastoralist assistance)	✓	✓	✓		✓	(✓)		

[2] SUPPA is not represented in the documentation relating to the 26 DFID-funded projects, and brings the total to 27. SUPPA was selected by ACT! as one of the two projects for field visits.

Project	Capacity building	Policy influencing	L/hood support, strengthening	Diversification/ substitution	Conservation, env. rehab., NRM	Directly addressing specific climate risks		
						Adaptation Deficit	Incremental	Transfor-mational
4. KCCWG (CC policy & legislation in Kenya)	✓	✓						
5. Enhancing food security and climate change adaptation through faith-based non-formal education for sustainable development	✓					(✓)	(✓)	
6. ZINDUKA AFRIKA (alternative livelihoods)	✓		(✓)	✓		✓	(✓)	
7. HAK (land management)	✓				✓	✓	✓	(✓)
8. ICE (community resilience)	✓	✓	✓	✓	✓			
9. HIVA (Mandera)	✓	✓	✓	✓		(✓)		
10. NEEDO (citizen participation)	✓	✓	✓	✓		✓	(✓)	
11. KOEE (education, Machakos & Marsabit)	✓	✓	✓	✓	✓	✓	(✓)	(✓)
12. USTADI (Kilifi adaptation)	✓	✓	✓	✓		(✓)	(✓)	
13. Green Cross (Marsabit Drought Resistance)	✓	✓	✓		✓	✓	(✓)	
14. Norwegian Aid (youth climate action)	✓	✓	✓	✓		(✓)	(✓)	
15. NAPAD Nomadic Assistance for peace and development (Mandera)	✓	✓	✓	✓	✓	✓	(✓)	
16. Pastoralist Girls Initiative (Garissa, Tana)	✓	✓	✓		✓			
17. RACIDA (Mandera participatory NRM)	✓	✓		✓	✓	✓	(✓)	
18. Reformed Church of E. Africa (Pokot Adaptation)	✓	✓	✓	✓		✓	(✓)	
19. IIN (NR dependent communities adaptation)	✓	✓		✓				
20. MAZIDO (rainwater harvesting)	✓	✓		✓	✓	✓	✓	
21. ALIN (community resilience & NRM)	✓	✓		✓	✓	✓	(✓)	

Project	Capacity building	Policy influencing	L/hood support, strengthening	Diversification/ substitution	Conservation, env. rehab., NRM	Directly addressing specific climate risks		
						Adaptation Deficit	Incremental	Transfor-mational
22. INADES (community resilience & NRM)	✓	✓		✓	✓	✓	(✓)	
23. EAWLS (com. & ES resilience, non-charcoal)	✓	✓			(✓)			
24. RAE Trust (land management)		✓	✓	✓	✓	✓	(✓)	
25. WIKO (Waso River Alliance resilience)	✓				✓	✓	(✓)	
26. IEWM (gender mainstreaming) strengthening institutional	✓	✓						
27. SUPPA (community forest associations)	✓	✓	✓	✓	✓	✓	(✓)	(✓)
TOTALS	26	22	14(15)	17	16(17)	15(20)	2(20)	(5)
						21		

4.1.1 DESK REVIEW OF THE ACT! PORTFOLIO

BUILDING THE FOUNDATION FOR ADAPTATION: CAPACITY BUILDING AND POLICY INFLUENCING

All the ACT! DFID-funded projects include elements of capacity building, mostly in the form of training and/or awareness raising, but also including activities such as increasing access to climate information (project 21) and promoting the mainstreaming of adaptation in development policies and actions county level (projects 14, 23 and 26) and more generally (project 7).

Sixteen projects seek to influence policy or to improve the capacity of communities for lobbying and advocacy. These include activities such as the establishment of community fora for lobbying (project 3), the seeking of direct policy input (project 10), consultations with government (project 18), general strengthening of community participation in (for example) natural resource governance (projects 20, 22). A number of projects are described as working to increase advocacy and voice, but the associated mechanisms are not clear from the desk review (projects 12, 13, 16, 19). One project (project 4) specifically targets the "enactment of climate change policy and legislation" at the national level by lobbying "for a climate change Act and policy framework that is responsive to the development needs of Kenya". Project 21 includes "lobbying for the development of a climate change adaptation framework" in Baringo, Kajiado and Laikipia counties. Project 23 includes lobbying "for climate change adaptation mainstreaming in county frameworks, policies, plans and projects," focusing on the promotion of alternative livelihoods, for Kaijado and Kwale counties. Learning from the ADA's work on County Adaptation Funds indicates that the mainstreaming of climate change adaptation at county level is a potentially very effective means of delivering adaptation and resilience benefits (See Section 4.5 below). Project 3 sought to increase the influence of pastoralists on policy and planning in Wajir, and the desk review claims at least some success here.

SUPPORTING AND STRENGTHENING LIVELIHOODS

Ten projects seek to strengthen or support existing livelihoods through measures whose resilience and adaptation benefits are ambiguous or uncertain. Some of these measures appear to be short-term or 'stop gap' measures, such as the provision of cash assistance for the purchase of food, animals and school fees (project 3). Some projects provide seeds (project 13), the resilience and adaptation relevance of which depends on the type of seed provided. If this is seed to grow crops that are familiar but not particularly resilient to climate stresses and shocks this will represent a short-term, stop-gap measure that does not increase resilience. However, if the seeds provided are for new, more climate (e.g. drought) resilient crops or crop strains, this is likely to increase household and community resilience. Project 10 supports existing pastoral livelihoods through the provision of feed and hay storage; the latter is an example of a measure to support existing livelihoods that will also contribute to resilience, and so is also discussed below. Project 20 also supports fodder management.

Five projects (1, 6, 7, 12, 18) support beneficiaries to market their products. Four of these do so in conjunction with agricultural innovation and/or diversification (see below), while one (project 18)

addresses livestock trading. Project 6 also provides support for fertiliser and pesticide use, while project 7 combines market access with improving post-harvest storage and agro-irrigation. Project 12 also addresses value chains in the context of climate smart agriculture. These projects also support agricultural innovations of various kinds, including 'modernisation', 'climate smart agriculture', and other forms of diversification, discussed below. Livelihood strengthening also takes the form of the promotion of savings under project 14.

Livelihood strengthening is also promoted through the adoption of more fuel efficient and cleaner energy technologies including jikos (wood burning stoves with heat-retaining ceramic liners that burn less fuel) (projects 1, 17, 19, 22) and biogas (project 1), with benefits in terms of reduced fuel costs and collection times. Solar technologies including pumps, drip irrigation systems and lamps are supported by projects 15, 21, and 25. Note that project 1 (TILT) was the subject of one field visits discussed below.

All the above measures have the potential to improve resilience and facilitate adaptation indirectly, provided they deliver the intended livelihood benefits, and provided the opportunities for adaptation and resilience building afforded by improved livelihoods are taken up. Some of these measures may confer resilience benefits in a more direct manner, for example the provision of hay storage. While fodder management may be pursued to boost productivity rather than improve resilience, reliable fodder supply chains that reduce dependence on more directly climatically sensitive and therefore unpredictable local pasture or feed crops may confer considerable resilience benefits.

LIVELIHOOD DIVERSIFICATION/SUBSTITUTION

The ACT! projects promote a variety of alternative livelihood activities, including pig husbandry (project 6), poultry (project 18), beekeeping (projects 6, 11, 15, 17, 18), goat husbandry and milk production (projects 10, 11), horticulture including through the use of greenhouses (projects 10, 11), sandalwood propagation (project 2), and aloe vera cultivation (project 18). These may confer resilience and adaptation benefits if they replace or complement livelihood activities that are more vulnerable to climate hazards, and if they are economically sustainable.

Diversification is implicit in the activities of some projects through their promotion of climate smart agriculture or sustainable farming, and the use of demonstration farms or gardens (projects 5, 12, 14, 15, 16, 21). However, the extent to which the measures promoted in these projects have been adopted is likely to be variable.

CONSERVATION/REHABILITATION OF NATURAL RESOURCES

Improved management or the rehabilitation of landscapes is promoted by at least nine projects. In four cases (projects 16, 17, 20, 24) this takes the form of pasture management. Under project 24, pasture management is part of a suite of complementary measures, including policy influencing, that together are claimed to have had direct, positive impacts on livestock survival. Six projects (8, 15, 16, 22, 25, 27) support landscape rehabilitation either directly or indirectly through tree planting or the establishment of tree nurseries. Reforestation of a deforested area is the central focus on project 27 (SUPPA), the subject of field visits as discussed below.

Project 25 is of particular interest from the point of view of landscape rehabilitation activities, as it involves the planting of drought resistant trees in riparian areas in order to rehabilitate and stabilise the environment in the immediate vicinity of river banks. This is an example of landscape management predicated on climate resilience in the form of drought resistant vegetation, that confers further resilience by reducing erosion and flood risks associated with heavy rainfall and runoff. However, confirming the resilience benefits of this activity would require further investigation and monitoring in the longer term. For example, if the resilient tree species used are already common in this area, this might be viewed as an exercise in restoring a landscape to its previous state, particularly if this restoration is required because of local human impacts. This would make this intervention one that addresses the adaptation deficit. If the species used are novel in the area in question, and have been selected because they are likely to survive where indigenous species are not as a result of increased aridity or drought risk, then the activity can more convincingly be described as adaptation to climate change.

ADDRESSING CLIMATE RELATED RISKS

Twenty of the 27 ACT! projects examined either directly address familiar climate hazards and risks, or are likely to deliver resilience benefits in relation to these hazards and risks. These measures are listed in Table 4 below (see Annex 1 for more detailed summaries of ACT! projects and activities supported).

All but two of the above 20 projects have the potential deliver adaptation benefits in relation to climate change. The extent to which this is the case will depend on the precise nature, scope and intensity of the activities and measures supported. For example, water harvesting, supported by a number of projects, may represent a form of incremental adaptation if it allows people to continue with existing livelihood practices by compensating for reductions in rainfall and/or streamflow.

Project 7 includes early warning systems (EWS) and other disaster risk reduction (DRR) measures, as well as the promotion of drought tolerant crops and sand dams. These measures are likely to help people cope with any intensification of disaster risk and with increased drought, but will improve resilience to these presumably familiar hazards regardless of how they are evolving because of climate change. The extent to which these measures may represent incremental adaptation depends on the details of implementation (e.g. are the measures different to what they would be in the absence of climate change?), the climatic context (i.e. are hazards demonstrably intensifying?), and the development context (e.g. are losses increasing because of climate change or are these measures mostly driven by a desire to reduce losses with respect to a historical baseline?).

Regardless of whether these measures represent adaptation to changes in climate hazards, they do appear to have improved resilience, as the desk review reports that households are now moving to higher ground during rains, water availability has increased, and drought resilience has improved.

Project 10 provides us with a similar example. Here, the installation of hay storage is a measure to strengthen an existing livelihood that is desirable under historical climatic conditions and thus addresses the adaptation deficit.

Table 4. Measures supported by ACT! projects that directly address climate related risks. Under "Type of measure", the term "resilience building" is used to be synonymous with addressing the adaptation deficit. Bold numbers indicate that the measure is addressed in an initiative, but perhaps only to a limited extent. For example, training might be given but the measure may not actually be implemented; this appears to be the case for project 5, which identifies drought tolerant crops and rainwater harvesting, and project 16, for which the summaries emphasise training activities.

Resilience/adaptation measures	Projects	Type of measure
Introduction of drought-tolerant crops/trees & short cycle crops	2, *5*, 7, 20, 25	Incremental adaptation; transformational if novel crops
Water harvesting/storage/saving including sand dams	*5*, 6, 7, 9, 17, 18, 20, 21, 22	Depends on details and context
Pan desilting	3, 7, 13	Resilience building to incremental adaptation
EWS that facilitate people moving to higher ground during wet periods	7	Resilience building to incremental adaptation
Adoption of goat herding	11	Transformational adaptation?
Provision of fodder during dry season, and associated storage	10	Resilience building to incremental adaptation
Horticultural innovation, e.g. vertical farming, planting pits	6, 14	Depends on details and context
Sustainable & dryland farming	13, 15, **16**	Depends on details and context
Flood defences (sand bags)	15	Resilience building to incremental adaptation
DRR including contingency planning, rehabilitation of riparian zones	**16**, 17, 25	Resilience building to incremental adaptation
Drip irrigation to replaces less efficient irrigation	21	Resilience building to incremental adaptation
Improved pasture & livestock management regimes & policies	*3*, ***9***, ***16***, 17, 20, 24	Resilience building to incremental adaptation
Adoption of activities or practices that mean livelihoods/incomes less climate sensitive, e.g. covered fish ponds, chickens, beekeeping, etc.	6, 10, 15, 17, 18	
Support to value chains, if these are based on climate resilient production systems/crops	12	

However, it may also help to build resilience in the face of intensifying droughts and/or increased variability in rainfall and vegetation cover, depending on whether the amount of hay produced and stored is sufficient to sustain livestock during dry periods whose nature and duration may evolve under climate change.

Nonetheless, the extent to which activities that increase resilience to current or historical climate variability also deliver adaptation to climate change remains a subject for further investigation, and the adaptation benefits of many of the above projects remain uncertain and speculative. The most unambiguous adaptation measures to address climate change in the ACT! portfolio are the introduction of drought-tolerant and short-cycle crops, under projects 7 and 20 respectively. These are likely to replace or complement crops grown in the recent historical period whose performance is increasingly unreliable as a result of changes in climate, specifically rainfall variability. Project 25 includes the introduction of drought-resistant trees for the rehabilitation of river bank areas, suggesting an incremental adaptation to protect areas adjacent to the river against flooding and erosion under generally drier conditions. However, whether this can truly be interpreted as adaptation depends on whether these trees are indigenous or endogenous. The use of indigenous trees to rehabilitate an area degraded by human activity cannot be interpreted as adaptation, in contrast to the use of endogenous drought resistant species to reverse a process of degradation driven at least in part by climate change.

Some ACT! projects might be supporting transformational adaptation, but this cannot be said with any certainty. Transformational adaptation may be occurring where people are adopting novel, drought-resistant crops, if this occurring on a sufficient scale, and is replacing or significantly augmenting previous

livelihood activities that are becoming less productive as a result of climate change. Transitions to goat herding (project 11) may represent transformational adaptation if they involve shifts away from less drought-tolerant livestock driven by drought-related losses and/or concerns about the viability of existing (e.g. cattle) herds as a consequence of climate change. If the adoption of goats is driven primarily by the fact that they are relatively inexpensive and represent an attractive livelihood option, the case for such as shift as an adaptation to climate change is more difficult to make.

Significant adaptation, either incremental or transformational, may be occurring in ACT! project contexts, without being evident via desk review. This possibility was explored through meetings with ACT! project representatives, and through field visits, as discussed below.

4.1.2 MEETING WITH ACT! PROJECT REPRESENTATIVES

A meeting was held with ACT! and some of its project partners on 17 November 2016. Despite the short notice, six projects were represented at the meeting:

- **Indigenous Information Network (IIN)** - Promoting climate change adaptation for natural resources dependent communities in Narok County
- **Nomadic Assistance for Peace and Development (NAPAD)** - Mandera
- **Northern Education and Environmental Development Organisation (NEEDO)** - Improved participation of citizens and marginalised groups in governance, management and utilisation of natural resources in Lafey and Mandera East sub-counties (Mandera)
- **INADES Formation Kenya** - Strengthening community based resilience to climate change through governance and management of natural resources (CRCC-GM) (Makueni and Machakos)
- **Arid Lands Information Network (ALIN)** - Strengthening Community Resilience to Impacts of Climate Change and Stewardship of Natural Resources in Baringo, Kajiado and Laikipia Counties
- **Kenya Organisation for Environmental Education (KOEE)** – Faith-based climate change education for sustainable development (Machakos and Marsabit)

The meeting opened with a short presentation from the Consultant outlining the key issues around resilience and adaptation and their relation to development, based on the six categories of activity listed in Table 2 above. Following this, the project representatives were asked to complete a questionnaire based on the same categories as those listed in Table 2. The questionnaire is included in this report as Annex 2, along with a summary of the responses. The purpose of this exercise was to elicit views from those present at the meeting regarding to what extent, and how, their projects were or might be contributing to resilience and adaptation through these activities.

RESPONSES TO THE QUESTIONNAIRE

All the project representatives at the meeting provided information on the questionnaire regarding how they believed each category of activity was contributing to resilience or adaptation. Capacity building activities focused on training, awareness raising, and assisting communities with land and natural resource management, livestock and fodder management, livelihood diversification, and water harvesting. Policy influencing included lobbying for the mainstreaming of climate change and advocacy for better environmental management regulations at the county level, strengthening community advocacy, involving non-state actors in policy formulation, and lobbying for policies that supported food security, livelihood diversification and more affordable access to water.

A number of livelihood strengthening measures were identified, including an increase in the planting of crops for sale, the adoption of renewable energy technologies with associated cost and time savings, 'climate friendly' farming and conservation and farming to reduce input needs, better fodder and livestock management regimes, more sustainable land use, agro-irrigation, the generation of income from fodder production, and tree planting associated with tree products. Livelihood diversification has included moves into commercial crops, beekeeping, forestry-related activities, kitchen gardens, brick-making, goat herding and milk production, and poultry, in some cases to provide an alternative or supplement to pastoralism.

The conservation and rehabilitation of natural resources features prominently in the questionnaire, with all six projects engaged in tree planting or other activities intended to maintain or increase vegetation cover. Two projects link the restoration of vegetation with the rehabilitation and maintenance of river bank environments. One project seeks to make charcoal burning more sustainable, and another emphasises the role of indigenous knowledge in the conservation of natural resources. A number of projects involve water conservation and harvesting.

The identification of activities to address specific climate risks was more challenging. The most prominent such activities involved measures to reduce livestock losses during dry periods, including fodder production and pasture management. Better access to water for communities and livestock was also highlighted, as was water harvesting and storage to reduce shortages during dry periods. Although respondents did not include them in this category, beekeeping, poultry and goat herding are activities that are more resilient to drought than many existing livelihood activities. The rehabilitation of river banks was explicitly associated with reduced bank erosion and reduced crop damage from flooding by one project, and thus represents an activity to address risks associated with heavy rainfall and episodes of high streamflow. The adoption of drought-resistant crops also falls under this category.

Cabbages growing on deforested land while seedlings become established as part of the rehabilitation process, Bahati forest.

RESULTS OF THE GENERAL DISCUSSION

The meeting also included a general discussion that highlighted a number of issues (the original notes from this discussion are included in Annex 2). Regarding the resilience of beekeeping, one of the representatives from NAPAD said that in the areas they worked, even during drought there were still some flowering plants along the rivers that sustained bee populations. The same participant described how hybrid solar and diesel pumps reduce expenditure on water for livestock by as much as half. In addition, it is during the dry season, characterised by heat and dust, that conventional diesel pumps are most likely to break down. In the border regions, pastoralists may need to cross into Somalia to find water if a generator fails, meaning they cannot pump water for their livestock. Solar-diesel hybrids are desirable as people are reluctant to move to what they see as the untested technology of solar-only pumps, and the use of diesel allows power generation at night.

The NEEDO representative described how Mandera is mostly desert between December and March. During this period pastoralists used to import hay. However, the recent introduction of Sudan grass irrigated from the river, which can be dried in two days, means that the need to import hay has been reduced. NEEDO has provided subsidies and seeds for the growing of Sudan grass, with 60% of its target beneficiaries being women. The resulting hay bales can be sold for KSh 500-700 each, providing income as well as improving the resilience of livestock systems during the dry period. An example was given of someone who paid KSh 65,000 of university bills from the proceeds of hay sales so their son could sit his exams. Another woman covered KSh 900,000 in school fees from hay sales. Women's groups have also been supported to move into poultry production, and a scheme to encourage goats husbandry for milk production is targeting single mothers.

Further details were provided about drought resistant crops, which included drought resistant maize, cow peas and watermelon in the Tana River area. Water harvesting in Makueni included the use of waste water to sustain kitchen gardens, and the use of sand dams, one of which can be used by up to 200 households. Tree planting is undertaken not just for conservation, but also because trees represent value chains that support livelihoods.

ALIN is working with farmers and pastoralists in Baringo, Kajiado and Laikipia to strengthen their resilience to climate change. The ALIN representative related how the organisation was working with communities at three sites on climate smart agriculture, including solar powered drip irrigation. As a result, some pastoralists were practicing crop production for the first time, and some farmers were calling ALIN to say they were enjoying eating their produce in the dry season for the first time. Multiple benefits of better water management were reported, including higher productivity for longer, falls in water use, more water being available for crops (previously livestock would be prioritised, often leaving no water for crops), and more animals coming to water holes. Drip irrigation reduced soil disturbance and erosion due to reduced splashing. An example was cited of a group that saved KSh 28,000 in water costs through more efficient water use in the production of tomatoes and onions on a plot of one acre.

Other measures promoted by ALIN through capacity building and community sensitisation include the use of manure, which is plentiful in areas where livestock are reared, but was often not used. Producers were aided to access local markets, meaning they no longer needed to travel to Nairobi, and delivered more competitive prices for consumers. Training was provided in the maintenance of water pumps, as these can break down requiring the intervention of a specialist from Nairobi to effect repairs. All of the measures were framed within activities focused on policy, including policy briefs for the three counties to help them develop climate change policy frameworks and include climate change measures in their county budgets.

Some challenges were identified by ALIN. One group in Laikipia made losses as their crops were destroyed by elephants. One irrigation system in Baringo was tapping water from a particular channel, in

which the water level fell below the tapping level during the driest period of the year, resulting in the failure of the irrigation system.

4.1.3 FIELD VISIT TO SUPPA

BACKGROUND TO SUPPA

Sustainable and Practical Programs in Africa (SUPPA) is an NGO that was established in 2008 in Nakuru County, largely in response to concerns about environmental degradation and deforestation, which were perceived as having negative impacts on soil and water. SUPPA received support from ACT! prior to the start of the StARCK+ programme, and this was then augmented by additional support from StARCK+. The work of SUPPA and the role of StARCK+ support was explored during a meeting in Nakuru on 22 November 2016, with representatives from SUPPA, the Ministry of Agriculture, and the Agricultural Sector Development Support Programme. SUPPA works closely with these government stakeholders. This meeting was followed by visits to the Nakuru office of the Kenya Meteorological Department and the Bahati community forest project.

The meeting with SUPPA and government stakeholders indicated that initial support from ACT! (prior to StARCK+ involvement) enabled SUPPA to engage in advocacy around forest conservation with communities and smallholders (with less than five acres), the dissemination of climate information through the media, and the printing and distribution of weather advisories. Farmers' networks were formed to continue with this advocacy work, and ACT! has supported SUPPA to ensure that a county-level version of the National Climate Change Action Plan is informed by these networks (Box 4). An example was given of an organisation – Nakuru Food Security and Climate Change (NAFOSEC) – supported by SUPPA that started as a self-help group and evolved into a cooperative. Another organisation, the Mau Narok Rural Farmer Sacco cooperative, is involved in dairy production and the production of crops for export. A small percentage of the sales revenue from this cooperative goes to a conservation fund which supports activities such as afforestation.

FIELD VISIT TO THE BAHATI COMMUNITY FOREST ASSOCIATION

The model of community-led conservation indicated by the examples cited above was examined through a visit to Bahati forest, where SUPPA has been working with the Kenya Forest Service (KFS) on mobilising local communities to reverse severe deforestation, through the creation of a Community Forest Association (CFA). The learning team visited the KFS office in the Bahati forest, where they met with Samuel Kabi from KFS and the Treasurer of the CFA, Masa Kilodi. Two homesteads were also visited.

At the core of the activities of the CFA is the management of five community nurseries (one in each of the five forest zones), in which seedlings are nurtured and then planted in forest clearings. While the seedlings are growing, crops are planted between them in the clearings, meaning that the process of forest rehabilitation is associated with productivity benefits. Weeding around the crops also keeps the ground clear while seedlings are becoming established. Once the seedlings have reached a certain stage of maturity, agricultural activities cease, and the land is returned to forest.

CFA members with their own smallholdings must plant at least 50 seedlings, provided by the CFA nursery, on their own land. Members benefit from agricultural activities in areas of regrowth: crops evident during the field visit included potatoes and beans. These areas of regrowth also provide farming opportunities for the landless. The planting of trees in homesteads provides smallholders with a source of firewood, meaning they no longer need to gather this from the forest. Trees also provide other benefits to smallholders, including the provision of tree crops, shade, and natural fencing.

CFA members reported multiple benefits of the establishment of the CFA and the activities it undertook with support from SUPPA and KFS, in addition to those described above. These included the recharge of water sources due to improved infiltration, income from pruning work, and the generation of firewood from pruning. In addition, 10% of the income that KFS makes from the forest goes to the CFA, providing an additional income for the community. Capacity building activities have supported savings schemes and table banking. The establishment of the CFA and the capacity development activities supported by SUPPA have given people a voice and empowered them to manage their own resources while strengthening their livelihoods.

Box 4. Context for the work of SUPPA in Nakuru County

The meeting with SUPPA and government stakeholders on 22 November 2016 highlighted a number of changes in Nakuru County. One stakeholder mentioned "irregular rainfall patterns", echoing a widespread perception that rainfall was becoming more variable. Others spoke of rising water levels in Lakes Nakuru, Elementaita and Naivasha, suggesting this was due to siltation driven by soil erosion resulting from land use practices and deforestation associated with catchment mismanagement.

However, the causes of lake level fluctuations in the Rift Valley remain the subject of scientific debate, and might include changes in rainfall over the Ethiopian plateau, and tectonic activity. Regardless of their causes, changes in lake environments were said to be affecting fishing communities, and were also said to be linked with a decline in the numbers of flamingos, an important and iconic species in Nakuru County.

These issues are being addressed in the Nakuru County Integrated Development Plan 2013-2017, which also recognises the need to support farmers to become resilient to climate change. Under this plan, farm forestry rules (set up by the National Government via the Ministry of Agriculture) require all farms to maintain 10% of their land as forest, to address deforestation and increase landscape resilience. The Development Plan also promotes conservation agriculture and renewable energy (in the form of biogas, wind and solar energy), while the Ministry of Agriculture is advocating for water harvesting technology and water conservation.

A mix of crops on Mercy Kiruthi's farm, planted in and around a channel dug to catch runoff and prevent soil erosion.

For example, the CFA has a mandate to arrest anyone engaging in illegal logging. According to the community members interviewed during the field visit, local people are now aware of their rights with respect to government services, where they were not prior to SUPPA's intervention. When asked what difference the support from SUPPA had made to the community, based on the situation today compared with that, say, 10 years ago, one interviewee classified the situation in the past as one in which:

- People were not aware of climate change;
- There was no community group or association;
- People were not serious about farming, which was done in a "casual" way;
- Deforestation was not being addressed;
- Community members would cut forest trees for firewood;
- People were not aware of their rights relating to government services;
- There was no access to savings schemes;
- Crops such as potatoes, bananas and yams were not grown;
- People did not have a voice.

VISITS TO HOMESTEADS LINKED WITH THE BAHATI CFA

Two homesteads supported by SUPPA were visited, in the vicinity of the Bahati forest. The householder of the first homestead related how he had used trees from the CFA nursery for natural hedges/barriers around the household, and how these provided wood for fuel and other uses. This homestead contained a large number of fruit trees, including mango and avocado. Potatoes were intercropped with maize. The householder also kept a small number of cows and a number of beehives. Water was stored in an underground pit.

The householder of the second homestead, Mrs Mercy Kiruthi, described how she used to grow little more than maize, and how farming used to be relatively unproductive. Maize often failed, and crops such as potato and cassava were neglected. However, with support from SUPPA and microfinance, she has diversified her on-farm activities and now grows a wide range of crops. She still grows maize, but employs intercropping to improve the productivity of the maize growing area of the farm. At the time of the visit, potatoes were being grown in the same areas as maize. Other crops being grown on the farm included banana, sugar cane, sweet potato, arrowroot and Napier grass. Banana and sugar cane were grown in channels that captured water runoff and helped prevent soil erosion. The banks enclosing these channels were stabilised with two types of sweet potato. The farm also housed cattle, whose dung fed a biogas digester, the slurry of which was used to fertilise crops. Water storage tanks had also been installed. Potatoes and bananas were processed on the farm into crisps/chips, adding considerable value to these products. Mrs Kiruthi related how a 20-litre bucket of these crops in their raw form might sell for KSh 300, whereas the same amount processed into chips could sell for KSh 2300. It was noted that the production of potato and banana chips was carried out by deep frying them on a stove fed by wood, in an enclosed area. Value addition for these crops was thus associated with increased fuel wood consumption and indoor air pollution, with potential health impacts for the women involved in this activity. Support might be provided to ensure that such processes are based on renewable energy (e.g. the biogas generated from the cattle waste), to reduce impacts on wood or charcoal demand, and health.

SUPPA'S WORK WITH KENYA METEOROLOGICAL DEPARTMENT

SUPPA has worked with the Kenya Meteorological Department (KMD) to provide climate information to farmers, a subject that was discussed during a visit to the KMD Nakuru station, where the learning team met with Mr Thuo Congo. The main benefit of the SUPPA-KMD partnership is that farmers can now access meteorological services without going through Nairobi. While the central meteorological office provides a national forecast, this forecast needs to be downscaled at the county level to be useful. Although the Nakuru meteorological station opened in 1908, it has been poorly resourced and therefore could not reach the community it was intended to serve. Prior to the partnership with SUPPA, farmers were not aware of the existence of the Nakuru station; the Nakuru County service approached farmers through SUPPA, which thus

Production of potato and cassava crisps at Mercy Kiruthi's farm.

facilitated 'first contact' between farmers and the county branch of KMD.

As a result of support from SUPPA, the Nakuru meteorological station has disseminated daily and seasonal forecasts (Box 5) to farmers and communities at large via radio. SUPPA has supported the production of weather advisories that are produced collaboratively by KMD and local communities, to ensure that the information is understandable and practical for those using it. Farmers are also able to call the KMD station at Nakuru directly, and the station can provide 'point forecasts' for particular locations, for example advising farmers whether rainfall is likely to be below or above normal. According to Mr Thuo, the accuracy of the forecasts is about 85%, and this is acknowledged by farmers. It was also claimed that, now that farmers are using forecasts, they are planting two crops a year rather than one, and food production has increased in the county. The engagement between KMD and SUPPA has improved awareness of and confidence in forecasts, and farmers are learning about forecasts and their use from the original target farmers engaged directly by KMD and SUPPA. Some farmers now approach KMD directly as a result of this increased awareness. Mr Thuo reported that SUPPA's support has enabled KMD to:

- Produce downscaled forecasts;
- Sensitise farmers to the usefulness of forecasts;
- Disseminate forecast information;
- Increase acceptance of meteorological/climate information services.

KMD also reported that a prominent politician in Subikia became aware of the forecasts being produced by KMD in Nakuru as a result of the work by SUPPA, and now disseminates forecasts through his own radio station at no cost.

OTHER ACTIVITIES SUPPORTED BY SUPPA

SUPPA has supported a variety of other activities and initiatives in Nakuru County. These include the promotion of: drought resistant crops such as cassava and sweet potato; early maturing crops including maize that matures in 3-4 months rather than 12 months; water harvesting using roofs and pans; water pumps; renewable energy, for example through demonstrations using schools. SUPPA also supported the development of regulations relating to the use of Parethram, a natural insecticide. In the semi-arid area of Lari adjacent to Lake Nakuru, SUPPA has worked with farmers on water harvesting and biogas; an example was given of neighbours adopting biogas as a result of the demonstration effects of biogas installation in one particular farm.

Box 5. Forecasts and climate trends

The forecasts produced by KMD in Nakuru are presented in probabilistic terms. For any given area, forecasts involve a percentage chance of rain. For example, a 60% chance of rain in a particular area would mean that 60% of that area is expected to receive rain. According to KMD, 85% of these forecasts are accurate. Forecasts do no specify the amount of rain, but if farmers call into the KMD station at Nakuru, staff can offer further advice. As a result of SUPPA's involvement, farmers have greater confidence in KMD's forecasts for Nakuru County.

KMD also maintains longer-term meteorological records. These indicate increases in temperature, with notable rises in minimum temperatures. Up until the 1980s, minimum temperatures would fall below 5°C. Today, they rarely fall below 10°C. This has been associated with the effective disappearance of frost, but is problematic in terms of mosquito breeding.

ADAPTATION AND RESILIENCE BENEFITS OF SUPPA

The activities supported by SUPPA, with support in turn from ACT! and StARCK+, cover most of the categories in Table 2, combining capacity development, advocacy, livelihood strengthening, environmental rehabilitation and measures to address climate risks.

Fuel-efficient jiko stove that also provides warmth for rearing chicks.

The Bahati forest rehabilitation alone combines activities in all six categories; the adoption of drought resistant crops such as cassava and potatoes, and of beekeeping, which is productive even in drought years, means that people have broadened their livelihoods to include activities that increase their resilience to climate variability. It is an open question whether the adoption of a suite of more climate resilient livelihood measures constitutes 'transformational' adaptation; certainly the picture painted by stakeholders is one in which SUPPA has facilitated a transformation in people's livelihoods in general.

The work with the KMD station in Nakuru directly addresses climate risks by enabling farmers to use forecasts to plan their agricultural activities. A shift from one to two planting cycles represents a more 'climate smart' approach to agriculture made possible by climate information, but it is difficult to make the case for this as adaptation. The adoption of more rapidly maturing varieties of maize is a good example of 'incremental' adaptation. Water harvesting serves to increase resilience in the face of climate variability, and may represent a form of incremental adaptation where water stress is increasing.

4.1.4 FIELD VISIT TO TREE IS LIFE TRUST (TILT)

BACKGROUND TO TILT

The field visit to SUPPA was followed by a visit to the Tree Is Life Trust (TILT) field office in Nyahururu and to some selected TILT beneficiaries. The learning team met Thomas Gichuru, Director of TILT, and his colleagues, who accompanied them on the field visits.

TILT was established in 2002, and began its partnership with ACT! in 2012. Initially, in Phase 1 TILT focused on capacity building, training of trainers, sensitisation, the development of frameworks to assist communities with natural resource management (NRM) and measures to address climate change (for example at the catchment level).

This was followed by Phase 2, which focused on the application of learning from Phase 1, and on activities such as the promotion of alternative energy for cooking and lighting (biogas, solar lamps), and solar drying for food preservation. TILT directly supported the installation of 20 biogas units, each with a capacity of 60 m^3, and this led to the installation of an additional 34 units of up to 14 m^3 (the maximum capacity for a household unit, at a cost of KSh 100,000, which provides energy for cooking, lighting and heating).

Phase 3 of TILT, from July 2015 to June 2016, examined how to make interventions sustainable. Fish and poultry were supported as ways of generating additional income that was not directly dependent on natural resources that might be used unsustainably. Greenhouse fish farming was supported in Nyandarua County as a means of supplying tilapia year-round; in the southern part of Nyandarua, open ponds are considered marginal due to seasonal cold. In addition, beneficiaries received financial training in relation to the adoption of drought resistant crops and village and table banking. TILT have also established a system that enables people to report forest clearance for charcoal burning, and cattle rustling, via free SMS messages which are converted to spreadsheet data. The relevant authorities can be informed of such instances, and ground truthing can be carried out, to monitor and address these activities.

FIELD VISIT — JIKOS AND CHICKS

The learning team, accompanied by representatives from TILT, visited a community group at the homestead of Mr Kamore. Here a fuel efficient jiko (a cookstove with a ceramic liner that uses less fuel wood) had been installed. Mr Kamore and his family reported that the installation of the jiko had greatly reduced their use of firewood, resulting in significant cash savings. The general discussion with the group and TILT staff suggested that an average size family might spend up to KSh 300 per day on firewood, and save up to KSh 900 per week as a result of the installation of a jiko. These savings might be spent on activities such as education. Household members reported walking up to 10 km per day to collect firewood from the forest prior to installing the jiko. The need to purchase a permit to collect wood from the forest was also raised. The review of end-term evaluations,

The two cattle (left) that provide Madam Maruga with biogas (right).

used in the desk review of ACT! projects, indicates that TILT installed 337 energy-saving ceramic liners to direct beneficiaries.

The construction of jikos was accompanied by training, enabling 12 community group members to adopt the technology, with others outside the group copying the technology. As well as savings in terms of time and expenditure, jikos had positive impacts on health, specifically for women, due to reduced indoor air pollution levels. The reduced requirement for firewood meant that jikos could be run largely from wood derived from on-farm pruning. It was noted that jikos required a significant amount of space, and some smaller households did not have sufficient space to install them.

Another benefit of the jikos was their role in raising chicks, which were housed overnight in the enclosed area containing the jiko, with access to the cavity within the jiko that remained warm due to the heat retained by the ceramic liner. This was reported to have dramatically increased survival rates of chicks with positive impacts on incomes, and to have reduced or removed the need to house chicks in spaces kept warm by electric heaters, with further energy cost savings. Incubators for hatching chicks still need to be powered by electricity, and TILT has provided support for the purchase of electric incubators, which increase survival/hatching rates. Mr Kamore had installed one such incubator, with a capacity of 64 eggs.

FIELD VISIT — BIOGAS

The team visited a small household run by Madam Maruga, whom TILT had supported to install a biogas digester. Madam Maruga reported that her expenditure on firewood had decreased from KSh 1500 to KSh 400 per month due to the adoption of biogas, which meant that she no longer used firewood for cooking. This expenditure was expected to fall further with the planned purchase of a third cow. In addition, this household was using the slurry produced as a by-product of the biogas as fertiliser. Application of the slurry to fields had resulted in them retaining moisture for longer, meaning that crops generally did not need watering. The reduced need for firewood meant that less time was spent collecting it, which meant more time was available for farm activities. Biogas also meant greatly reduced levels of indoor air pollution, with positive health impacts. The learning team were struck by the strength of the flame produced by the gas in Madam Maruga's kitchen, and noted the filters on the gas pipes to remove sulphur from the gas prior to burning.

FIELD VISIT — GREENHOUSE FISH FARM

A farm was visited near Nyahuru, where the farmer, Mr Ruhiu, had constructed a large, covered fish pond with support from TILT. Previously, fish had been raised in open ponds, where they took 18 months to 2 years to mature, and were vulnerable to cold extremes. The farmer related that snow sometimes occurred in this area, and that he had lost some 20,000 fish in one night during one episode of extreme cold.

As well as protecting them from such cold extremes, the warmer conditions in the covered pond meant that the fish matured more rapidly, in some 12 months, after which they reached a weight of around 400g. Warmer temperatures are more conducive to breeding, meaning that more fingerlings were produced to supply to other farms. Previously, fingerlings were brought into the area from some 400 km away. The farmer related how he had helped others to establish fish ponds, including a number of elderly people.

Support for covered fish ponds promotes resilience to climate variability in the form of cold extremes. Whether this constitutes adaptation depends on whether such extremes are becoming more common. The single beneficiary farmer claimed that fish grew well in this area until about 10 years ago, after which frost became more prevalent in September and October. However, this currently remains unverified and seems contrary to expectations of higher minimum temperatures as a result of climate change, and is at odds with the claim by the representative from KMD in Nakuru that temperatures now rarely fall between 10°C. A general rise in minimum temperatures does not preclude the occurrence of isolated extremes,

and these might be geographically restricted, perhaps in areas not covered by meteorological observing stations. Nonetheless, these two interviews seem contradictory with respect to changes in minimum temperatures, and indicate that such anecdotal reports should not necessarily be taken at face value. They also demonstrate the desirability of highly localised climate data for tracking changes in the behaviour of extremes.

This visit highlighted the fact that resilience building and mitigation activities can be in conflict. To maintain the pond, water needs to be exchanged every few weeks, and this is currently done with the aid of a diesel generator. In addition, the diesel generator is used to provide power for refrigeration when the fish are harvested, although they are only stored for a day or two prior to sale. In this instance, resilience building has resulted in an increase in the use of fossil fuel based energy, and thus of greenhouse gas emissions. This case highlights the need to ensure that resilience/adaptation and mitigation/low-carbon development are 'joined up', and that any increased energy demands associated with resilience building are met through the deployment of renewables.

It was noted that fish is a priority value chain in Laikipia and Nyandarua, but that hotels, restaurants and supermarkets often prefer to buy fish farmed in Asia due to its superior quality to locally produced fish. It was speculated during the field visit that this might be due to water quality, and that more frequent or continuous water exchange might improve the quality of the fish. This would increase demand for pumping and thus for energy, exacerbating the conflict between resilience and mitigation if pumps continued to be powered by diesel generators. Solar pumps might be an alternative; while they may not achieve the pumping rates possible with pumps powered by diesel generators, they can provide more sustained pumping. It is recommended that TILT and other organisations screen their activities to determine whether they are likely to increase energy demand, and support transitions to renewable energy where this is the case.

4.1.5 SUMMARY OF LEARNING FROM ACT!

ACT! represents one of the most diverse portfolios of activities of all the StARCK+ components, due to its pursuit of a 'traditional' project-based approach, with individual projects engaging multiple stakeholders and supporting a diversity of activities across a range of geographical contexts (in contrast to the more narrow focus of the private sector initiatives under KCIC and REACT, for example). The ACT! projects span all six categories of activity in Table 3, with a strong focus on capacity building, policy influencing, and livelihood strengthening and/or diversification, which are represented in the majority of ACT! projects.

Most of the ACT! projects support activities that address the existing adaptation deficit and improve resilience to familiar historical climate risks, that would be sensible even in the absence of climate change. The majority of these activities are likely to confer some adaptation benefits with respect to climate change. However, the extent to which they will deliver the adaptation that is necessary in the foreseeable future will depend on the scale of their deployment, their sustainability, and their ability to compensate for the impacts of climate change. An example is water harvesting and storage. For this to constitute adaptation it needs to be on a sufficient scale to compensate for future deficits in rainfall and runoff. It is uncertain to what extent these general resilience-building measures, which represent the majority of the ACT! portfolio, will deliver sustained adaptation benefits under climate change that is likely to continue to accelerate for the foreseeable future.

Only a handful of projects (those supporting the adoption of drought-resistant and short cycle crops) can be said to involve specific measures to adapt existing systems to changed climatic conditions. These will represent 'incremental' adaptation measures where they involve drought-resistant or short-cycle strains of crops currently grown. Where they involve the adoption of completely new crops they may be described as transformational. ACT! supports some other measures that might represent 'transformational' adaptation, if they replace or augment systems or practices that are failing increasingly frequently as a result of climate change. These measures include the adoption of novel, climate-resilient crops (including perennial trees and shrubs) and livestock (goats, chickens, bees), as alternatives to existing activities. However, for these measures to represent transformational adaptation they would need to be adopted at scales sufficient to supplant, either individually or in combination, existing activities. SUPPA provides an example of the adoption of a package of crops and agricultural practices that has had a transformational impact on productivity and livelihoods in the face of more variable climatic conditions, and it might be argued that this constitutes transformational adaptation. If so, similar experiences might be identified elsewhere in the ACT! and StARCK+ portfolios, and the extent of adaptation might have been underestimated.

Discussions with ACT! stakeholders highlighted the strong focus on improving the productivity of existing systems, reducing inputs or improving their efficiency, diversification of livelihoods and income streams, increasing access to energy, natural resource management, and empowering people through training and advocacy support. The livelihood benefits of reduced energy costs resulting from a transition to renewable energy sources was a recurring theme, as were reduced water costs due to more efficient water use. Ancillary resilience benefits of this transition were also identified (e.g. slurry from biogas as a means of improving soils). It was clear that some interventions (e.g. Project 21) were enabling people to grow crops during the dry season due to the introduction of drip irrigation, when production had previously been impossible in this period. Clearly the ACT! projects have made significant differences to people's lives and livelihoods. Another aspect that was highlighted in the engagement with stakeholders was the importance of links between communities, non-state actors and NGOS (including the ACT! partners implementing the projects), policy makers, local government at large, and other actors. The apparent success of ACT! projects appears to be due in large part to these links, and the extent to which the

management and implementation of the projects is being carried out by organisations that are deeply embedded in project areas, and in local communities.

Challenges were also identified from the learning around ACT!, both at the level of individual projects and more generally. These included the failure of irrigation systems when the water level in an irrigation channel fell below the minimum operational level, and the destruction of crops by elephants. The field visit to SUPPA highlighted an example of where greater resilience and productivity had led to on-farm processing activities associated with increased fuel wood consumption and exposure to indoor air pollution. Similarly, the productivity gains associated with more resilient fish farming under TILT were being supported by storage that relied on diesel generators. This highlights the need to ensure that resilience/adaptation and low-carbon development activities are more closely aligned. The meeting with TILT beneficiaries and KMD yielded conflicting narratives around minimum temperature trends that raise questions about the utility and relevance of climate data/information at very local scales, and/or the way in which climate change and adaptation narratives are being used to frame development activities.

In summary, there is abundant evidence that the ACT! portfolio is delivering significant development and livelihood benefits, many of which are likely to increase people's resilience to climate hazards. The extent to which this can be interpreted as adaptation to climate *change* is uncertain; there are likely to be some such adaptation benefits, and these may be more prevalent than can be determined through this rapid assessment. Certainly, there is a need to better understand the links between livelihood strengthening, natural resource management, general resilience to climate variability, and adaptation to climate change. The ACT! portfolio provides us with an appropriate context for such an investigation.

4.2 LEARNING FROM KCIC

The Kenya Climate Innovation Center (KCIC) provides flexible financing mechanisms to the private sector to "accelerate the development, deployment and transfer of locally relevant climate and clean energy technologies" (KCIC 2016: 3). The learning assignment examined 24 businesses described in the current KCIC Client Handbook (KCIC 2016), based on desk review of the handbook and discussions with KCIC staff. One KCIC project/business (Future Pump) was visited in the field, and a meeting was convened to discuss resilience and adaptation issues with KCIC clients, which two clients (Wanda Organic and Azuri) attended.

Table 5 maps the activities associated with each initiative/business supported by KCIC onto the six categories identified in Table 2 above. The range of activities is narrower than that associated with certain other StARCK+ components, particularly ACT!, but this is to be expected given the focus of KCIC on business support and incubation rather than conventional development projects.

4.2.1 DESK REVIEW OF THE KCIC PORTFOLIO

BUILDING THE FOUNDATION FOR ADAPTATION: CAPACITY BUILDING AND POLICY INFLUENCING

Capacity building by KCIC focuses on support to businesses in the development of business models, proof of concept/demonstration of commercial viability, access to financing, and moving from proof of concept to commercialisation. At the policy level, KCIC works "closely with the government and interested groups/parties to develop policies that support the development and adoption of green technologies in Kenya" (KCIC 2016:4). In addition, KCIC contributes to the creation of enabling environments for resilience and adaptation by promoting technology transfer, supporting research and development through partnerships with local businesses and institutions, and seeking to accelerate the adoption of climate friendly technologies with a potential catalytic effect resulting in further uptake of these technologies. Any training in the use of new products/technologies provided by KCIC's private sector partners to their clients may also be classified as capacity building.

SUPPORTING AND STRENGTHENING LIVELIHOODS

Supporting and strengthening livelihoods through value addition, linking producers with processors and distributors, and providing improved inputs is a major feature of the KCIC initiatives. Linking producers with markets is often associated with innovation involving new livelihood activities, which are discussed below under diversification. Examples of the strengthening of existing livelihoods through opportunities for (further) commercialisation include Classic Foods (partnerships with farmers to increase outputs and provide markets), Nyangora Banana Processing (purchasing bananas from famers), Farm Capital Africa (linking agri-entrepreneurs with investors), and Meisham International (processing of manure to add value for sale).

In terms of improved inputs, Lisha Bora provides improved dairy feeds to increase milk yields, while Wanda Organic sell improved organic fertilisers to farmers. Kenya Biologics seeks to reduce chemical pesticide use through the development of bio insecticides targeting bollworm and the diamondback moth. The manure processed by Meisham International also provides an alternative input to chemical fertilisers.

At the other end of the production process, TSS strengthens the value chain in the dairy sector through the sale of solar powered milk chilling and collecting equipment that reduce milk losses in rural areas.

All the above measures have the potential to improve productivity and thus to improve the economic situation of farmers, putting them in a better situation with respect to further investment in resilience and adaptation. However, with the possible exception of Wanda Organic and Meisham (see below), it cannot be assumed that resilience or adaptation benefits will automatically flow from these activities. Where such benefits are realised, they are likely to be

indirect and depend on the subsequent choices made by farmers and, in the case of Farm Capital Africa, the precise nature of the innovations supported. Projects 14 to 24 in Table 5 focus on the provision of clean water and clean energy, and therefore support the provision of basic human needs, which will have knock-on effects on livelihoods, with potential indirect, downstream resilience benefits. The water-related initiatives may deliver some direct resilience benefits, as discussed below.

LIVELIHOOD DIVERSIFICATION/SUBSTITUTION

The promotion of alternative or complementary livelihoods, linked with access to markets, is supported by a number of the KCIC clients. Contract farming for honey (Proactive Merit), the buying of fruit (Eco Agribusiness), the purchasing of chickens from smallholders (Kuku Bora), and the processing of hibiscus into products for new markets (East African Roselle), all provide opportunities for producers to move into new livelihood activities to replace or complement existing activities. It is likely that many or all of these activities will confer some resilience benefits, due to their lower sensitivity to climate variability than the production of certain seasonal crops whose sowing and cultivation is highly dependent on amounts and timings of rainfall. The resilience benefits of these initiatives are discussed further below.

Many of the initiatives in Table 5 are associated with the creation of job/employment opportunities, associated with additional income streams for households whose members are employed as a result of these initiatives. However, the number of these jobs will be limited, and they do not themselves represent opportunities for livelihood diversification or substitution that can be realised at any significant (i.e. transformative) scale.

CONSERVATION/REHABILITATION OF NATURAL RESOURCES

Conservation, environmental rehabilitation or natural resource management are not addressed directly by any of the activities associated with the initiatives listed in Table 5. However, many of the businesses represented in Table 5 are developing or selling products with potentially large environmental benefits beyond climate change mitigation through reduced greenhouse gas emissions. Initiative 13 and initiatives 16 to 24 all promote the use of clean energy, which has the potential to reduce the consumption of firewood and charcoal, helping to maintain and regenerate natural vegetation systems (provided the adoption of these technologies at least keeps pace with energy demand/consumption).

Table 5. Businesses supported by KCIC, mapped onto the six categories of activity identified in Section 5 of this report. Brackets indicate potential/ uncertain benefits. Shading indicates renewable energy initiatives.

Initiative/business	Capacity building	Policy influencing	L/hood support, strengthening	Diversification /substitution	Conservation, env. rehab., NRM	Directly addressing specific climate risks		
						Adaptation Deficit	Incremental	Transfor-mational
1. Proactive Merit, Makueni				x	x	x	x	
2. Eco Agribusiness Ltd			x	x		x	x	
3. Kuku Bora Indigenous Chicken, Bungoma			x	x		x	x	
4. Classic Foods			x			(x)	(x)	
5. Lisha Bora			x	x		x	x	
6. Nyangora Banana Processing, Kisili			x					
7. Farm Capital Africa – Angel funding, Machakos,			x	(x)				
8. East African Roselle, Kirinyaga			x	x		x	x	
9. TSS			x					
10. Wanda Organic			x			x	(x)	
11. Kenya Biologics Ltd			x		x		(x)	
12. Meisham Intl.			x			x	(x)	

Initiative/business	Capacity building	Policy influencing	L/hood support, strengthening	Diversification /substitution	Conservation, env. rehab., NRM	Directly addressing specific climate risks		
						Adaptation Deficit	Incremental	Transfor-mational
13. Safi Intl., Kibera				x	(x)			
14. Maj Milele Ltd, country-wide			(x)			x	(x)	
15. Human Needs Project			(x)			x	(x)	
16. Future pump			x			x	(x)	
17. Solimpexs Africa			x		(x)			
18. Kenya Power, Mt. Kenya (producers)			x		(x)			
19. Green Link			x		(x)			
20. Schutter Energy PAYG Biogas			x		(x)	x	(x)	
21. Maa Briquette, Narok			x		(x)			
22. Keekonyokie slaughterhouse abattoir gas			x		(x)		(x)	
23. Global Supply Solutions Ltd			x		(x)			
24. Strauss Energy			x		(x)			
TOTALS (ALL)			**20(22)**	**6(7)**	**2(11)**	**11(12)**	**(12)**	
TOTALS (1-16 only)			**12(14)**	**6(7)**	**2(3)**	**10(11)**	**(14)**	

Some of the initiatives involving clean energy are associated with potential risks from climate change. The production of ethanol from sugar cane (Safi International) and biomass briquettes from pineapple feedstock (Global Supply Solutions) is dependent on the continued productivity of these crops, which may be vulnerable to climate stresses and shocks. There is also the potential issue of competition between sugar cane and other crops, which echoes wider issues about the competition between biofuels and food production. This risk is low provided the biomass used to produce ethanol and briquettes is derived from the non-edible parts of food crops or other secondary sources. A possible risk is that dependence on waste from particular types of crop might represent a barrier to adaptation involving a shift to other crops, should climate change threaten the viability or productivity of the former. The development of a biofuels market could also encourage the conversion of land solely for the production of biofuel crops, competing with food crops. However, these risks are hypothetical at this stage. Mini-hydropower (Kenya Power) may also be vulnerable to changes in streamflow resulting from climate change.

ADDRESSING CLIMATE RELATED RISKS

Fourteen out of the 24 businesses supported by KCIC are involved in activities associated with likely or potential resilience or adaptation benefits, beyond those associated with higher incomes resulting from increased productivity. Contract farming for honey (Proactive Merit), the buying of fruit (Eco Agribusiness), the purchasing of chicken from smallholders (Kuku Bora), and the processing of hibiscus into products for new markets (East African Roselle) all provide opportunities for farmers to diversify into activities that are likely to be less sensitive to climate change than the production of certain commonly grown crops such as maize. While bees, fruit trees, poultry and hibiscus can all be affected by climatic conditions, their production is not critically dependent on the timing of rainfall, there is no narrow planting window, and productivity is less likely to be adversely affected by drought than is the case for many crops. A move into these products is therefore likely to deliver benefits in terms of making farmers more resilient to drought and rainfall variability, and helping them adapt to an intensification of these hazards. This adaptation might be incremental. However, if a shift to one or more of these products allows livelihoods to be sustained where previous livelihood activities become unviable, these activities might constitute transformational adaptation.

Resilience benefits are also likely to result from the use of fertilisers that increase soil organic content and thus improve its ability to retain moisture. This will ensure that soils retain moisture longer during dry periods, reducing the need for irrigation and the likelihood of crop failure or damage. The use of such fertilisers may or may not

help farmers to sustain or improve production in the face of intensified dry episodes, depending on the severity and duration of such episodes, and on how long the use of organic fertilisers extends the period crops can survive without rain or irrigation. On these grounds, we can infer that the activities of Wanda Organic and Meisham International are likely to deliver resilience benefits that address the adaptation deficit (see Section 5 above), and may deliver some benefits in terms of incremental adaptation. However, the latter is currently speculative. The slurry from biogas also improves the organic content of soil and its ability to retain moisture, meaning that Schutter Energy and Keekonyokie slaughterhouse may also be placed in this group (although it is unclear what is done with the slurry from the latter).

The strengthening of input/supply can also deliver resilience benefits where climate related risks to specific links in these chains are reduced. This may be the case for Lisha Bora's provision of new dairy feed, if this replaces fodder whose availability is more likely to be affected by climate variability. While this is speculative, work with the climate smart agriculture component of the Finance and Innovation for Climate Change Fund (FICCF) found that innovations in dairy feeds included a shift to high-nutrition feed based on drought resistant fodder crops.

Improved access to potable water, associated with the activities of Maji Milele and the Human Needs Project, may improve people's resilience by making supply more reliable during times of water stress when the quality or quantity of natural/informal water sources may decline. Again, this is speculative, and depends on factors such as the reliability of the supply infrastructure and the existence of buffer reserves for periods of shortage. Future Pump, discussed in more detail below, may confer resilience benefits by allowing more sustained irrigation than more costly and intermittent diesel powered irrigation systems.

Classic Foods and Farm Capital Africa appear to represent entry points for the building of resilience and the promotion of adaptation, but too few details are available to draw any conclusions as to whether such benefits have been or are likely to be realised.

4.2.2 MEETING WITH WANDA ORGANIC AND AZURI

A meeting was held with KCIC partner companies on 28 November 2016. Only two companies were available to attend this meeting: Wanda Organic and Azuri. Both companies were at the proof-of-concept stage in the development of their products.

Wanda Organic[3] produces two types of organic fertiliser for sale to farmers: Plantmate and Prime EC. Plantmate is an organic fertiliser produced from a mixture of plant and animal waste using a bio-fermentation process. Prime EC is a plant food in spray form that can be used with crop protection sprays, which contains a mix of nutrients and trace elements. The Wanda Organic representative highlighted the role of these products in reducing the use of chemical fertilisers and improving soil fertility and moisture retention. It was also claimed that Prime EC appears to extend the lifetime of produce once it is harvested, by a matter of days. Farmers are already using these products and are apparently reporting increases in yield. It was reported that one farmer had been able to purchase two goats as a result of increased incomes from better yields. Some of Wanda Organic's client farmers use sprinklers, but most rely entirely on rainfall.

Azuri[4] is testing solar driers, which are effectively greenhouses, to produce vegetable based flour and dried fruits for local markets. Azuri is involved in a number of value chains, including bananas and mangos. The latter can last up to a year once dried, so solar driers provide a means of reducing post-harvest losses and enhancing opportunities for sustained income generation. It was reported that mangoes fetch around KSh 15 per kilo unprocessed, and that this rises to around KSh 500 per kilo once they are dried. Two kilos of fresh mangoes produce 1 kilo of dry product. Farmers have formed groups for processing their produce using solar driers, and Azuri is currently buying dried products from these groups. Azuri is interested in buying feedstock to undertake more processing themselves. Azuri trains farmers and KCIC has assisted with this training, which the Azuri representative described as "really beneficial". Azuri is also looking at the production of biogas from feedstock waste, which could be used to heat driers meaning that drying could be undertaken even under cool and/or wet conditions, making processing less climate sensitive.

Both Wanda Organic and Azuri focus on activities and products that help to strengthen livelihoods, the former through increased productivity, and the latter by converting productivity into income through processes that reduce post-harvest losses, add value, and enable farmers to spread their income over time through the sale of processed goods. However, there are secondary resilience aspects to these activities in the form of (i) a reported (and plausible) increase in soil organic and moisture content that is likely to mean soils dry out more slowly, and (ii) a means of processing produce that reduces sensitivity to climate variability while improving incomes.

4.2.3 FIELD VISIT TO FUTURE PUMP DEMONSTRATION SITE

Future Pump sells Sunflower solar water pumps and, with support from KCIC, backs up the sale of these pumps with training and maintenance services. A field visit was undertaken to a demonstration farm employing Sunflower pumps near Kendu Bay, on 21 November 2016. The farm included crops, fruit trees, poultry, a fish pond, and a small nursery raising seedlings for sale. At the time of the visit people were purchasing *Moringa oleifera* seedlings. The farmer maintained two solar pumps, one for demonstration purposes and one for household use. A solar pump was observed in operation, pumping water from a concrete irrigation channel to the nursery and fish pond. The irrigation channel was fed by water from the Kibuon

[3] http://www.wandaorganic.com/
[4] http://www.azuri-technologies.com/

Solar pump at the demonstration farm near Kendu Bay.

River, and was part of an irrigation system installed by the Kimira–Oluch Smallholder Farm Improvement Project (KOSFIP). The solar pumping system therefore augments and depends on this pre-existing infrastructure.

The farmer reported that he was using one pump for four acres, and that a total of three pumps would be optimal for this area. Acting as a distributor of Sunflower solar pumps, he told the learning team that he had sold pumps to 50 other farmers. The cost of a solar pump was comparable to that of a diesel pump, but without the subsequent fuel costs. Previously, the farmer had used a diesel pump twice a week on average, at a cost of some KSh 500 per week in fuel. Training and maintenance provided by Future Pump technicians, and the relative simplicity of the pumps themselves, reportedly meant that maintenance was easy and inexpensive, and did not require a long trip to a town or city to purchase replacement parts. The learning team was shown a stack of four diesel generators that were currently not in use.

At first sight this appears to be a purely mitigation/low-carbon development story. However, it was noted by the stakeholders present that, while solar pumps did not produce the peak flow that was possible with a diesel powered pump, solar pumps could be used continuously, providing a steady flow of irrigation water (or supply to a fish pond) during daylight hours. In contrast, pumps powered by diesel generators were used for short periods only intermittently, and so provided a more erratic and occasional supply of water. Solar pumps might therefore be preferable during dry conditions when a more regular flow of water is required.

4.2.4 SUMMARY OF LEARNING FROM KCIC

KCIC focuses on promoting climate friendly businesses, technologies, products and practices through support to the private sector in the form of grants and loans. It is therefore a key test case for the role of the private sector in supporting climate change resilience and adaptation, as well as low-carbon development. KCIC's work with private sector clients focuses on the development of products and business models that strengthen livelihoods, supported by capacity building in the form of assistance with the development of business models, proof of concept, demonstration of commercial viability, access to finance, and commercialisation. A common theme in the KCIC portfolio is linking producers with purchasers and processors who can buy and add value to agricultural products (e.g. purchasing of bananas by processing firms). Another approach is the development of technologies that can be purchased by producers and pay for themselves through productivity gains or adding value to primary products (e.g. organic fertilisers, solar drying kits for fruit preservation, solar milk coolers, improved dairy feeds). Other initiatives focus on the provision of energy and clean water (although the latter is in its early stages).

Like many of the activities supported under ACT!, the above are likely to deliver livelihood benefits that may contribute to general resilience (e.g. longer storage for dried fruits making them less susceptible to spoiling that may be influenced by weather conditions, and reduced milk spoiling that will be greater during warm periods). Transitions to clean energy may indirectly support resilience by contributing to reduced deforestation related to the use of charcoal and fuel wood. Organic fertilisers may improve soil quality, making farming more resilient to dry conditions.

More direct resilience and (potentially) adaptation benefits are likely to be associated with some of the commercial arrangements that provide incentives for farmers to move into livelihood activities that are less sensitive to climate variability than seasonal cropping associated with narrow planting windows. These include relationships based on the purchasing of honey, fruit, indigenous chicken, and hibiscus. Shifts into the production of these commodities may constitute incremental adaptation (where existing livelihoods are augmented by additional amounts of income), or transformational adaptation (if people shift into these activities wholesale, as an alternative to the livelihoods they were pursuing

previously). The development of commercial markets for these products by the private sector through product marketing creates an enabling environment for the adoption of these more resilient livelihoods.

Only two businesses (Wanda Organic and Azuri) could provide representatives to be interviewed in Nairobi, and only one business (Future Pump) was visited in the field. It was therefore difficult to assess the success of the KCIC partnerships with the private sector, both in terms of commercial viability/sustainability and the delivery of resilience and adaptation benefits. Nonetheless, this stakeholder engagement suggested positive outcomes, with the benefits of fruit processing using solar driers from Azuri providing the most convincing livelihood and resilience narrative.

In summary, there appears to be significant potential for the private sector to contribute to improvements in resilience, based on the review of KCIC. However, the nature and extent of any resilience benefits will depend very much on the nature of the business or product. Initiatives to support private sector contributions to resilience and adaptation therefore need to consider very carefully what their goals are, and which businesses and products they should support. Insofar as KCIC appears to have the potential to drive adaptation, this is likely to be through the development of markets for less climate sensitive products and their derivatives, coupled with partnerships between producers and purchasers, processors and distributors. Transitions to such systems linking producers and markets will benefit from policy support and the provision of technical assistance. While the private sector has a very significant role to play in enhancing resilience and delivering adaptation, the KCIC portfolio suggests that it will not be able to do this acting in isolation from government, donors and key intermediaries, at least not initially.

4.3 LEARNING FROM REACT

REACT is a Window under the US$ 244 million AECF, "open to business ideas based on low cost, clean energy and solutions that help small holder farmers adapt to climate change." REACT's goal is the reduction of rural poverty in sub-Saharan Africa, and its "purpose is to catalyse private sector investment & innovation in low cost, clean energy and climate technologies." REACT has multiple objectives, namely coupled environmental & development benefits, employment benefits, and gender impacts. REACT selects business models on the basis of both profitability and ability to reach the 'bottom of pyramid' and high risk remote markets (AECF 2015).

REACT provides funds to 53 companies, with 66% of the funds in the form of repayable grants. 83% of the companies are start-ups, and 54% are renewable energy (RE) companies. The best results to date have been in solar and micro solar photovoltaics (PV), with pay-as-you-go (PAYG) solar described as "transformational" (and therefore relevant to ICF KPI 15). REACT is currently in its third round ($20m *cf.* $53.33m in all rounds), with results being reported throughout 2016. At the end of December 2015, 22 companies had been contracted under Round 3, one had withdrawn, and five were pending approval.

The 2015 REACT report recognises that adaptation is context-specific, and that adaptation is a process, not an event. This presents challenges in terms of measuring the success of adaptation-focused interventions, which add to the challenge of designing adaptation interventions, particularly involving the private sector. This latter point is recognised in the statement that REACT is still looking for evidence of "how business can impact upon climate adaptation," and is developing a "critical mass evidence base." Nonetheless, following discussions within REACT about the feasibility of adaptation investments, it was recognised in Round 3 that "some innovative business models that are outside the scope of renewable energy and climate smart agriculture have potentially significant climate adaptation benefits (e.g. provision of clean water)." However, these are yet to be tested.

In Rounds 1 and 2 of REACT the main focus was on renewable energy (RE), with 18 out of 29 companies focusing principally on RE, and a further 5 having a secondary focus on RE. In contrast, only 8 companies had a primary focus on adaptation, with a further 3 having a secondary adaptation focus. (Three companies had a primary focus on financial services, with a further 6 having this as a secondary focus).

There has been a greater emphasis on adaptation in Round 3 of REACT, with 12 out of 23 companies having a primary focus on adaptation, and one having adaptation as its secondary focus. All but one of the remaining 11 companies have a primary focus on RE. REACT supports companies with an adaptation/resilience focus in Kenya, Mozambique, Tanzania and Uganda. Round 3 of REACT has involved an expansion of support to such companies in Kenya, on which this learning initiative is focused. Currently there are 11 companies supported by REACT in Kenya for which adaptation is a primary or secondary focus.

These include three water initiatives (drip irrigation, pre-paid water supply and solar pumps), three livestock-focused initiatives (insurance, holistic management and feed), one initiative targeting post-harvest storage, one on silk and cotton production, and one media initiative. Five of these companies target arid and semi-arid land (ASAL) areas.

The review of the REACT portfolio included Round 3 initiatives listed on p.19 of the 2015 REACT portfolio report (AECF 2015) with a primary or secondary adaptation component. The review was based on interviews with REACT staff in Nairobi. In addition, two initiatives/companies (Takaful Insurance and Tosheka Textiles) were visited in the field. Future Pump was also the subject of a field visit, although this is jointly funded with KCIC and so is described under learning from KCIC, above. Table 6 maps the activities associated with each initiative/business supported by REACT onto the six categories identified in Table 2 above.

Table 6. Businesses supported by REACT, mapped onto the six categories of activity identified in Section 5 of this report. Brackets indicate indirect or potential/uncertain benefits.

Initiative/business	Capacity building	Policy influencing	L/hood support, strengthening	Diversification /substitution	Conservation, env. rehab., NRM	Directly addressing specific climate risks		
						Adaptation Deficit	Incremental	Transfor-mational
1. Futurepump			x			x	(x)	
2. Equator Kenya Ltd				x			(x)	(x)
3. Takaful Insurance of Africa Ltd			x			x		
4. Mara Beef			x		(x)	x	(x)	
5. Water Forever International Ltd (Maji Milele)			x			(x)	(x)	
6. Bell Industries Ltd			x					
7. Quite Bright Films Ltd	x							
8. Tosheka Textiles Ltd				x			x	x
9. EA Fruits and Farm Co.			x					
10. Drylands Ltd	x		x		x	x	(x)	
11. Seal Towers	x		(x)					
TOTALS	3		7(8)	2	1(2)	4(5)	1(6)	1(2)

4.3.1 DESK REVIEW OF THE REACT PORTFOLIO

BUILDING THE FOUNDATION FOR ADAPTATION: CAPACITY BUILDING AND POLICY INFLUENCING

REACT focuses on the development of business ideas and businesses that promote climate change mitigation/low-carbon development and adaptation, rather than on the building of capacity or policy influencing *per se.* While individual projects or companies might build the capacity of their partners and clients, capacity building activities are not explicitly built into REACT support at the 'project' level to the extent that they are in ACT!, for example. Nonetheless, three REACT initiatives have quite clear capacity building elements or consequences. Quite Bright Films has been supported by REACT to produce a film about climate friendly innovation in Kenya, with a focus on ASAL areas, raising awareness of "innovative devices, techniques and practices relating to renewable energy and adaptation to changing climate."[5] Drylands Ltd provides assistance with animal husbandry as part of its package of support for the rehabilitation of rangelands. Through the installation of telecoms infrastructure, Seal Towers is acting to increase the access of people in previously under-served rural areas to information and communications (including, potentially, the ability to access TV programmes such as those produced by Quite Bright films). Access to communications and information is a vital aspect of people's capacity to innovate and adapt.

SUPPORTING AND STRENGTHENING LIVELIHOODS

Six of the REACT initiatives provide support to existing livelihoods. Future Pump provides farmers with clean, reliable, low running cost equipment for irrigation, that removes the need for expenditure on petrol or diesel, and which can support sustained pumping. It also enables farmers to extend their activities into the dry season. Takaful provides insurance to pastoralists that enables them to buy fodder to sustain livestock during dry periods (or spend pay-outs on other goods and services that improve their livelihood situations — see below). Mara Beef helps to sustain pastoral livelihoods by providing a market for livestock that enables herders to sell cattle before dry conditions depress prices significantly. Bell Industries supports farmers to store grain post-harvest, removing the need to sell when prices are low and securing food stores during the dry season. Drylands Ltd helps to support pastoral livelihoods through animal husbandry and pasture management/rehabilitation. Water Forever / Maji Milele provides people with access to a clean and reliable water supply, a fundamental livelihood need.

Note also that REACT supports a variety of low-carbon initiatives which improve people's livelihoods by expanding access to (clean) energy.

[5] http://www.aecfafrica.org/portfolio/projects/renewable-energy/quite-bright-films-limited

LIVELIHOOD DIVERSIFICATION/SUBSTITUTION

REACT supports two initiatives that promote the adoption of alternative livelihoods. Equator Kenya Ltd supports low-intensity drip irrigation for the cultivation of birds-eye chilies in Malindi, while Tosheka Textiles supports the adoption of eri silk production. Both of these initiatives appear to offer actual or potential adaptation benefits, as discussed in more detail below. Tosheka was the subject of a field visit during the learning assignment (see below).

CONSERVATION/REHABILITATION OF NATURAL RESOURCES

Two of the initiatives in Table 6 directly or indirectly address the conservation or rehabilitation of natural resources. Drylands Ltd works directly to rehabilitate pasture and ensure its sustainable management. While Mara Beef does not work directly on conservation or rehabilitation, the use of areas within the reserve for feeding cattle that are purchased from Maasai pastoralists should add to the utility value of the reserve, making it 'useful' and contributing to the normalisation of relations between reserve areas and pastoralism, which can otherwise be in conflict.

ADDRESSING CLIMATE RELATED RISKS

In terms of adaptation and resilience, five of the initiatives in Table 6 address the adaptation deficit, and build resilience to existing climate hazards. Takaful and Mara Beef directly support people to cope with dry conditions, through insurance designed to ensure fodder for animals during drought, and a market that reduces the financial risk of drought by enabling pastoralists to sell animals before falls in their value, respectively. Future Pump enables farmers to sustain production during dry periods through irrigation. Water Forever/Maji Milele potentially improves resilience if it provides people with a water supply that remains reliable during drought, and replaces less reliable natural or informal water sources that might decline in terms of quantity or quality during dry periods. By using drought resistant grass seed, Drylands Ltd should improve the resilience of pasture to drought.

All of the above five initiatives *might* contribute to incremental adaptation, by building resilience to drought that might be intensifying. Solar water pumps can help farmers cope with increases in rainfall variability by allowing them to irrigate during periods when rain is expected but does not materialise. It is feasible that pastoralists will make greater use of insurance and markets for animals prior to or at the beginning of stress periods as drought increases. An increase in water stress may mean that the relative benefits of a secure water supply increase as climatic conditions become more challenging.

Equator Kenya and Tosheka Textiles provide new livelihood activities (chili cultivation and silk production respectively) that are resilient to drought, and that can replace or augment historical livelihood activities that are becoming less secure as the climate becomes drier. The linking of chili and silk production to value chains through the purchase of these products by Equator and Tosheka respectively provides an additional income stream that might compensate for a decline in reliability of other livelihood activities as drought risk increases. This might be described in terms of incremental adaptation. However, there is also the potential for adaptation through these activities to be transformational if they replace other activities or make them redundant, and if production of chilies and silk is carried out at sufficient scale to significantly improve households' economic wellbeing despite worsening climatic conditions.

Based on the field visit to Tosheka and a sample of its clients (described in more detail below), silk production appears to have significant potential as a transformational adaptation. The discussion of the Equator Kenya initiative suggested that chili farming was perhaps less robust as an adaptation option due to the narrow scope of the market, and the fact that income from chili production is currently dependent on a single buyer, although the latter could also be said of the Tosheka initiative.

4.3.2 FIELD VISIT TO TAKAFUL INSURANCE

BACKGROUND AND RESULTS OF DISCUSSION WITH TAKAFUL

The learning team met with a representative of Takaful in Isiolo town on 24 November 2016, who then accompanied them on a visit to a Turkana village north of Isiolo on 25 November. Takaful is a private company that provides index-based insurance for pastoralists, and has been operating in Isiolo since 2014. The insurance is branded as "Sharia compliant", on the basis that it represents the sharing of risk by community members and is a means of mutual support. While Takaful is a private, profit-making company, it was reported that it does not make a profit from the insurance, but generates this from other products.

The Insurance provided by Takaful is intended to provide pay-outs to cover the cost of fodder for animals during drought periods; it does not compensate people for loss of livestock. It is based on thresholds in forage levels inferred form the Normalised Difference Vegetation Index (NDVI), a satellite-derived proxy for vegetation cover and health. NDVI based monitoring of forage levels is carried out by the International Livestock Research Institute (ILRI). An 80% decline in NDVI values to 20% of a reference value is the trigger for a pay-out.

Takaful has two sales windows during which clients may purchase insurance cover, in January-February and August-September, before the rainy seasons. Pay-outs are made in February and August, as these are the dry periods during which pastoralists are most likely to experience hardship. A policy is valid for one year from the date on which it is taken out, and clients who purchase cover in the first sales window may take out additional cover in the second window (e.g. for additional animals not insured in the former period). Policies are issued to individuals, and individuals within the same household can purchase their own policies. Clients choose which livestock to insure, and how many head of livestock to insure. There is no minimum number of livestock that can be covered, meaning that insurance may be purchased for an individual animal.

Premiums are set based on the type of animal insured, and in which of the 6 weather divisions of Isiolo the client resides. Each weather division has a fixed premium for a given species of livestock, based on the meteorological characteristics of that division. Divisions are defined based on common such characteristics. Pay-outs vary according to animal species and the extent to which forage cover declines below the pay-out threshold. Example premiums and associated pay-outs for the division including Isiolo town, for a given NDVI value, are listed in Table 7. Premiums are calculated by ILRI, based on animals' weight, and using a cow weighing 250 kg as a reference Total Livestock Unit (TLU). The premiums have remained fixed from year to year for each weather division, over 8 sales windows (including the window following the field visit).

Table 7. Example premiums and pay-outs for an NDVI value 10% of the reference value, for different livestock species.

Species	Premium	Payout at 10% below NDVI reference
Goat/sheep	130	1,400
Cow	1320	14,000
Camel	1845	19,600

Pay-outs are intended to enable herders to purchase fodder (and possibly water access) during periods when forage is not available, to avoid the loss of livestock. Pay-outs are made via vouchers or M-Pesa. The amounts of the pay-outs are significant, but less than the value of the livestock. For example, the maximum market price for sheep and goats was quoted by the Takaful representative as around KSh 4000 and KSh 7000 respectively, compared with an example pay-out of KSh 1400 for a fall in NDVI to 10% of the reference value, based on a premium of KSh 130.

The Takaful representative reported that 276 members purchased premiums during the last sales window prior to the field visit (i.e. August-September 2016). Over the seven windows that the scheme had been in operation some 2000 people had purchased premiums, covering some 10,000-14,000 goats, 500 cattle and 15 camels. Takaful has more clients who are completely dependent on livestock than it does clients who live in towns, for whom livestock represents just one livelihood activity. Pay-outs had been made in four of the seven windows to date. In January-February 2016, no pay-outs were made in any of the seven counties in which Takaful operates. In August-September 2016, pay-outs were made for two weather divisions in Isiolo (Central and Oldanyero), based on NDVI cover declining to 14% of the reference value.

A significant challenge identified by Takaful was how clients can secure forage if they are away from their home area. The Takaful representative indicated that Takaful was working with the county government on how to address this.

Takaful is effectively in competition with the Kenya Livestock Improvement Programme (KLIP), supported by the World Bank, which insures a maximum of five TLUs per client (i.e. 5 cows, 3 camels, or 50 sheep or goats). KLIP uses the same threshold as Takaful to determine when to make payments. However, KLIP differs fundamentally from Takaful in that clients receive free insurance cover (hence the limit on the number of TLUs insured). The Takaful representative stated that individuals who take the KLIP insurance generally will not pay for Takaful premiums, and that the free nature of the premiums acts as disincentive for people to understand the details of how the insurance scheme works. In addition, it was claimed that the process for pay-outs under KLIP was not transparent, and people did not understand how they were triggered.

VISIT TO TAKAFUL CLIENTS

The Takaful representative facilitated a visit to Chumbieri Village northeast of Isiolo, home to a Turkana pastoralist community, where there were some 30-40 Takaful clients, and where the learning team met a group of villagers who had taken out Takaful insurance, as well as the local agent for Takaful.

The learning team questioned the group about recent droughts, and 1992, 2002, 2012 and 2014 were identified by the group as drought years, with 2012 representing the most severe drought. It was thought that 2016 might be a drought year, and some herders had already travelled further than usual in search of pasture, but they were beginning to return to their usual grazing areas. Takaful insurance was first taken out by villagers in 2014, and there were pay-outs in 2015. More people joined the insurance scheme in 2015. The group interviewed by the learning team all purchased their first insurance premiums in 2015, and had received pay-outs in 2016.

Nonetheless, the group spoke about the experiences of others in the village who had received pay-outs in 2015, when (according to Takaful) NDVI fell to 14% of the reference value. They related how many people simply moved their animals further to find pasture, preferring to use the pay-outs for purposes such as feeding their families and paying school fees. Wider ranging of herds was possible because elders from the village negotiated access to pasture in other areas. Animals were weak due to the poor forage, but apparently recovered.

One client (Client 1) spoke about how they had initially insured one cow and five goats as a pilot, and now wanted to increase the number of animals covered. They said that since 2015 people who had taken out insurance were speaking favourably about it, with more people taking out premiums, but that it still required some improvement. This last point related, at least in part, to the fact that people did not understand why premiums were different in different areas (the different weather divisions). A second client (Client 2) had insured five goats and used the pay-out to cover school fees. A third client (Client 3) also insured five goats and used payouts to help her buy more goats; she now has a herd of 15 goats.

It was apparent that the members of the community at Chumbieri were generally not using insurance pay-outs for their intended purpose of purchasing fodder to sustain their animals. Instead, they

were relying on the traditional practice of taking their herds further afield to find grazing during dry periods, and using the pay-outs to improve their livelihoods or wellbeing in other ways. It appeared that, at least to a large extent, people saw pay-outs as a source of income rather than as a means of addressing drought risk. Client 3 said that if she did not receive a pay-out she would sell goats for income.

The group was asked what they would do if there was a very severe and extensive drought, that meant options for moving further away to find grazing were limited or negligible, and animal prices were low meaning that sales of livestock would generate little income. The response was that they would definitely use the insurance pay-outs to purchase animal feed. If this was insufficient to sustain their livestock through the whole of the dry season, they would sell their healthiest animal to buy feed to keep the others alive.

The group was also asked about the extent to which they used climate information. They responded that they received a lot of information from national radio, and also from Takaful field visits, the latter in the form of downscaled forecasts from the National Drought Management Authority (NDMA). Drought flags were also placed in villages by the NDMA, with green indicating good conditions, yellow indicating a risk of drought (i.e. below average forage), red indicating drought conditions, and black indicating severe drought (with an NDVI below 20% of the reference value). All this information enables people to plan for bad seasons, for example by moving or selling animals. However, people do not have forecast information when they purchase the insurance premiums from Takaful, so their decision as to whether to take up insurance is not informed by any information about the likelihood of drought in the period to be covered.

A number of issues were raised by the clients and the local agent for Takaful. Insurance pay-outs sometimes came in the form of vouchers that recipients needed to take to a bank in order to receive cash. However, banks were sometimes not ready to honour the vouchers, meaning that people might spend KSh 500 taking a motorbike to town, only to discover that they could not receive the payment. People sometimes have to make several trips to the bank before they receive a payment, spending a significant proportion of the pay-out on travel. This problem is particularly acute where small numbers of animals are insured, as is common.

Another challenge is that people sometimes don't believe that no pay-out is due, and want Takaful staff to come to the village to explain why they are not receiving pay-outs (as opposed to explaining via phone). This is a drain on Takaful's time and resources. It also suggests that people expect a pay-out as a matter of course, and do not fully understand how the insurance works.

A further issue was that the local agent said that he was not making money by representing Takaful, meaning that there was no incentive for him to carry on with this role.

CHANGES IN LIVESTOCK MIX

The Chumbieri group reported that there was a general shift away from cattle and camels to goats. Goats are viewed as more drought resistant, and are also more productive, having an average of 2-3 offspring per year compared with one calf per cow. Goats are also viewed as easier to keep, and were said to be popular with women. This view is compatible with the stories of Clients 2 and 3, both women who owned goats, with at least one of them seeking to increase the number of goats. Because of the ease with which they can be managed and fed (on a wide range of feed stuffs), goats can be kept by women in the vicinity of the village, without the need to travel long distances in search of pasture. As a result, more women are apparently moving into goat husbandry, which provides them with an independent income and their own assets.

While camels are also drought resistant, they are expensive to buy and maintain, and so are seen by the villagers as a less attractive alternative to cattle than goats. Only three people in the village were reported as owning camels.

Another innovation reported by the Chumbieri group is the shifting of some of their assets from livestock into money in bank accounts, through the sale of part of their herds. This partial shift from animals to "silent" financial assets reduces risks associated with climate hazards (principally drought) and theft/rustling that can devastate herds and livelihoods, and represents a form of risk spreading through asset diversification. Financial assets can be used to rebuild herds after drought-related losses. When the learning team visited the village, a herd of 700 goats had been stolen, and armed villagers were in pursuit of those responsible.

INTERPRETATION OF THE TAKAFUL SCHEME FROM A RESILIENCE AND ADAPTATION PERSPECTIVE

The Takaful insurance scheme should enhance the resilience of pastoral livelihoods by enabling pastoralists to maintain their herds during droughts, through improved access to animal feed/fodder. However, at present, it appears that the insurance is viewed principally as an additional source of income, with pastoralists taking up the insurance continuing to rely on traditional mechanisms for coping with drought, including travelling greater distances to find pasture, and reciprocal arrangements or negotiations with other communities to access pasture in other areas. This might act as a disincentive to the more sustainable management of rangelands that could reduce the impact of droughts, although evidence from the learning around the Isiolo County Adaptation Fund suggests that there is a shift to more sustainable rangeland management, at least in some areas. Currently, the benefits of the insurance provided by Takaful seem to be focused principally on general livelihood strengthening and an increase in incomes and assets (e.g. livestock numbers).

This situation may change if droughts become more severe, suggesting that in practice this insurance scheme may represent a means of incremental adaptation, allowing pastoralists to

accommodate an increase in drought risk. However, this remains untested.

The shift in livestock mix away from cattle and camels towards goats, and the increasing importance of financial assets as a substitute for assets in the form of livestock, are interesting from an adaptation perspective. These might be viewed as representing 'transformational adaptation', in which one livelihood activity or system is replaced with something else, or a new livelihood is adopted. Transitions from cattle to goat herding during times of increasing aridity have a long history, and have been observed in archaeological records from the Central Sahara and Western Asia, where they coincided with transitions to much more arid conditions during the last period of global climatic reorganisation between about 6400 and 5000 years ago (di Lernia 2002; Brooks 2010; Clarke et al. 2016). In the contemporary setting of Chumbieri, the shift to goats appears to be driven only partly by adaptation to increased climatic variability and aridity (although this seems to be a significant factor), with economic factors playing a major role. The pay-outs from Takaful appear to be supporting this shift to goat herding by enabling people, and particularly women, to purchase goats, which are economically attractive due to relatively low inputs and high returns. The economic independence this is delivering to women is in itself transformational, and echoes the finding that past transformational adaptation has often involved changes in relations between different social groups (Brooks 2006a, 2016; Djoudi and Brockhaus 2011).

It is notable that the purchasing of insurance premiums from Takaful is not informed by climate information. Further investigation would be required to determine whether forecast information during the sales windows would enable people to make more informed decisions as to whether to purchase insurance cover. If so, this would be useful to pastoral communities in terms of optimising their expenditure on insurance. However, such an innovation would undermine Takaful's business model, as people would be more likely to purchase insurance only in high-risk years, when pay-outs would be triggered. One response might be for Takaful to base premiums not simply on weather divisions, but also on the likelihood of drought based on forecasts. Once again, it should be emphasised that further investigation into the availability and utility of forecast information during sales windows is desirable to understand this issue more fully.

An alternative to the purchase of insurance premiums might be the establishment of community savings funds which would be deployed to assist people during times of stress. This would require the creation of enabling environments for the establishment of such funds, and would represent an alternative to the current model that seeks to improve resilience through the private sector.

4.3.3 FIELD VISIT TO TOSHEKA TEXTILES

Tosheka (http://www.toshekadesigns.com/) is a social enterprise producing eco-friendly textile products. A field visit was undertaken to the Tosheka installations in Makueni, and some nearby client farms, on 28 November 2016. This visit was facilitated by a Tosheka staff member from Nairobi.

Tosheka started working with farmers approximately a decade ago, to improve cotton yields using natural fertiliser produced from the neem tree. At that time cotton was the main cash crop in Makueni. According to the Tosheka representative, this resulted in increases in yields from around 200 kg/acre to 600-800 kg/acre. However, in the past decade or so, climatic conditions have deteriorated, making cotton less viable. The Tosheka representative spoke of more frequent rainfall failures and more pests, which were difficult to deal with due to the high cost of pesticides and health effects associated with their use. She related that people have turned to charcoal as a cash alternative to cotton, out of necessity, with "almost no-one [now] growing cotton due to changing weather patterns." Fruit farming (e.g. mangoes, oranges) is also practiced in Makueni, although there had been widespread failure of the fruit harvest in the previous year due to disease.

For the past 3-4 years, Tosheka has been working on silk production using eri silk worms imported from Ethiopia (the species originates in Japan), which are fed on the castor plant that is indigenous to Makueni and grows widely in the county. Crucially, both the castor plant and the caterpillars survive in conditions under which cotton fails. Tosheka is encouraging the planting of castor to prevent people taking the plants and/or leaves from areas where it grows wild (e.g. along the river), and thus make the production of silk sustainable. The establishment of the Tosheka operation involved a long process of piloting and certification. Support from REACT has enabled an expansion of this operation through the training of farmers. Currently, Tosheka is not blending silk with cotton, but the company is still encouraging people to grow cotton as a cash crop, as they would like to bring it back into production. While cotton can still be grown, it is less productive than it was, and has a low effective monetary value.

The field visit started with a tour of the Tosheka 'granary' at Wote, which propagates eri eggs and rears the eri moth through its complete life cycle. Eggs are hatched and caterpillars are reared on castor leaves. The caterpillars produce cocoons in which they pupate to hatch as moths. It is the cocoons that provide the raw material for the production of eri silk. Some cocoons are allowed to hatch to provide the next generation of eggs and caterpillars, while most enter the supply chain. The granary sells eggs to farmers, who also receive technical support and training in how to rear caterpillars to produce cocoons. The cocoons produced on farms are placed in sacks and sold back to Tosheka, which uses them to produce textiles. Pupae are used in chicken feed, and the excreta from the caterpillars is used as fertiliser.

The field visit included a tour of the Tosheka workshop in Wote, where local people were trained in weaving, providing both jobs and income. Both men and women are trained at the workshop, with men tending to be more interested in dyeing, although some men also engage in weaving. However, silk production through the rearing of eri caterpillars has attracted more young women. It was reported that

Eri caterpillars (left) and cocoons for silk production (right) at the Tosheka granary at Wote.

many young people have stopped farming in Makueni, and they are increasingly seeking employment in the cities. The rearing of caterpillars for silk production is less labour intensive than farming, and is not associated with the stigma attached to farming, which is seen as an activity for the uneducated. As a result, young people are moving into silk production, which provides an alternative to leaving rural areas for scarce jobs in the cities.

FARM VISITS

Tosheka works directly with 40 farmers, and with four community groups. Two farms were visited, both of which were run by women who reared caterpillars as clients of Tosheka. One of the clients had worked with Tosheka since 2006, when the focus was on organic cotton; both had been rearing caterpillars for approximately a year. Both clients told similar stories about the benefits of caterpillar rearing, including minimal inputs and the small amount of time required to maintain the granaries (about half an hour a day). Caterpillar rearing is done at home, and can engage the whole family including children, meaning all family members are effectively trained in this livelihood activity. There was no need to plant anything where castor leaves could be picked from plants already growing on the farm, and no pesticides are involved. Low inputs were coupled with high returns; the cycle from farmers' receipt of caterpillars to their production of cocoons is typically about 16 days, after which the cocoons are sold back to Tosheka, who pay 200 Ksh per kilo of cocoons. A typical enterprise can produce 20 kg of cocoons per cycle, meaning an income of some KSh 8000 per month. This is likely to be exceeded only by the income from fruit sales during the months when fruit are harvested. One of the clients spoke of how some people received government food relief, but the money from the cocoon sales meant that they did not need such support.

It was reported that it is typically women who show interest first in caterpillar rearing, but that men become involved once they see the financial benefits of this activity.

INTERPRETATION OF TOSHEKA ACTIVITIES FROM A RESILIENCE AND ADAPTATION PERSPECTIVE

The most immediate and obvious impact of Tosheka's activities is the significant amounts of regular, additional income that caterpillar rearing generates for participating households. The novel nature of caterpillar production means that Tosheka is supporting both livelihood strengthening via additional income, and livelihood diversification / substitution. While caterpillar production may not be seen by farmers as an adaptation to climate change, it appears to be climate resilient, and offers an alternative, highly profitable, livelihood activity that can be expected to be sustainable under climate change, where other activities such as cotton production and perhaps even fruit production may become less viable. It is thus the most convincing candidate for the category of 'transformational adaptation' in the REACT portfolio, and one of the best examples of this type of adaptation at the farm level in the entire StARCK+ portfolio. There seems to be significant potential for silk production to be scaled up, as long as there is a market for the product. Silk production from eri caterpillars thus provides us with a rare example of an alternative livelihood activity that is likely to be viable under climate change when prior/existing activities may not be, and that has the potential to improve people's economic circumstances under climate change.

4.3.4 SUMMARY OF LEARNING FROM REACT

Like KCIC, REACT focuses on delivering resilience, adaptation and low-carbon development through support to the private sector, promoting climate-friendly businesses and business ideas. However, REACT supports some initiatives that are less directly focused on the development of specific commercial products and values chains than the majority of the KCIC portfolio, with structures and goals that are more reminiscent of the development project-type approach. These include awareness raising of innovation in response to climate change by Quite Bright Films, drylands rehabilitation by Drylands Ltd, telecoms access via the work with Seal Towers, and improved water access through the partnership with Water Forever.

REACT directly supports livelihood strengthening through its support to Future Pump (through solar water pumps with low running costs), Bell Industries (through post-harvest storage bags that reduce losses), and its support to numerous clean energy initiatives. Its support to Takaful and Mara beef contributes to the resilience of pastoralists by providing insurance for fodder, and a market for cattle that reduces the livelihood impacts of drought, respectively. Both these initiatives may help pastoralists cope with climate change, although the extent to which they can be viewed as adaptation initiatives is arguable. The Takaful clients that were interviewed appeared to feel they were benefiting from the insurance. However, rather than spending insurance pay-outs on fodder as intended, they continued to practice historical strategies for coping with dry conditions (e.g. moving further to find pasture) so they could spend this money on other livelihood investments (e.g. additional goats) or costs (e.g. education). It is therefore difficult to argue that the insurance had made them more resilient to climate variability and change, although it could potentially have this effect if these historical strategies cease to be options in the future.

Tosheka textiles provided more convincing evidence of adaptation, through a move into a livelihood activity (the rearing of caterpillars for silk production) that is demonstrably less sensitive to climate variability and change than livelihood activities pursued historically, which appear to have become less reliable and productive because of climate change. A case could be made that Tosheka has enabled 'transformational adaptation' in Makueni; the adoption of silk production certainly seems to be having a transformational impact on participating households. Adaptation benefits might also result from chili production supported by the partnership with Equator Kenya Ltd in Garissa, although the evidence for this is much more equivocal.

Like KCIC, REACT demonstrates the importance of developing markets for products based on climate-resilient value chains, and of linking producers into those value chains. Partnerships with established enterprises supplying existing markets, to transition to more climate-resilient / less climate-sensitive inputs, provide good entry points for the promotion of adaptation through the private sector.

4.4 LEARNING FROM FICCF

The FICCF provides grants to Climate Care, the Kenya Association of Manufactures (KAM), and the United Nations, and supports a climate smart agriculture (CSA) initiative via four microfinance contracts to ECLOF MFI, Century Bank, Rafiki, and Inuka Africa MFI. Climate Care and KAM focus on low-carbon development. The resilience and adaptation learning around the FICCF component of StARCK+ therefore focused on its support for CSA, and specifically on the support to ECLOF and Superior Highland associated farmers in Embu, TRANSU Ltd in Kisumu, and Dashcrop in Homa Bay (via Rafiki). A field visit was undertaken in September 2016 to a dairy initiative supported by ECLOF in Embu. In November 2016, field visits were made to Dashcrop and its parent organisation, RhEAL Solutions, in Homa Bay, and a number of cassava growers working with Dashcrop. A meeting was also held with TRANSU, which acts as a sorghum aggregator in Kisumu. The results of these field visits are described below.

4.4.1 MICROFINANCE FOR DAIRY FARMERS IN EMBU COUNTY

On 29 September 2016, the learning team visited the Embu branch office of ECLOF, Superior Highlands Dairy, a demonstration farm, and two smaller beneficiary farms in Embu County, accompanied by representatives of ECLOF and Shedwin, a local consultancy firm working with ECLOF. FICCF provides microfinance loans to farmers through ECLOF, and these loans are combined with technical assistance to farmers provided by Shedwin. Loans are available for a wide range of purposes, including the purchase of cattle, insurance, biogas generators and farm equipment. However, the key focus of this intervention is on climate change mitigation through increased efficiency of milk production combined with reduced emissions from livestock, resulting from a transition to more nutritious fodder plants and feed mixtures.

Superior Highlands acts as an aggregator, collecting milk from dairy farms and sending it to Brookside Dairies, the national processor, after testing for quality, biological contamination and adulteration. The dairy is supplied by feeder farms, which include two demonstration farms. These are piloting transitions to improved fodder, an initiative which started in January 2016 with support from the FICCF. One farm working with Inuka in Ngorika is combining this with the use of climate information from the local meteorologist that is sent to a technical adviser who disseminates this information to farmers in a more useful form. While this scheme has not been replicated in Embu, stakeholders in Embu were introduced to it during sensitisation.

The transition to improved fodder involves a shift from a low-protein, high-fibre mixture of dry maize (which is grown as a fodder crop) and Napier grass to a mix including higher protein, lower fibre fodder crops including grasses and leguminous plants. These grasses include bracharia and sorghum; the legumes include calliandra, lucern, leucaena and mulberry. Bracharia is more drought tolerant than Napier grass, and contains 16% protein compared with Napier grass' 4%. Leucaena and calliandra contain 25% and 22% crude protein respectively. Mulberry is mixed with other crops to make them more digestible.

The basis of the transition to higher protein fodder mixes with a higher content of legumes is the view that animals fed on high-fibre grasses produce more greenhouse gas emissions and produce lower milk yields than those fed on legumes and higher protein, lower fibre feed. Currently, the hypothesis that a shift to higher protein fodder mixes will result in higher milk yields is being tested in the supply chain around Highlands Dairy, using a data sheet including a farm profile and a record of day-to-day operations including milk yield per animal. Results were beginning to come in at the time of the field visit, and managers at Highlands Dairy reported that they were seeing

an increase in the quantity of milk being delivered. They were in the process of determining whether this was the result of an increase in milk yield per animal.

VISIT TO DEMONSTRATION FARM

The demonstration farm was growing a diverse mix of crops, including banana, coffee, calliandra, mulberry, leucaena, bracharia, spinach and squash. Microfinance from ECLOF had enabled the owner of the demonstration farm, Esther, to purchase and pilot new fodder crops. It was described how the new leguminous crops are planted in the wet season, after which they can grow year-round without irrigation. Esther stated that she needed about 500 leucaena plants to provide fodder for one animal. Three cows out of the 25 on the farm were being fed with the new fodder mix, and Esther related how milk yield had increased and health had improved on this regime, declining again when the new fodder crops were finished and she reverted to the previous mixture of dry maize and Napier grass.

Microfinance had also enabled Esther to purchase a water tank for dry season supplemental irrigation, and structures for dry season fodder storage. Other farms had purchased solar coolers to keep evening milk cold/chilled overnight. ECLOF also provided support for farmers to insure their cattle. Among the loaned farmers, three insured cows had died and pay-outs had been made within four months. Common causes of cattle death were reported as disease, lightning strikes and floods.

VISITS TO SMALLER FARMS

The second farm visit was to Jane Wawira, who owns two acres of land on which she grows only coffee and fodder for her cattle, but farms 14 acres in total herself, and 24 acres with her husband

Jane was working on a feed and lactation plan, the latter involving staggered calving, so that at least one of her cows was producing milk. Jane had learnt about silage storage from the Esther's demonstration farm, and took out a KSh 300,000 loan to extend her cattle shed and cover it with a roof, install piped water for the cattle, and create silage pits. She was also leasing land to grow fodder, and purchasing commercial feeds. Her loan repayment period was three years, but she had undertaken to repay the loan in one year. A strong motivation for repaying the loan rapidly was her desire to borrow more money from ECLOF to purchase a biogas digester to conserve electricity, and to construct larger, permanent silage storage pits. She already owned a machine for chopping fodder to make silage, but the Shedwin technical adviser recommended that she consider purchasing a pulveriser. During the course of this exchange it was apparent that whereas maize was used exclusively for silage, woody parts of the calliandra plant could be used for fire-wood, while the remaining parts could be turned into silage.

When asked about the local climate, Rose indicated that the cold was a problem for the coffee on her farm, which was already growing when she acquired the land, and that she had planted some more cold-tolerant varieties of coffee to address this hazard. It was not clear whether problematic cold episodes had become more frequent or severe, but it is worth recalling the claim of more frequent frosts made by the owner of the fish farm visited as part of the learning around ACT!'s activities.

The third farm visit was to Mr and Mrs Simon and Mary Gitonga Wachira, who own just three quarters of an acre on which they grow coffee and fodder crops including mulberry, leucaena, calliandra and sweet potato, whose leaves are eaten by cattle. The couple learned about these fodder crops from Esther's demonstration farm, having previously relied on Napier grass. This farm also houses two cows, a Friesian and a Guernsey, which produce approximately 25 litres of milk per day, some 20-22 litres of which are sent to the dairy. Starting with one cow (the Guernsey), Simon took out a loan to purchase the Friesian (based on training and advice from Shedwin), a chaff cutter to produce fodder, and a motorcycle to transport the milk produced by the farm to Superior Highlands dairy. Simon also uses the motorbike to take milk from other farmers to the dairy, for a fee.

Discussions at the second farm ranged from the amount of the loans provided by ECLOF (sums of KSh 150,000 and 250,000 were mentioned), to the fact that ECLOF requires any cattle purchased with its loans to be insured, although not all animals need to be insured on a farm taking an ECLOF loan. The housing of the cattle, which are zero-grazing, was discussed, and it was stated that climate extremes were not an issue as housed animals have good shade and aeration which makes them better off in the hotter seasons than cattle kept without shelters.

4.4.2 CASSAVA GROWING IN HOMA BAY

SUPPORT TO FARMERS FROM DASHCROP/RHEAL SOLUTIONS

FICCF support to cassava growers was examined through a visit to Dashcrop, an aggregator, RhEAL Solutions, an organisation that provides technical support to Dashcrop, and some cassava growers, in and around Homa Bay on 21 November 2016. With support from FICCF, Dashcrop provides credit and extension support to farmers, who sell cassava back to Dashcrop. Dashcrop recoups its credit and extension costs from these sales. RhEAL Solutions provides training on cassava agronomy to farmers, and provides a link with climate information service providers. Dashcrop developed as a trading arm of RhEAL Solutions, which started as a local technical NGO providing technical support.

Dashcrop and RhEAL Solutions have been engaged with FICCF since August 2015. Prior to this, farmers were producing cassava but there was no well-developed commercial market for the crop. Dashcrop focuses on ethical trading, and providing farmers with finance to develop their cassava business. Transparency was highlighted by the Dashcrop representatives, including transparency in terms of how much produce is purchased from farmers, rates at which produce is bought and sold, and costs within the supply chain between production and processing. The learning team was informed that, if Dashcrop's profit is more than 30%, farmers receive a bonus. Prices

are fixed depending on the state of the market, and farmers' production costs are also taken into account.

The first round of support engaged 264 farmers, and by end of December 2016 Dashcrop expected to have reached 733 farmers in total with the credit services. Cassava planting is spaced/staggered at intervals of four months to ensure a regular supply throughout the year. Technical support from RhEAL Solutions involves meetings in which farmers prioritise their needs, and training for farmers on how to include a 'climate smart' element in the cassava production. This includes intercropping with a focus on green grams (Box 6), which matures in 60 days and acts as a cover crop that reduces weeds and conserves soil moisture/improves soils, and also fixes nitrogen, which increases soil fertility. Cassava does not require pesticides and is in high demand — in the Dashcrop stores the cassava flour shelves were empty as a result of this demand.

Some challenges have been experienced with the production of cassava and associated crops. In the season prior to the field visit, inadequate rainfall led to problems with the establishment of cassava crops and a shortfall in green grams, meaning orders were not fulfilled. Some farmers planted late because they were not reached with credit, and forecast information was also delayed. The timeliness of climate information and credit is critical for successful production. While there is no cassava 'season', some rain is necessary for the crop to become established immediately after planting, and climate information is important in informing farmers when to plant.

FARM VISITS

A visit was undertaken to a cassava farmer, Grace Atieno, who was working with Dashcrop and RhEAL solutions. Grace maintains one acre of cassava of an older variety that is not resistant to disease that had nonetheless been identified by Dashcrop as appropriate for her farm context. She had experienced failure in the previous season due to insufficient rains following planting, but had filled gaps in production with other crops.

Grace Atieno grows cassava alongside maize, but the productivity of the latter has declined in recent years. In the past she would plant maize with few inputs but now she needs to use more inputs such as manure to fertilise the soil. Grace is compensating for the decline in maize productivity on her farm by increasing the scale of maize production, seeking land elsewhere where maize still performs well. She reported that sorghum is growing well and that she is expanding sorghum production, although she decided not to plant it in the season prior to the field visit based on the climate information she received. A further visit was made to another location to meet two other cassava growers, who demonstrated intercropping in their cassava fields.

Box 6. Background to cassava growing in Homa Bay

Cassava is not a new crop in the Homa Bay area. Previously, particularly during the colonial era, maize was heavily promoted alongside rice, potatoes, sugar cane and kale, displacing many traditional crops including cassava and sorghum. Climate change means that these traditional crops now appear to be more appropriate for the region. Currently there is a transition underway from a model in which farmers grow only small amounts of cassava for their own consumption, to one involving the commercial production of cassava, on a larger scale. This transition from maize to cassava can be characterised as one involving a climate 'push' and a market 'pull', as well as other factors such as disease.

The transition from maize to cassava has occurred as maize has become more fragile, with production failing more frequently, and failing more extensively than cassava or sorghum. As a response to the emergence of lethal necrotic disease, which affects maize, in Kenya in 2011 (Wangai et al. 2012), farmers have been advised to adopt a 'sweep clean' approach that involves clearing maize from affected areas, and to diversify into other crops including cassava. As a result of climatic deterioration and disease that affects maize, cassava is more reliable in terms of food security than maize, and there is an emerging commercial market for it. A key advantage of cassava over other crops (including sorghum) is that its production is not tied to specific patterns of seasonality, and is not associated with a specific planting window, which also makes it more resilient to erratic and changing rainfall patterns.

Cassava takes some nine months to mature, which is longer than many other crops, but this can be addressed by diversification and intercropping. While cassava is maturing, multiple legume crops can be produced, including green grams, beans and peas. Intercropping of these crops with cassava is therefore being promoted. Green grams are made into flour, which is mixed with cassava flour to fortify it. Cassava flour is also blended with wheat flour to produce cassangano, which is apparently more nutritious and cheaper than regular wheat flour. Cassava flour is also blended with red sorghum, finger millet and amaranth: a mix of 60% cassava, 30% red sorghum, 5% finger millet and 5% amaranth is produced for schools.

Different varieties of cassava have been produced for different regions. For example, the coastal variety matures in five months rather than nine, but does not do well in the cooler inland and upland areas, and is more susceptible to the cassava mosaic virus. Cassava has also been bred for resistance to the mosaic virus, although this is not total.

4.4.3 SUPPORT TO SORGHUM GROWERS

On 21 November 2016, the learning team met with Phillip Kajwang, head of the NGO Community Action for Rural Development (CARD), of which TRANSU Ltd is a trading wing. TRANSU partners with sorghum growers in the Kisumu, Siaya and Homa Bay counties, among others, through contract farming arrangements. However, FICCF works with TRANSU only in the three mentioned counties. TRANSU provides logistical and technical support to sorghum growers, and buys sorghum from farmers which it then sells on. Farmers are free to sell sorghum elsewhere if they produce sufficient quantities to fulfil their

Grace Atieno on her farm, where she continues to grow maize but now mixes it with cassava.

contractual obligations with TRANSU. Farmers use some of the sorghum they produce for their own consumption, and will often withhold some sorghum for this purpose if the harvest is bad.

TRANSU already had relations with farmers and sorghum buyers prior to the involvement of FICCF. Support from FICCF has enabled TRANSU to expand its operations and address its financial liquidity gap; previously there were insufficient funds to support farmers and mobilise produce on a sufficient scale. FICCF has supported GIS mapping of sorghum production farmer locations to build up a picture of where production is concentrated, so that weather stations can be placed in the most appropriate locations. This also enables the ground truthing of satellite rainfall data for climate information targeting and for index-based weather insurance cover.

FICCF also supports the provision of climate information services (CIS) via SMS messages that inform farmers about planting windows, as well as the desirability of purchasing insurance. FICCF support started in January 2015, but a significant amount of foundational work was required, and the first SMS was not sent out until September 2015. One constraint on the provision of climate information is that the Kenya Meteorological Department (KMD) must make a forecast declaration before other bodies are permitted to use the forecast information for downscaling. This is one of the reasons for the late issuing of the SMS forecasts in the first season of 2016, which had negative impacts on some crops such as cassava (see above). FICCF is moving away from the provision of forecasts by direct SMS messages to farmers, to one in which agents from bodies such as CARD, TRANSU, Dashcrop and RhEAL Solutions pass forecast information to farmers and discuss the implications of forecasts with them at community meetings (Box 7).

FICCF is supporting the provision of insurance to sorghum farmers by a company called APA Insurance Ltd, which has a working arrangement with Acre Africa Ltd for actuarial services. Acre calculates premiums for APA, and these calculations are informed by forecast data supplied by KMD, with which Acre works closely. FICCF has partnered with Acre to provide climate information services, over and above providing actuarial services to APA for insuring FICCF farmers through the microfinance providers identified above; it was reported that a major challenge in securing the provision of insurance was to persuade the microfinance organisations to use climate information as a basis for insurance. The insurance offered to sorghum growers as a result of FICCF support takes a hybrid approach, combining an index-based weather insurance cover with an indemnity-based multi-peril crop insurance cover. The availability

Box 7. Use of weather information for sorghum production in Kendu Bay, and climate change trends

The use of weather information by TRANSU and its contract farmers in the Kendu Bay area involves a strong participatory element. At the beginning of the season, a community meeting is called, after which planting window information and advice based on weather and climate forecasts is sent to farmers by SMS. At the end of the season the forecast is compared with the conditions experienced and observed throughout the season. In this way, communities can develop an understanding of how forecasts relate to conditions on the ground — a qualitative, interpretive process that is analogous to the highly technical process of downscaling forecasts at large spatial to produce forecasts that are relevant at local scales.

Weather forecasts are increasingly important as rainfall deviates further from its historical behaviour. Phillip Kajwang, head of the CARD NGO that works with sorghum growers, related that over the course of the 3-year project to establish and support sorghum contract farming, growers had been asked how their planting dates differ from those of their grandparents in 3 community meetings over two counties. The average difference was around 1 month, indicating that the onset of both the short and long rains occurs approximately one month later than it did two generations ago.

and quality of climate and yield data are poor (except for wheat and maize), and this creates challenges for insurance cover for commodities such as sorghum, hence the fall back on hybrid insurance cover. Weather-oriented losses are assessed using satellite data but peril-oriented losses are assessed through spot checks on farm. There were two insurable seasons in 2016 but due to late timing during the two seasons, premiums (calculated by Acre) have been high. Consequently, this insurance has not been offered to farmers, as it would have been too expensive. CARD intends to offer insurance to farmers in 2017, and sees the problems associated with the first two rounds as part of the learning process in the establishment of a new model to support production.

Phillip Kajwang described the FICCF programme of support to sorghum growers through contract farming backed up with microfinance, CIS and insurance as "pioneering". Farmers were not aware of CIS before the intervention of FICCF, whereas now these services help farmers to decide when to plant; a delay of 1-2 weeks in planting because of uncertainty over rainfall can make a big difference to production. Planting windows are typically two weeks in duration, and agricultural scheduling is carried out in two-week blocks, with two weeks of planting during dry conditions followed by two weeks of 'onset rains', and subsequent late planting. In October 2016 CIS indicated that risks were very high, so not as much sorghum was planted as would otherwise have been the case, and seed was held back. Seed is purchased on credit, so farmers and aggregators who provide the credit risk losing this money as well as yield.

Prior to the shift towards sorghum, farmers were focusing on maize, despite its higher failure rate. Farmers are now planting more diverse and resilient crops. Rains can 'disappear' before a crop matures, and diversification means that there is likely to be more to harvest, and more farmers harvesting. Mr Kajwang highlighted the use of intercropping with sorghum, including beans, peas, soya and cassava. As cassava and sorghum now have well-defined markets, these crops deliver income as well as food security. Farmers are increasingly planting early maturing crops which include beans and white sorghum, the latter of which matures in 60-65 days. Faster growing crops mixed with longer-maturing crops and cassava, which has no specific planting window, help to provide food security throughout the year.

Sorghum production is benefiting from the development of a market for sorghum as an input to the brewing sector, with the production by East African Breweries (EAB) Ltd of low-cost sorghum beer. TRANSU sells some of the sorghum it buys from farmers to EAB for the production of sorghum beer. The extent to which this represents climate-driven adaptation is debatable; sorghum is used to produce a lower-cost beer than that produced from barley, and so targets a different consumer market. Nonetheless, the TRANSU representative interviewed for the learning assignment reported that the costs of barley production are increasing, due to the movement of the suitable barley growing zone as a consequence of climate change. The zone in which barley can be grown is shifting into areas in which existing tea production prevents the expansion of barely cultivation. It is therefore plausible that climate change will adversely affect barley production and push up prices, with impacts on the brewing industry. Although the move into sorghum beer might not be driven by climate change, it might deliver adaptation benefits, by enabling EAB to further develop this part of the market, or to use sorghum as a basis for higher-end products. In this context, it is relevant to note that sorghum from South Africa is used as an alternative to barley by St Peter's Brewery in the UK to produce gluten-free beer for the higher end of the market[6], demonstrating that sorghum beer does not necessarily have to be restricted to the lower-priced end of the market. According to the TRANSU representative, local sorghum production is still not sufficient to supply the Kenyan market, with sorghum being imported, so there is room for significant growth. The same situation pertains for other crops such as soya and green grams.

4.4.4 SUMMARY OF LEARNING FROM FICCF-CSA

There is a strong resilience and adaptation narrative emerging from the FICCF CSA support to cassava and sorghum growers in Homa Bay and Kisumu. Both crops are more resilient to drought than maize, and cassava is particularly robust in the face of increasingly unpredictable rainfall due to the non-specificity of the planting window. Cassava and sorghum are replacing maize to a greater or lesser extent depending on the local context, and sorghum is replacing or complementing barley as an input to beer production, even if it is not necessarily replacing barley *in situ*. Both maize and barley appear to be declining in reliability and productivity as a result of changes in climatic conditions, and there are strong grounds for concluding that the behaviour of rainfall has changed significantly, for example through a sustained shift of one month in the onset of the long and short rains in parts of Western Kenya. There is thus a demonstrable context of climate change, and a clear response in terms of crop substitution. This can be convincingly argued to constitute transformational adaptation, facilitated by the creation or strengthening of markets, and the creation of enabling environments with support from FICCF. The crop diversification that has accompanied the transitions to sorghum and cassava is best interpreted as representing a general increase in the resilience of agricultural systems and livelihoods. The use of climate information to inform farmers about planting windows represents a measure to address a specific climate risk, namely (increased) rainfall variability. The nascent insurance initiative represents another such measure to address the risk of crop failure associated with erratic rainfall. FICCF appears to have been instrumental in these adaptation and resilience-building measures, and it is important that the emerging systems receive sufficient support to establish themselves properly and become sustainable. Phillip Kajwang likened the sorghum growing initiative to an aircraft that not yet taken off but had just lifted its nose in the air.

[6] https://www.stpetersbrewery.co.uk/our-beer-range/bottled-beers/

The adaptation aspects of FICCF support to dairy farming in Embu is less obvious, and this is intended principally as a livelihoods and low-carbon intervention. Nonetheless, the shift to more nutritious fodder based on at least some legumes and grasses that are claimed to be more drought resistant than maize and Napier grass, which have been used historically, suggests increased resilience in the supply chain, which may increase the resilience of diary production to climate variability and change. Micro-insurance for dairy animals might also represent adaptation if climate-related mortality (e.g. from weather extremes, pests or disease) is increasing, although it is not clear whether this is the case in the FICCF dairy context. If the transition to new types of feed results in an increase in zero grazing, it may reduce dependence on rain-fed pasture, thus increasing the resilience of cattle farming. While free grazing is not common in Embu, it is common in Ngorika, and more common in Bomet (which were not visited as part of the learning assignment). FICCF is encouraging a shift towards confined feeding in all the areas in which it operates.

Where FICCF support for microfinance enables farmers to purchase cows, there is the potential for a shift to, or increase in, the use of animal dung as a fertiliser (either applied as dung, slurry from biogas generation, or after other forms of processing). This may improve the resilience of soils by increasing their organic matter content and thus their ability to retain moisture during dry periods, in turn making production systems more resilient to drought.

In summary, the dairy-related support is likely to have some positive impacts on resilience, although these should be viewed as ancillary or indirect resilience benefits resulting from actions principally intended to increase productivity and improve livelihoods regardless of climate considerations. The FICCF work with sorghum and cassava growers is much more directly concerned with addressing risks associated with climate variability and change. While the underlying drivers and motivations for transitions to sorghum and cassava are complex, particularly with regard to their relationship to climate change, there is a convincing case that these transitions represent actual or potential transformational adaptation, supported by transformational changes in enabling environments, and with potential positive transformational impacts on livelihoods.

4.5 LEARNING FROM ADA (COUNTY ADAPTATION FUNDS)

County Adaptation Funds (CAFs) have been set up for Isiolo, Garissa, Kitui, Makueni and Wajir, to support people to cope with climate change through the provision of climate information and other adaptation investments, and to allow climate finance to flow from the Green Climate Fund and other sources to the county level. CAFs are intended to mainstream adaptation into development planning and practice at the county level, and to place decision making around adaptation in the hands of communities.

The first CAF was established in Isiolo. This was developed with support from DFID and the Catholic Organisation for Relief and Development Aid, staring in 2010. DFID provided further support for continuing the CAF process in Isiolo, and for the development of CAFs in the other ASAL counties listed above, from 2013-2016, as part of StARCK+. This involved the establishment of the Adaptation Consortium (Ada) under the leadership of the Kenyan National Drought Management Authority, with technical support provided by Christian Aid, CARE Kenya, the Met Office (UK), Kenya Meteorological Department and the International Institute for Environment and Development (IIED).

The adaption consortium is designed to establish mechanisms not just to give county government access to climate finance and to integrate climate information into county planning and budgeting systems, but also to allow poor and vulnerable households to prioritise investments that will provide resilient pathways out of poverty and climate vulnerability. The approach is designed to enable county governments to institutionalise a decision-making process that puts communities in control of their adaptation priorities, and it will help to ensure that vulnerable communities can oversee the flow of climate finance from national to local level, reducing the risk of elite capture for political or personal gain. The work is being implemented within the framework of devolved governance provided by the Constitution of Kenya that obliges county governments to ensure citizen-led and rights-based approaches to planning and prioritisation of public funding for development. The approach consists of four interrelated elements:

1. County Climate Change Fund;
2. Adaptation planning committees at Ward and County levels;
3. Integration of climate information into adaptation decision-making;
4. Monitoring and Evaluation of Adaptation using the TAMD framework, which ADA has tailored to the Kenya county context.

As part of the StARCK+ learning assignment, learning around ADA and the CAFs focused on Isiolo. This involved rapid desk review of relevant documents (listed below), discussions with members of ADA, and a field visit to Kinna in Isiolo. It should be noted that the ADA consortium includes the Kenya Meteorological Department (KMD) and the UK Met Office, which provide climate information services (CIS) at the county level in the counties where a CAF has been developed. Climate information is downscaled to the sub-county level to provide more relevant information for users than can be delivered by county or national level information. This information is disseminated via various mechanisms including radio, public dissemination through local chiefs, and livestock and agriculture extension officers. These intermediaries have been identified and formed into a CIS dissemination network by ADA, and the CIS plan developed by ADA is used across the 47 counties to deliver CIS. Similar approaches are used by KMD and the UK Met Office to strengthen CIS across the wider region through the Weather and Climate Information Services for Africa (WISER) initiative.

The documents consulted in the rapid desk review of the ADA work around the Isiolo CAF were:

- Strengthening Local Customary Institutions: A Case Study in Isiolo County, Northern Kenya. Ada/IIED Research Paper, May 2015. (Tari et al. 2015).
- Isiolo County Livestock Strategy and Action Plan 2016-2020.
- Isiolo County Adaptation Fund: Activities, Costs and Impacts after the 1st Investment Round. National Drought Management Authority – Kenya. Project Report: June 2014.
- Supporting Counties in Kenya to Mainstream Climate Change in Development and Access Climate Finance. ADA Backgrounder, November 2015.
- Isiolo County Gazette Supplement No. 12 (Bills, No. 10) 2016: Isiolo County Customary Natural Resource Management Bill, 2016.

4.5.1 DEVOLVED GOVERNANCE FOR ADAPTATION AND RESILIENCE IN ISIOLO: RAPID DESK REVIEW

ISIOLO COUNTY ADAPTATION FUND

The Isiolo CAF (ICAF) "consists of a devolved fund to finance investments in public goods prioritised by communities through Ward Adaptation Planning Committees (WAPCs)" (NDMA 2014: 7). These WAPCs work with government planners and local organisations to conduct participatory livelihood and local economy self-assessments, to identify resilience and adaptation needs and prioritise investments to promote "climate resilient growth and adaptive livelihoods" based on a set of principles that seek to maximise benefit, relevance, inclusion, effectiveness, sustainability and value for money (NDMA 2014: 7). The ICAF is aligned with the Isiolo Draft County Climate Change Fund, which ensures the sustainability of actions to address climate change by entrenching climate change action within the county government, and by allocating 1% of the county development budget to fund these actions.

The ICAF is managed by the WAPCs, which are appointed following a public information campaign and vetting process. The ICAF is fully functional, and has funded projects through several investment rounds. The identification of projects is informed by the Community Resource Atlas, which is used for planning at the county level as well as at the community level to identify what projects are needed and where.

WAPCs make adaptation investments from the ICAF and other sources, and to date have focused on strengthening customary institutions known as *dedha*, to improve the management of natural resources. Tari et al. (2015) report that dedha members invested their own funds to boost resource surveillance and the management of grazing areas during the long dry season of May-October in 2014, and that this resulted in areas not being overgrazed despite people coming in from neighbouring counties in search of forage. Tari et al. (2015) also estimate that investment by dedha members in resource surveillance and management was five times the amount provided by the ICAF, and yielded an average immediate return ratio on investment of 24:1, based on livestock sales, survival, health and milk production. In the event of a drought they estimate that this would have risen to 90:1, based on a livestock mortality rate of 40-60% expected in the absence of the water and pasture in drought reserves established under the new community management regimes made possible by the ICAF framework. This suggests that the ICAF has already leveraged community investment in measures that have improved landscape resilience through better management of natural resources, and that this has had a considerable economic benefit.

A notable section of the NDMA (2014: 7) report on the ICAF indicates that the prioritisation and development of investments by WAPCs is targeted at improving resilience and reducing vulnerability to current and near-future climate hazards, but that this may change in the future "to reflect the need for more 'radical' adaptation, such as changes in land use and livelihoods." It is unusual to see such an explicit recognition of the potential need for what the IPCC (2014: 1758) and others (Kates et al. 2012; Chung Tiam Fook 2015) characterise as "transformational adaptation", in any development document. The ICAF is thus remarkably forward looking in its approach to adaptation, at least on paper.

The ICAF has supported 42 community prioritised projects over two investment rounds. These projects are intended to be low-cost, high-impact climate investments, and include rainwater harvesting infrastructure, sand dams, pans/ponds/dams, solar hybrid pumping systems for deep boreholes, the Kinna veterinary laboratory, and community radio stations disseminating CIS and information relevant for natural resource management in local languages. A further 38 projects have been funded under CAFs in other counties, where ADA has also worked to develop legislative contexts. These include the enactments of the 2016 Wajir County Climate Change Act, the Makueni County Climate Change Regulations, and other legislation in Garissa and Kitui that allocates a minimum percentage (1-2%) of development budgets to climate change actions. These budgets were confirmed for the financial year 2016-2017. Different county governments use the same national legal framework (based on the 2016 Climate Change Act) to guide and coordinate their work on climate change. A good example is the use of the Climate Change Act to guide the adaptation actions in Wajir, where Mercy Corps are realigning their approach to conform to the Act. The County Climate Change and Adaptation Funds have helped to realign natural resource management, land governance and climate change legislation at the county level with the dominant pastoralist and agro-pastoralist economies, and to address contradictions and ambiguities in prior legislative frameworks.

ISIOLO COUNTY LIVESTOCK STRATEGY AND ACTION PLAN 2016-2020

ADA has supported the development of the Isiolo County Livestock Strategy and Action Plan 2016-2020 (referred to below as the Strategy), produced by the Isiolo Livestock Department in partnership with the Resource Advocacy Programme (RAP), the International

Institute for Environment and Development (IIED), and programme for Resilience and Economic Growth in Arid Lands – Accelerated Growth. The strategy focuses on removing barriers that constrain the livestock sub-sector's contribution to food security, climate resilience and economic development, and recognises that this contribution could be significant. These barriers include poor governance of rangelands, livestock disease, poor market access and organisation, weak disaster response frameworks, and inappropriate and inadequate service delivery systems. The Strategy seeks to address these barriers and to reinforce the practice of strategic mobility to enhance the performance and productivity of pastoral systems, improve livestock value chains, and facilitate the pursuit of alternative, non-pastoralist livelihoods for those who choose them. Critically, it recognises pastoralism as an appropriate strategy for navigating high levels of climatic variability and uncertainty that might increase as a consequence of climate change.

The Strategy recognises that pastoralism requires specific forms of land rights that allow flexible and negotiated access to key areas and resources. It cites the 2010 Policy Framework for Nomadic Education in Kenya, which proposes a flexible academic calendar with options for educational delivery mechanisms compatible with mobile pastoral lifestyles. The need for mobility across national borders, recognised by a number of regional governance bodies, is discussed, and the restriction of mobility within and between countries is highlighted as a constraining factor that adversely affects productivity. The loss and fragmentation of rangelands is identified as a significant problem for pastoralists and pastoral productivity, as is the poor understanding by government planners of the rationale behind pastoralism.

The Strategy also discusses the entrenched and problematic identification by planners and development professionals of pastoralism with low productivity, overgrazing and land degradation. Low productivity is partly inherent in pastoralism as a result of its dependence on mobility and low impact grazing that emphasises resilience over production, but is also a result of a lack of investment in pastoral livelihoods and value chains. Discourses around overgrazing and land degradation, which became prominent during the Sahel droughts of the 1970s, have been widely discredited as the climatic drivers of rangeland desiccation in this region have become better understood (Brooks 2004, 2006). Nonetheless, they continue to be invoked by governments as a justification for the undermining of pastoral livelihoods, often associated with the expansion of agriculture into historically pastoral areas. The Strategy acknowledges the need to protect rangelands and pastoral resources from such activities, and from other forms of over exploitation, for example through the designation of wet and dry season grazing areas and drought reserves. Crucially, the Strategy recognises the need to place the governance of pastoral areas and resources in the hands of pastoral communities, and to strengthen their voice and role in decision-making.

Box 8. The Kinna Veterinary Laboratory

The Kinna Veterinary Laboratory provides a focus for the delivery of support to pastoralists that means they do not have to travel to Isiolo town to acquire medicine for livestock. The laboratory, supported by DFID, the NDMA and the Adaptation Consortium, stocks a variety of vaccines and offers treatment for livestock. The laboratory also diagnoses diseases so animals can be quarantined to keep them out of grazing areas.

The Laboratory is supported by the community, and the visiting group heard how members are prepared to sell livestock to contribute to the maintenance of the laboratory, and how the community has come together to seek funding to address tsetse fly in the area. The lab was rehabilitated following a proposal from Kinna WAPCs that was fully supported by the ADA consortium. The County Government employed a technician to support the operation of the lab.

ISIOLO COUNTY CUSTOMARY NATURAL RESOURCE MANAGEMENT BILL, 2016

The purpose of the Isiolo County Customary Natural Resource Management Bill, 2016 ("the Bill") is to establish a legislative framework for the management of natural resources in the county. It seeks to ensure that indigenous knowledge systems are recognised and used in natural resource management (NRM), provide for the establishment of a Council of Elders to coordinate water and pasture management, ensure the conservation and sustainable use of natural resources, ensure access to water and forest resources by all community members, and provide for penalties for prohibited activities that affect the sustainability of resources.

The Bill outlines the functions of the Council of Elders, and enshrines principles of justice, diversity, impartiality and gender equality. It also specifies certain aspects of how water, pasture and forest should be governed, defines permitted activities and offences in the use of natural resources, and outlines a dispute resolution process.

4.5.2 FIELD VISITS, KINNA

GENERAL DISCUSSION WITH ELDERS, KINNA VETERINARY LABORATORY

The learning team joined a visiting delegation from the Government of Tanzania for a visit to Isiolo to learn about the experience of decentralisation in Isiolo County, and its implications for resilience and adaptation in the context of the Isiolo CAF. This visit was facilitated and led by ADA. The learning team joined the Tanzanian delegation on 24 November 2016 for a visit to the Kinna Veterinary Laboratory (Box 8) and a community water management initiative, where the group met Kinna Elders and other community members.

The visiting group learned how some of the mechanisms outlined in the documents reviewed above were operating in practice, with a focus on the monitoring of rangelands and the enforcing of their

Water pan near Kinna, with storage tanks via which water is piped to taps and troughs.

sustainable management. Elders described how rangelands are monitored by motorbike, to ensure that people graze only in designated areas, for example avoiding areas set aside for grazing during drought (drought reserves) during non-drought periods (the region had not experienced a severe drought since that of 2011). One community representative is responsible for ensuring that people graze only in designated areas. If they are found grazing outside these areas, they are given two days to move. If they refuse to do so their animals can be seized, and they can be taken to the Elders and fined.

Drought reserves are sometimes used inappropriately by people from outside the ward, for example Garissa, and by herds owned by wealthy individuals who live in Isiolo and are not part of the local community. These might be described as 'absentee pastoralists' practicing 'telephone pastoralism' involving the contracting out of grazing. Reserves are also sometimes used outside of drought periods by people from within the ward. The Elders explained that people grazing in non-designated areas will sometimes lead their animals away to avoid detection, or they may leave. On occasion they are caught, and often they are armed. The local ADA coordinator emphasised that the solution to conflict over grazing is through the governance of natural resources, based on rules enshrined in law.

The visiting group heard about the effectiveness of the decentralisation of decision making and natural resource management, which was now in the hands of local communities. The Elders related how the last drought in the region was in 2011, but the last experience of severe drought in the ward was in 2009. In 2011, people in neighbouring areas suffered from drought, and even today livestock were dying because of inadequate rainfall (rains had not occurred until 17 November, when the 'usual' or expected onset date is around 15 October). However, the members of the Kinna community were not losing animals because of their effective rangeland management. This echoes the conclusions of the report by Tari et al. (2015) cited above. There was a view among the Elders that the changes in governance represented a return to the way resources were managed before government became heavily involved in the area during the colonial and post-colonial periods. Of course, the return to community based management of resources is occurring at a time when governance and management can be assisted by technology in the form of vehicles, satellite remote sensing, systems for generating and delivering climate information, modern animal medicine, and electronic databases. It is also occurring at a time of significant economic and demographic change.

VISIT TO WATER PAN

The learning team and the Tanzania delegation visited a water pan in the vicinity of Kinna, where the local community had installed two water tanks so that water could be piped from the pan, stored, and then piped into troughs for livestock. Prior to the installation of this infrastructure, people, livestock and wild animals had all taken water directly from the pan, and the activity in and around the pan had led to regular water contamination, principally with animal waste. The principle motivation for the installation of the water infrastructure thus appears to have been to improve water quality, rather than to store water for use in dry periods. Community Elders told the visiting teams that the pan could hold water for nine months, although it was dry at the time of the visit, when the rains had only just started, a month later than anticipated.

Access to the pan is now controlled, and users pay to access water. Costs were quoted as KSh 1000 per family per month. This might cover water access for a herd of up to 400 cows. With the new access regime, the pan can service some 5000 livestock at any given time. The fees paid to access water are used to maintain the infrastructure.

Water is lost from the pan through both infiltration and evaporation, and the visiting team speculated that adaptation and resilience building measures could include lining and covering the pan to reduce losses and extend the period during which water is available. The installation of solar panels, for example on or as a cover, could provide the community with renewable energy.

CHANGES IN LIVESTOCK COMPOSITION IN THE KINNA AREA

A discussion with one of the Elders, who was also the Chairman of the Kinna Veterinary Laboratory, indicated that the transition from cattle to goats highlighted in Chumbieri village, also in Isiolo (visited as part of the learning activities around the REACT portfolio), was also

One of the troughs that receives piped water from the pan near Kinna, via storage tanks.

occurring around Kinna. The Chairman related how most people were placing less emphasis on cattle, and more on goats, sheep and camels. The 2009 drought played a key role in this transition, with some households losing 40, 50 or even 80% of their livestock. Because goats are cheaper to purchase than cattle (and camels), they represented an attractive means of restocking. This discussion also highlighted the importance of relations between farmers and pastoralists during drought episodes; in 2009, many pastoralists from Kinna travelled to Meru, where they bought grass from farmers to feed their animals. Nonetheless, most conflict occurs during drought periods, as pastoralists are forced to range further afield, where the potential for conflict with other pastoralists over rangeland is greater.

4.5.3 SUMMARY OF LEARNING FROM ADA

ADA has played a key role in the development of the CAFs, including the ICAF. In addition, it has provided crucial input to the development of the Isiolo Livestock Strategy and Action Plan, and the 2016 Isiolo County Customary Natural Resource Management Bill. The documentary framing of these governance mechanisms is exemplary and, if this is reflected in their implementation, this suite of governance mechanisms will represent a transformational change in the way natural resources and the pastoral livelihoods that depend on them are governed in Isiolo (i.e. a transformational change in the enabling environment for resilience building and adaptation). It is extremely encouraging (and sadly rare) to see the architecture of governance so explicitly recognising the value and appropriateness of pastoralism in dryland areas, and seeking to support and strengthen, rather than undermine, pastoral livelihoods. Pastoralism in Africa emerged and spread as a response to climate change (Holl 1998; di Lernia 2002, 2015; Kuper and Kröpelin 2006), and pastoralism will have an important role to play in adapting to climate change in the 21st century (Brooks 2006b; Kräti 2013). Supporting pastoralism is therefore of great importance from a resilience and adaptation perspective.

Effective implementation of the above governance mechanisms will significantly improve the resilience of livelihoods, livestock systems, landscapes and the economy of Isiolo County to climate stresses and shocks, and will help communities and society at large in Isiolo respond to climate change. The recognition that improving the resilience of existing systems to familiar (albeit potentially intensifying) climate hazards might need to be augmented with more 'radical' or 'transformational' adaptation measures in the longer term is strikingly far sighted.

The discussions with Elders and other community members suggests that the mechanisms outlined in the documents discussed above have indeed translated into significant changes in governance on the ground, and that these are already paying dividends in terms of better, community driven management of natural resources, and improved resilience to drought and rainfall variability. This change has been facilitated to a significant extent by Kenya's decentralisation agenda.

More generally, the CAF represents a mechanism via which resilience building and adaptation measures can be identified, prioritised and implemented by the communities that need to adapt and build their resilience. Adaptation is highly context-specific, and this local ownership of the adaptation process is critical if it is to be successful and sustainable. The requirement that a percentage of the county development budget (varying across counties and 1% in Isiolo) be channelled to adaptation means that at least some adaptation measures should be supported by guaranteed funding. The ICAF demonstrates the importance of decentralised climate finance mechanisms that guarantee predictable budgets for adaptation, coupled with mechanisms for participatory decision-making at the local level, a combination with is critical if appropriate adaptation and resilience-building actions are to be identified, prioritised and implemented at the scales at which they are need to support potentially vulnerable communities.

4.6 TECHNICAL ASSISTANCE TO THE GOVERNMENT OF KENYA

4.6.1 OVERVIEW OF THE TECHNICAL ASSISTANCE COMPONENT OF STARCK+

StARCK+ technical assistance (TA) to the Government of Kenya (GoK) has supported the implementation of the Climate Change Act, and the development of the Intended Nationally Determined Contribution (INCD) and a draft Climate Finance Policy. The TA component of StARCK+ is divided into six work streams (WS), described below.

WS 1 – Development and Implementation of the Climate Change Bill and Policy
Development of a draft Code of Conduct for the National Climate Change Council, the appointment of Council members, the development of terms of reference (ToR) for the Council, and a six-month work plan to implement the Climate Change Act. In addition, this WS includes the development of ToR and the identification of a consultant to undertake an *ex post* Regulatory Impact Assessment of the Act, and liaison with key government personnel responsible for managing the implementation of the Act.

WS 2 – Establishment of a Climate Change Financing Mechanism
Exploring options for the mechanism and developing a report and briefing note on these options, participation in meetings of the National Treasury with County governments to generate input and comments on the draft Climate Finance Policy, revision of this draft policy, review of the policy for consistency with the Climate Change Act, and liaison with the Treasury.

WS 3 – Coordination and Mainstreaming of the National Climate Change Action Plan (NCCAP)
Development of sector briefing notes on Kenya's INDC, expert meetings and reports for the INDC sector analysis, contracting experts to assist with the INDC analysis, and meetings with a variety of government, donor and other stakeholders to coordinate input to the INDC and actions under the NCCAP.

WS 4 – Linking the National Adaptation Plan (NAP) to National Development Priorities
Review and editing of the final approved NAP and submission for design.

WS 5 – Support to Environmental Sustainability Policies
Support to Kenya Revenue Authority and meeting to discuss regulations on solar technologies.

WS 6 – Support to Sectoral Ministries and County Governments
Review of CIDPs for climate change plans and actions, discussion of climate change portfolio, consultation with Ministries of Energy, Agriculture, Transport and Industrialization, NEMA and Kenya Forest Service under INDC.

Together, these activities represent significant support for the mainstreaming of climate change into decision making and planning at the national level. The aligning of national climate change governance and finance mechanisms with those operating at the county level is vital if national policies and plans are to lead to meaningful action on climate change. The establishment of mechanisms for attracting and channelling climate finance is also essential if plans are to translate into actions.

4.6.2 KENYA'S NATIONAL ADAPTATION PLAN (NAP)

The role of financial support from StARCK+ in finalising the NAP, which was published in 2016 prior to COP 22, is explicitly recognised in the preface of the NAP.

The NAP highlights "Kenya's approach of mainstreaming climate adaptation in national and county (sub-national) development planning" (RoK 2016: 1), builds on the 2010 National Climate Change Response Strategy (NCCRS) and the 2013 NCCAP, and aligns with the Climate Change Act, which was enacted into law in May 2016. The NAP also highlights the central role of the National Drought Management Authority (NDMA) in ensuring that "drought does not become famine and that impacts of climate change are addressed" (RoK 2016: 2). The NAP proposes adaptation actions in 20 planning sectors, spanning the short, medium and long term (1-2, 3-5 and >6 years respectively). It also proposes adaptation indicators at county, sectoral and national levels for adaptation monitoring and evaluation (M&E).

The NAP includes a summary of current and projected future climate trends, including a warming of up to 1.5°C by the 2030s, 2.7°C by the 2060s, and 3°C by 2100. This is with respect to the 1961-1990 average, and the projected warming for 2100 is less than that anticipated globally by many climate scientists. The NAP cites a projected increase in annual rainfall with an increase in the proportion of precipitation falling in heavy rainfall events.

The NAP describes current institutional arrangements, climate change policies, and proposed institutional arrangements for coordinating action on climate change. This is followed by a brief analysis of climate hazards (droughts, floods and sea-level rise) and vulnerabilities, the latter described in very general terms at the macro level.

The core of the NAP is a list of proposed sectoral adaptation actions for each of 20 sectors (Table 8). Crucially, a budget is specified for the list of actions in each sector.

Most of the measures listed in the NAP are very general in nature. There is a strong emphasis on risk and vulnerability assessment (RVA), particularly in the short term. It is noted that both DFID and the TA component of StARCK+ recommended a different approach involving the identification of more concrete actions, expressing reservations about the lack of guidance for donors or county governments seeking to understand and invest in priority adaptation actions. Capacity building and integration/mainstreaming also feature prominently. All these activities are important as a foundation for adaptation, and to create the enabling environments in which it

can take place, but they do not constitute adaptation in and of themselves.

More tangible adaptation actions begin to appear in the medium term. These are focused around energy, science and technology, infrastructure, water and sanitation, housing, vulnerable groups, tourism, agriculture, livestock and fisheries. However, some these actions are still described in very general terms such as "diversification".

The intention to increase power generation (Energy) from small hydro plants bears some scrutiny, given hydro power's sensitivity to climate and the potential for climate change to affect the amount and reliability of surface runoff and streamflow. The promotion of locally available climate change adaptation technologies (Science, technology & innovation) echoes the development of such technologies by the businesses supported by StARCK+ through KCIC and REACT, and the innovation 'on the ground' seen in the context of the work of ACT! and the FICCF CSA. Livelihood diversification (Gender, youth and vulnerable groups) is something that StARCK+ has already supported through ACT! and REACT. For example, eri silk farming supported by REACT represents a low-input, high benefit income stream, and goat rearing is a livelihood that is particularly attractive to women and has been supported by ACT! The development and scaling up of CCA (Agriculture) is something that is being pioneered by the FICCF CSA projects, as well as ACT!, and REACT and KCIC also support activities that contribute to CSA. The development of new feed and livelihood options, and the restoration of degraded lands (Livestock) have been supported by StARCK+ through the FICCF (feed transitions), REACT (Drylands Ltd and the promotion of new livelihoods with Equator Ltd and Tosheka), and ACT! (numerous ACT! projects include livelihood diversification, including for pastoralists).

The proposed long-term actions are again very general, involving the implementation of plans, the updating of assessments, the promotion and scaling up of successful measures piloted in the short to medium term, and further capacity building. More 'concrete' actions include the rehabilitation of water catchments (Energy, Water), the improvement of access to climate resilient tree species and cultivars (Environment), the delivery of improved housing and related infrastructure (Population, urbanisation and housing), the implementation of CSA (Agriculture), and the breeding of resilient livestock (Livestock). The expansion of inland and coastal fishing zones is potentially high risk, given the potential negative impacts of higher temperatures, ocean acidification and other changes on fish stocks. On the one hand this may mean an expansion of fishing zones is necessary to maintain production. However, on the other, it may result in an amplification of local anthropogenic stresses on fish stocks, and an increased economic and livelihood dependence on a threatened resource that might become unviable as a result of climate change. The implementation of County Adaptation Plans is already ongoing in some counties with the support of StARCK+ through ADA.

The mainstreaming of climate change in all sectors, the use of climate information and scenarios in planning (currently only apparent under Land reforms), and the engagement of the private sector to encourage investment in adaptation, will be vital if adaptation and resilience are to be delivered.

The extent to which many of the actions listed in the NAP are already being supported by StARCK+ is striking. It is vital that the lessons learned around these actions are capture and disseminated to inform future work that builds on the NAP, and that support for them continues in some form.

Table 8. List of short, medium and long-term adaptation actions for 20 sectors as identified in the NAP. Abbreviations are as follows: CC – climate change; CCA – climate change adaptation; IP – intellectual property; RVA – risk and vulnerability assessment;

Sector	Short-term actions	Medium-term actions	Long-term actions
Devolution	• Participatory county RVAs • Increase community awareness of CC impacts • Build capacity of county governments for CCA	• Develop County Adaptation Plans • Develop County CCA financing mechanisms • Develop CCA finance tracking mechanisms	• Implement County Adaptation Plans • Upscale successful adaptation actions
Energy	• RVAs of infrastructure • Increase RE networks for off-grid areas	• Increase small hydro & geothermal plants for rural areas & job creation • Promote energy efficiency programmes	• Rehabilitate water catchments for sustainable ES including energy production
Science, technology & innovation	• Promote development of prototypes • IP laws to protect innovation	• Promote locally available CCA technologies • Assist tech. transfer to most vulnerable	• Strengthen science policy & practice • Upscale successful technologies
Public sector reforms	• Include CCA in school curricula • Develop public sector CCA manual	• Ensure CCA captured in performance contracting for government sectors	• Update Kenya School of Govt. curricula & performance contracts for CCA

Sector	Short-term actions	Medium-term actions	Long-term actions
Human resource development, labour & employment	• RVA of informal sector • Capacity building on green jobs/ enterprises	• Better SME access to Kenya Climate Fund	• Upscale climate resilient enterprises
Infrastructure	• RVA of existing infrastructure • RVA of upcoming infrastructure • Assess climate compatibility of assets • Capacity building on infrastructure climate proofing	• Climate proof buildings, roads, railways, marine, aviation, ICT infrastructure through use of appropriate design & materials	• Reassess infrastructure vulnerability & upgrade to withstand climate impacts
Land reforms	• Build capacity of land planners in climate change land-use planning	• Integrate CC scenarios in spatial planning • Build capacity of land managers in CA	• Update land-use plans with climate scenarios
Education & training	• Assess inclusion of CCA in school curricula • Design appropriate CC education material	• Integrate CCA in formal curriculum • Integrate CCA in education policy • Develop & implement CCA public awareness mechanism • Operationalise CC resource centre & enhance links with other resource centres	• Update curriculum & public outreach strategies on CCA as necessary
Health	• Undertake VRA of CC impacts on health • Increase public awareness and social mobilisation on CC & health impacts	• Design CC interventions for health sector • Design measures for surveillance & monitoring of CC related diseases for EWS	• Upscale results of pilot projects in CCA in health sector
Environment	• Improve public outreach • Operationalise CC coordinating institutions proposed in CC Act 2016 • Revise & update existing EIA regs. For CCA • Enhance capacity to monitor & enforce compliance of adaptation actions • Strengthen EWS using CIS & indigenous knowledge • Enhance participatory scenario planning • VRA on ES & adaptation guidance • Finalise & implement wildlife adaptation strategy • Develop a forestry adaptation service • Strengthen tree planting and conservation	• Strengthen capacity of national & county institutions responsible for coordinating CCA • Improve & expand CC modelling work by KMD	• Provide guidance and improve access to climate resilient tree species & cultivars • Integrate ES & community based approaches in sector strategies to support adaptation to reduce natural resource based conflicts • Continue rehabilitation of water catchments to provide sustainable ES
Water & sanitation	• Enhance capacity of water management bodies on CC • Promote CC & water awareness • Mainstream DRR in water sector • Promote efficient irrigation systems	• Enhance collaboration for trans boundary water resource management • Strengthen water resource monitoring & assessment for EW & planning • Promote water efficiency technologies	• Implement National Water Master Plan
Population, Urbanisation & housing	• Conduct RVA • Increase awareness of CC impats on sector	• Strengthen building code enforcement • Integrate CCA into planning policies & regs.	• Enhance adaptive capacity or urban poor via affordable housing & related infrastructure
Gender, vulnerable groups & youth	• Enhance access to enterprise funds • Strengthen/expand social protection, insurance • Affordable & accessible credit • Awareness of climate opportunities	• Promote livelihood diversification for vulnerable groups to reduce rural-urban migration	• Promote & support climate resilient livelihoods
Tourism	• Conduct RVA of tourism sector • Build capacity & awareness for CCA • Climate resilient sectoral action plans	• Diversification of climate resilient tourism • Design pilot project that enhances resilience	• Upscale successful pilot projects

Sector	Short-term actions	Medium-term actions	Long-term actions
Agriculture	• Promote indigenous knowledge on crops • Increase awareness of CC value chain impacts • RVA of agricultural value chain • Coordinate, mainstream CCA into extension • Promote new food habits	• Establish, maintain, promote CC info • Develop & scale up specific CCA actions • Performance Benefit Measurement methods for agr. adaptation & development • Support CCA of private sector value chain	• Promote & implement CSA practices
Livestock development	• Increase awareness of CC impacts • Strengthen land use management systems • Capacity building in indigenous knowledge, livestock insurance, EWS, management, etc.	• Develop new feeds • Promote livelihood diversification & market access (camels, poultry, bees, rabbits, ostrich, quail, guinea fowl, other) • Establish price stabilisation schemes & food reserves • Restore degraded lands	• Enhance selection, breeding & management of animals to adapt to CC • Promote CSA
Fisheries	• RVA of fisheries value chain • Enhance Ministry capacity on CC impacts • Upscale sustainable aquaculture	• Develop & implement pilot project on climate resilient fish species & related value chain	• Strengthen capacity to monitor & address over-exploitation • Promote upscaling of climate resilient strategies & technologies • Expand inland & coastal fishing zones
Private sector, trade, business & financial services	• Build capacity to enhance resilience of investments (new products, services) • Demonstrate business case for CCA	• Fiscal incentives to invest in CCA	• Implement long-term PS investment in CCA
Oil & mineral resources	• Build capacity on CCA • EIA of sector incorporating CC elements • Develop capacity for CC integration • Build capacity of oil & gas sector for CCA	• Integrate CC in mining, policy & regulatory framework	• Update risk assessments • Maintain climate resilient oil & mineral resource exploitation
Cross-cutting MTP	Eliminate conditions that perpetuate vulnerability, enhance productive potential of the region, strengthen institutional capacity for effective risk management		

5. LEARNING AROUND REPORTING AND INDICATORS

One of the purposes of the learning assignment was to support StARCK+ partners in their reporting against relevant Key Performance Indicators (KPIs) under the UK's International Climate Fund (ICF), or in contributing to such reporting at the programme level. The ICF KPIs represent a de facto results framework for the ICF at large, with individual programmes funded under the ICF (such as StARCK+) reporting against relevant KPIs. In addition, the learning assignment provided support to StARCK+ partners in their reporting against relevant "institutional climate risk management" indicators defined under the *Tracking Adaptation and Measuring Development* (TAMD) framework, developed by IIED under DFID research grant (Brooks et al. 2011, 2013; Brooks and Fisher 2014). Some of these indicators are closely related to the ICF KPIs, as discussed in more detail below. The TAMD indicators are addressed here because the DMI consortium has been assessing their potential to augment and improve the reporting and learning around StARCK+ results based on the ICF KPIs.

In 2016 the ICF KPIs were being reviewed by the ICF Climate Compass programme (previously Monitoring, Evaluation and Learning for the ICF or ICF-MEL). The outcome of this review was intended to be the revision and improvement of a subset of the existing ICF KPIs. However, the Climate Compass programme is currently on hold and it is unclear what will emerge from it in terms of revised methodologies. The relevance of this for StARCK+ is discussed below.

5.1 OVERVIEW OF RELEVANT ICF AND TAMD INDICATORS

5.1.1 EXPECTED STARCK+ REPORTING AGAINST THE ICF KPIS

StARCK+ currently reports against five of the 16 ICF KPIs:

- KPI 1 – Number of people supported by ICF programmes to cope with the effects of climate change.
- KPI 2 – Number of people with improved access to clean energy as a result of ICF programmes.
- KPI 5 – Number of direct jobs created as a result of ICF support
- KPI 6 – Change in greenhouse gas emissions as a result of ICF support; and
- KPI 12 – Volume of private finance mobilised for climate change purposes as a result of ICF funding

In addition, there are expectations that StARCK+ will explore reporting on:

- KPI 13 – level of integration of climate change in national planning as a result of ICF
- KPI 14 – level of institutional knowledge of climate change issues as a result of ICF support and
- KPI 15 – Extent to which ICF intervention is likely to have a transformational impact.

These KPIs have been added to provide a mechanism via which the actors reporting on policy/governance work can relate their results to the results framework comprising the ICF KPIs, and to begin to identify the results and successes of this work. DFID expects StARCK+ to report on KPI 13, and to explore the extent to which reporting against KPI 14 is feasible.

Another indicator that is highly relevant to StARCK+ is:

- KPI 4 – Number of people whose resilience has been improved as a result of ICF support

While StARCK+ could, in principle, report against KPI 4 at the programme level and/or at the level of individual projects under the StARCK+ umbrella, guidance for KPI 4 was not available when the StARCK+ programme commenced, and reporting against KPI 4 therefore was not mandated in the programme results framework. Reporting against KPI 4 in the wider ICF portfolio remains at an experimental stage. However, future programmes with similar aims to StARCK+ are likely to be expected to report against KPI 4. It is therefore useful to consider how StARCK+ might in principle report against KPI 4, in anticipation of future work building on StARCK+. Furthermore, KPI 4 is the KPI most directly related to the learning question of whether, and to what extent, StARCK+ has delivered adaptation and resilience benefits.

KPI 4 may be viewed as a measure of the *outcomes* of StARCK+, involving improvements in the resilience of individuals and communities to climate shocks and stresses resulting in whole or in part from the StARCK+ *outputs* measured under KPI 1. These outputs are associated with the delivery of goods (e.g. adaptation technologies such as solar pumps and irrigation systems, or drought resistant crop seeds) and services (e.g. training, climate information, capacity building) to programme beneficiaries. The KPI 1 methodology allows us to measure how many people receive such goods and services, which are intended to enhance their resilience and help them adapt to climate change. KPI 4 is intended to measure whether, and to what extent, receipt of these goods and services has had the desired effect of making people better able to anticipate, avoid, plan for, cope with, recover from and adapt to evolving climate related stresses and shocks. In other words, KPI 4 is intended as a test of whether the support captured by KPI 1 is effective in delivering adaptation and enhanced resilience. Any programme or project that reports against KPI 1 should therefore also be able to report against KPI 4, at least in principle.

It is worth noting here that KPI 1 addresses the "number of people supported … to cope with the effects of climate change." KPI 1 therefore is explicitly focused on support for adaptation and resilience, and not on support for low-carbon development (LCD) or the adoption of renewable energy (RE). While the adoption of RE may result in some adaptation/resilience benefits, these most likely will be incidental or 'ancillary' benefits. These benefits cannot be assumed (some RE interventions may have little or no relevance to adaptation/resilience), and even where they exist they are likely to be difficult to evaluate in any meaningful way, let alone quantify. While KPI 2 is a natural LCD/RE analogue to the adaptation/resilience focused KPI 4,

and while both are most appropriately viewed as outcome indicators, the former is not linked to KPI 1, whereas the latter is. Indeed, there is no direct RE analogue to KPI 1, although KPIs 7 and 9 (level of installed capacity and number of low-carbon technologies supported/installed respectively) might contribute to such an analogue output measure.

5.1.2 TAMD INDICATORS

In addition to reporting against relevant ICF KPIs, as part of its learning activities, StARCK+ is addressing how it can report against the eight TAMD institutional indicators[7] described in Brooks et al. (2013), namely:

1. Climate change mainstreaming/integration into planning
2. Institutional coordination for integration
3. Budgeting and finance
4. Institutional knowledge/capacity
5. Use of climate information
6. Planning under uncertainty
7. Participation (vertical and horizontal)
8. Awareness among stakeholders

The above TAMD indicators all take the form of a scorecard with five questions, the answer to each of which is "no", "partially", or "yes". These three answers are associated with numerical scores of 0, 1 or 2, yielding a maximum possible score of 10 for each indicator. These indicators are intended to capture different aspects of the capacity or efficacy of a system to manage climate change risks, the idea being that institutional performance can be tracked over time through repeated application of the indicators. The indicators do not address the issue of attribution or contribution, i.e. the extent to which improvements in institutional performance can be attributed to particular actions or interventions. It is expected that the extent to which an intervention such as StARCK+ has contributed to improved institutional climate risk management will be assessed on a largely qualitative basis, using multiple lines of evidence relevant to any given institutional or programme context. StARCK+ has only explored reporting against the first four TAMD indicators, and StARCK+ partners will not be asked to report against TAMD indicators 5-8. However, these remain relevant, and the Adaptation Consortium has already used them in its reporting.

5.1.3 RELATIONSHIP BETWEEN THE ICF KPIS AND THE TAMD INDICATORS

The TAMD framework and indicators were developed in parallel to the set of ICF KPIs, and there is some overlap between these two sets of indicators. Specifically, KPIs 13 and 14 are identical to TAMD indicators 1 and 4, except for one of the questions making up the scorecard for KPI 13: whereas the second question of KPI 13 asks whether an authoritative body has been budgeted and staffed to coordinate action on climate change, TAMD indicator 1 asks whether there is a formal requirement for climate change to be integrated into planning. TAMD indicator 2 addresses coordination, and its first question is closely related to the second question of KPI 13.

In 2016 it was assumed that KPI 13 would be revised as a result of the work of Climate Compass. Under Climate Compass, KPI 13 was expected to evolve into a more general integration or mainstreaming indicator that could address mitigation, adaptation, and/or forestry, with the focus on the national level being replaced by a more general application to institutional contexts at large.

KPI 14 was expected to undergo much more fundamental changes, evolving into a more general and comprehensive measure of institutional capacity. This would have seen KPI 14 developing into an indicator that included elements of many of the TAMD indicators, for example addressing budgeting, participation, planning under uncertainty, use of climate information, etc. It was assumed that the existing set of TAMD indicators would significantly inform the evolution of KPI 14.

The expansion of KPI 14 into a more general indicator of capacity based on the wider set of TAMD indicators would mean that information used for reporting against the TAMD indicators was likely to be useful for reporting against a future, revised version of KPI 14. Reporting against the TAMD indicators would therefore have been helpful in terms of establishing baselines for reporting against any future KPI 14, and thus as a foundation for future monitoring, reporting and learning.

However, with the Climate Compass programme currently on hold, the extent to which KPI 13 and KPI 14 will be revised, if at all, and the nature of any such revisions, remains highly uncertain. Nonetheless, the limitations of KPI 13 and, more importantly, KPI 14, mean that reporting against the TAMD indicators is still a useful exercise that will capture results and learning missed by the ICF KPIs.

5.2 STARCK+ REPORTING AGAINST THE ICF KPIS

Table 9 shows which of the ICF KPIs are reported on by each of the StARCK+ components considered in this report. The table omits Climate Care, which reports against KPIs 2, 5 and 6; the Kenya Association of Manufacturers, which reports against KPIs 2, 5, 6 and 12; and the UN programme, which reports against KPI 13. These partners are not considered in this report as they focus on low-carbon development and climate change mitigation, which is addressed in a parallel learning report[8].

There is scope for additional reporting against KPIs by various StARCK+ components, as discussed below. It is not proposed that

[7] Brooks et al. also define a 9th indicator under the TAMD framework: "Local uptake of CRM measures". This is not so much an institutional indicator as an indicator of outcome that is more closely related to KPIs 1 and/or 4.

[8] Spannagle, M. 2017: Access to Energy and Emissions Reduction learning from the Kenya StARCK+ Programme: Report for the UKAID Funded StARCK+ Programme (www.starckplus.com).

Table 9. KPIs reported on by the StARCK+ components considered in this report.

StARCK+ Component	KPI															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ACT!	x															
ADA	x				x											
REACT	x	x			x	x						x				
KCIC	x	x				x						x				
FICCF-CSA	x					x						x				
TA													x			

such formal reporting takes place at this stage, given that StARCK+ is in its final phase. Rather, the scope for further reporting should be understood and explored as a basis for improved reporting by future programme that build on the work of StARCK+. Understanding how StARCK+ and comparable programmes might report against certain KPIs (for example KPI 4 and KPI 13) may also be helpful for general learning around issues such as resilience and mainstreaming.

The discussion below focuses on reporting against KPIs 1 and 4, which are central to the assessment of programme effects on resilience, KPIs 13 and 14, which have proved challenging for some StARCK+ partners, and KPI 15, which is important for assessing the extent to which StARCK+ has had a transformational impact and may be more useful that KPIs 13 and 14 in capturing programme impacts. KPI 12 is considered briefly. The discussion builds on the results of a workshop held on 29 November 2016, as part of the learning assignment. The minutes of this meeting, provided by Deborah Murphy, Technical Adviser to the TA component of StARCK+, are included in this report as Annex 5.

5.2.1 REPORTING AGAINST KPI 1

Five StARCK+ components report against KPI 1. These are ACT!, ADA, the CSA component of FICCF, KCIC, and REACT.

There are some inconsistencies in approaches to reporting against KPI 1, both between and within these components. For example, REACT excludes those renewable energy interventions from KPI 1 reporting, on the grounds that these are intended to deliver climate change mitigation rather than adaptation/resilience benefits. While they may deliver significant development benefits to beneficiaries, they do not necessarily help them "to cope with the effects of climate change," as specified in the title of KPI 1. In contrast, KCIC assumes that all those receiving products developed with KCIC support are able to cope better with the effects of climate change. While renewable energy products and interventions may contribute to resilience, these effects are likely to be indirect and difficult to demonstrate. In addition, practice across the International Climate Fund, for which KPI 1 it is a key performance indicator, is to use this indicator for interventions focused explicitly on resilience and adaptation, but not for interventions focused on energy and low-carbon development.

Within the ACT! Portfolio, there are inconsistencies in how direct and indirect beneficiaries are defined. For example, beneficiaries are associated with training in 21 projects. Four of these associate training with both direct and indirect beneficiaries, one with direct beneficiaries only, and 16 with indirect beneficiaries only. In some cases, training of trainers is associated with direct beneficiaries, with people trained by these direct beneficiaries being indirect beneficiaries. However, training of trainers and primary training outputs are associated with both direct and indirect beneficiaries, depending on the project. People receiving farm inputs and benefiting from the installation of water and other infrastructure may be counted as direct or indirect beneficiaries, depending on the project.

The CSA component of FICCF defines beneficiaries as direct when they receive a loan, and indirect when they receive CIS via SMS messages. Numbers of beneficiaries under KPI 1 are calculated based on assumed average household size of 3.9.

The ADA methodology for reporting against KPI 1 is set out in a dedicated document (Elhadi 2016). ADA divides beneficiaries into those targeted for 'high intensity' and 'medium intensity' support, based on a version of the KPI 1 guidance developed for DFID's *Building Resilience and Adaptation to Climate Extremes and Disasters* (BRACED) programme. People benefiting from both high and medium intensity support are counted as direct beneficiaries; ADA does not count indirect beneficiaries. High intensity support includes resource mapping, resilience assessments, participatory vulnerability and capacity assessment, pasture and water management training, and other activities that "directly enhance the capacity/skills of individuals in the targeted communities". Medium intensity support includes the provision of climate information and early warnings (mostly for droughts and floods), via a combination of radio, SMS messages and extension work. The reporting of those receiving CIS as direct beneficiaries contrasts with the approach of FICCF-CSA. To a certain extent, the high and medium intensity categories used by ADA map onto the direct and indirect categories used by FICCF-CSA and (inconsistencies notwithstanding) ACT!

The above issues are not particularly problematic for overall reporting against KPI 1 that aggregates direct and indirect beneficiaries. However, if StARCK+ is to report disaggregated direct and indirect beneficiaries, the inconsistencies identified above need to be addressed through the development of consistent, programme-wide criteria for defining different types of beneficiary.

5.2.2 REPORTING AGAINST KPI 4

As indicated above, all interventions reporting against KPI 1 should, in principle, be able to report against KPI 4. Where beneficiaries receiving direct or indirect support from StARCK+ can be identified, the measurement of KPI 4 will involve determining whether this support has made them better able to anticipate, avoid, plan for, cope with, recover from, or adapt to evolving climate hazards/risks (which will interact with other factors such as changes in markets and policies). The ultimate test of resilience will be the extent to which yields, incomes, livelihoods and other aspects of human wellbeing are secured in the face of (evolving) climate hazards. However, it might not be possible to measure these *impacts* on the timescales associated with the monitoring and evaluation of an intervention's results (see Section 2.2 above). Reporting against KPI 4 is therefore recommended at the outcome level, and should seek to measure results *downstream* of a project's *outputs*, and *upstream* of the ultimate intended *impacts* as measured by standard development and human wellbeing metrics. These outcome-level results are most likely to be represented by changes in people's circumstances, assets, behaviour, practices, access to resources, and ability to take adaptation actions (e.g. as the result of changes in policy/regulatory environments).

KPI 4 could be reported on for those in receipt of direct support from StARCK+ via ACT!, FICCF-CSA, REACT and KCIC, as well as those undertaking initiatives made possible by CAFs and supported by ADA and its partners.

For ACT! and FICCF-CSA, this might involve assessing whether support has enabled beneficiaries to *take up* practices or use services that make them more resilient to climate stresses and shocks, in a sustainable manner. Alternatively, it might involve examining the extent to which taking up such practices and services *improves their ability to respond to climate risks*. For example, receipt of climate information may or may not improve resilience, depending on how useful it is to farmers. A test of this usefulness might be the extent to which farmers use this information to inform their decisions about planting dates or other aspects of agricultural scheduling. A sub-indicator of KPI 4 in this context might be the number of farmers who have based decisions regarding planting dates or other agricultural activities on climate information.

Reporting against KPI 4 might also take a qualitative approach, or blend this with a quantitative one. For example, farmers might be asked to rate how much their ability to sustain or improve their livelihoods has been improved as a result of their receiving specific types of support. Pastoralists might be asked how well they feel they are able to cope with droughts of different severity.

Where potential resilience benefits have been identified for activities supported by REACT and KCIC, KPI 4 could be used to measure the extent to which these are realised. For example, under REACT, KPI 4 might measure the number of households working with Tosheka who are receiving regular payments from the sale of inputs to the silk value chain, or the number of households in which income from silk production has replaced other, more climate sensitive, income sources while sustaining or increasing household incomes. Under KCIC, KPI 4 might measure the number of farmers whose soils exhibit measurable increases in soil moisture content or retention as a result of the application of organic fertilisers. If comparable measures for other activities/businesses can be identified, the numbers with improved resilience (based on a variety of measures) can be aggregated across the portfolio.

ADA might use a number of sub-indicators to measure improvements in the resilience of the livelihoods of direct or indirect beneficiaries. For example, where improvements in governance have resulted in better management of rangelands, KPI 4 might measure the numbers of people with access to drought reserves, or the number of people reporting a reduced need to travel long distances in search of pasture during the dry season or drought periods. Other sub-indicators might include the number of people who have changed their grazing practices, the state of vegetation cover compared to previous years with similar rainfall profiles (with the number of people benefiting), the number of people with access to adequate water during dry periods, and other such indicators.

Of course, where different proxies for resilience are used the issue of 'degrees of resilience', and the extent to which these proxies are comparable, will arise. This problem is mitigated somewhat if reporting against KPI 4 is based on demonstrable changes in circumstances or practices that help people manage climate hazards and risks, rather than assumptions that activities such as training and capacity building will automatically lead to increased resilience. Provided measures of improved resilience are based on sound evidence and reasoning, it is legitimate to aggregate numbers of people across different resilience contexts, as KPI simply counts the numbers of people with improved resilience, rather than the extent to which resilience has been improved.

5.2.3 REPORTING AGAINST KPI 12

REACT, KCIC and FICCF-CSA already report against KPI 12. Based on the review of documentation relating to the County Adaptation Funds, there may be potential for ADA to report against this indicator. Specifically, Tari et al. (2015) report on the considerable amount of community investment in rangeland monitoring and management leveraged by the CAF, which exceeds the amount directly invested in this activity from the CAF (see Section 4.5 above). The learning around ADA and the CAFs indicates that the latter may be leveraging

considerable community investment in resilience and adaptation, and that this will increase if the CAF model is successful.

5.2.4 REPORTING AGAINST KPI 13 AND 14

StARCK+ partners were initially not required to report against KPIs 13 and 14, and initiated an exercise to determine if reporting against these indicators would assist in telling the policy story. DFID then determined that StARCK+ should report against KPI 13. An initial completion of the KPI13 scorecard was undertaken, and a draft report developed for discussions with StARCK+ partners and DFID. KPIs 13 and 14 were the principal subject of the workshop held in Nairobi on 29 November, following considerable work by the StARCK+ TA team with StARCK+ partners around these indicators to develop baseline data (see Annex 5). The conclusion of this workshop was that KPIs 13 and 14 were challenging to report against because of the multiple scales and institutional contexts in which StARCK+ works, and because of the simplistic nature of the indicators, particularly KPI 14.

Based on the learning assignment and the work of the Consultant with the Compass programme, it is suggested that KPI 13 be completed based on progress at the national level, focusing on the results of the TA work. The answers to the first three questions are likely to be 'yes', with the answers to the fourth and fifth questions being 'no' or 'partially'. KPI 13 might also be reasonably completed at the county level, although for reporting back to the ICF these results would need to be either omitted or somehow combined with those at the national level.

The principal, and major, problem with KPI 14 is determining the institutional context at which it should be targeted. The scorecard asks about knowledge and capacity in a planning context, and is intended to be applied to individual institutional contexts. However, StARCK+ targets multiple such contexts at multiple scales. One approach would be to simply answer each question as 'no' or 'partially', on the grounds that this is likely to cover the range of situations in the various planning contexts that are relevant to StARK+. However, StARCK+ is only expected to explore the feasibility of reporting against KPI 14, and it would be entirely legitimate to argue that the programme should not attempt to report against KPI 14 because of the problems outlined above. These problems are likely to mean that any attempts to report against KPI 14 at the programme level would be a frustrating and meaningless paper exercise. KPI 14 has more utility when applied to individual institutions at the project level, but even this use of KPI 14 would require some 'operationalisation' of the indicator. The difficulties in reporting against KPI 14 at the programme level need to be communicated to DFID.

It is worth considering the issue of attribution in relation to KPIs 13 and 14, which ask about the processes operating and capacity within an institutional context, but which offer little or no guidance on how to assess the contribution of a programme such as StARCK+ to changes in institutional processes or capacity. Rather, they are tools for tracking how processes and capacity evolve over time – a consequence of their origins within the TAMD framework which is arguably more concerned with tracking climate risk management, resilience and adaptation over time in a given system than it is with measuring the outcomes and impacts of adaptation interventions. The best way to approach the issue of attribution is to report against KPIs 13 and 14 as if they are tools for tracking institutional change rather than intervention outcomes, and to complement this reporting with qualitative narratives detailing how, and to what extent, the intervention in question has contributed to these changes.

5.2.5 REPORTING AGAINST KPI 15

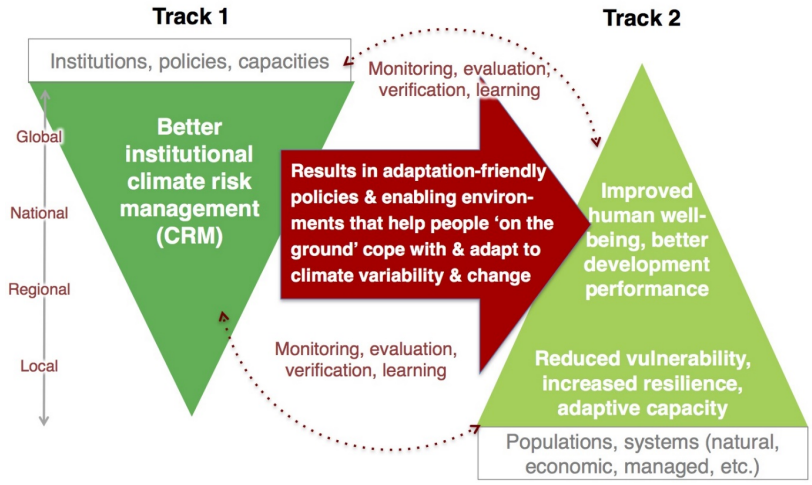
While StARCK+ is expected to report against KPI 13, and possibly 14, KPI 15 may represent a more effective and flexible means of capturing the results of the programme at the national level. KPI 15 is also relevant at the sub-national scale, and the learning results include considerable evidence that StARCK+ has contributed to transformational change in a variety of contexts, and at different scales.

Reporting against KPI 15 should take place at the programme level, with a KPI 15 evaluation team tasked with collating evidence from across the programme to determine the extent to which it is likely to have a transformational impact, based on considerations of the following eight criteria defined in the KPI 15 DFID methodological note:

i. **Political will & local ownership:** need for change agreed locally, process locally owned. For widespread changes, (e.g. to patterns of development), this will require high level political buy-in & broader support from across society;
ii. **Capacity and capability can be increased:** countries and communities have the capacities and capabilities necessary to bring the change about;
iii. **Innovation:** innovative technologies piloted, with potential to demonstrate new ways of doing things, which could lead to wider and sustained change;
iv. **Evidence of effectiveness is shared:** approaches proven successful in one location made widely available & lessons on usefulness credible & shared widely;
v. **Leverage/create incentives for others to act:** costs of climate action reduced to point that acting is a sensible decision for commercial firms & private individuals. Cost reductions may need to be steep enough to overcome behavioural inertia;
vi. **Replicable:** good ideas replicated in same country & more widely;
vii. **At scale:** interventions have sufficient reach to achieve institutional & policy reform, or drive down costs of technology deployment;
viii. **Sustainable:** change is likely to be sustained once support ends.

Based on the learning described in this report, there is a good case to be made for the likely – and indeed actual - transformational impacts of StARCK+. While it is not the purpose of this report to provide a comprehensive guide to how StARCK+ should report against KPI 15, the learning highlights the following transformational aspects of the programme, and their relevance to the above criteria.

1. **Transformation of livelihoods and markets through ACT!, REACT and FICCF CSA.** StARCK+ has helped to support/create new



The TAMD framework, based on Brooks et al. 2011, 2013.

markets and value chains for sorghum and cassava (FICCF CSA), and chilies and eri silk (REACT). These activities, and the work of ACT!, have helped to transform people's livelihoods and incomes, increasing their capacities to pursue climate resilient practices and livelihoods (criterion ii). There appears to be a high level of local buy-in to these activities by local communities (criterion i), and people are keen to join initiatives supported by StARCK+ at the local level (criterion vi). The support for markets and value chains means that transitions into CSA, for example, are more attractive, fulfilling criterion v.

2. **Transformation of governance.** While Kenya had already embarked on a process of political decentralisation, StARCK+ has supported systemic innovation in adaptation governance and the governance of climate finance. At the national level, StARCK+ has supported the development of policy frameworks and instruments such as the NAP and the Climate Change Act. It is also supporting the development of climate change finance mechanisms, including the draft Climate Finance Policy. StARCK+ has been instrumental in the development of County Adaptation Funds and associated mechanisms, through its support to ADA. These are aligned with national climate change governance mechanisms. Based on the learning around ADA, these county-level governance reforms already appear to be having a transformational impact on the governance of natural resources, and on the resilience of landscapes, communities and pastoral systems. These results fulfil criteria i, ii, v and vii. The success of the Isiolo CAF has led to the replication of the process in other counties, fulfilling criteria iv and vi. The buy-in to institutional and governance reforms under the Isiolo CAF, both figurative and literal (see section 4.5 and Tari et al. 2015), fulfil criteria i and vii, and suggest that these innovations in governance will be sustainable (criterion viii).

3. **Livelihood, market and private sector innovation.** StARCK+ has facilitated innovation in markets and agricultural and livelihood practices through the FICCF CSA facility, and through projects supported through ACT! and REACT. It is supporting technological innovation to deliver climate friendly technologies and products through KCIC and REACT. The programme has therefore fulfilled criterion iii in multiple respects.

In summary, a very convincing case can be made that StARCK+ is likely to have a transformational impact (or has already done so, at least in some contexts), by bringing together evidence from across the programme and mapping it against the criteria set out in the KPI 15 methodological note.

5.3 STARCK+ AND THE TAMD FRAMEWORK

All the StARCK+ partners have explored reporting against the TAMD climate risk management indicators (CRMIs), and have taken part in a reporting exercise using CRMIs 1-4. However, these are only really relevant to those partners whose work involves building the capacity of institutions to address climate change through resilience and adaptation (they may also be adapted to apply to capacity building in mitigation and indeed other contexts). The TAMD CRMIs are relevant to the TA and ADA components of StARCK+, and to certain activities under ACT! and FICCF CSA. However, they are much less relevant to the activities supported by REACT and KCIC.

The TAMD framework as a whole (see figure below) seeks to link institutional climate risk management (Track 1) with improved resilience (which also encompasses reduced vulnerability and enhanced adaptive capacity) on the ground (lower part of Track 2), and improved development results and human wellbeing (upper part of Track 2). The various elements of the StARCK+ programme map well onto the TAMD framework, indicating that the programme is contributing to resilience, adaptation and 'climate smart' development in what might described as a 'holistic' manner.

For example, the TA component sits towards the top of Track 1, with the work of ADA lower down Track 1. The learning around ADA indicates that it is already delivering improved resilience, linking with the lower parts of Track 2 and ultimately with better development outcomes at the top of Track 2. The work of ACT! and FICCF CSA building capacity and strengthening markets sits towards the lower part of Track 1. The development and piloting of technologies and business models that promote climate resilience also contribute to the creation of enabling environments in Track 1, and the delivery of these products to households, and the participation of households in these models, map onto the lower section of Track 2.

6. SYNTHESIS OF LEARNING ACROSS STARCK+

The StARCK+ programme supports a very diverse range of activities at a range of scales, from the national to the local, based on a variety of delivery mechanisms. It supports institutional capacity building and mainstreaming at the national, county and local levels, as well as specific measures that strengthen livelihoods and resilience to climate variability and change. Technical support and the dissemination of 'climate smart' practices, products and technologies are delivered through partnerships with government, NGOs, CBOs and the private sector. StARCK+ provides an opportunity for learning about the efficacy of these mechanisms in delivering development and, more importantly in the context of this report, resilience and adaptation benefits.

Two components of StARCK+ - support to the development of the County Adaptation Funds and associated activities through ADA, and the TA to the Government of Kenya – work to mainstream climate change into governance, planning and budgeting at the national and county levels. These components appear to have played a significant role in the creation of enabling environments for resilience building and adaptation, particularly at the county level. The Isiolo CAF appears to provide an example of where the enabling environment created by changes in governance has led to increased resilience on the ground, by placing governance of natural resources in the hands of pastoral communities and backing this up with policies and legislation that empowers these communities to enforce regulations around natural resource management.

The other four components of StARCK+ focus on delivering results directly 'on the ground' through partnerships with national and local organisations, private sector bodies and local communities. StARCK+ appears to have been particularly effective in this regard, in large part because of the way it is 'embedded' in the national and local contexts, building close partnerships with established bodies at multiple scales, and working to build links across scales. In many cases, StARCK+ has delivered results by supporting and expanding the activities of established actors, which reduced risks associated with the establishment of new bodies and initiatives. The extent to which StARCK+ has delivered resilience and adaptation results on the ground through such an approach is discussed below.

6.1 TO WHAT EXTENT IS STARCK+ DELIVERING RESILIENCE AND ADAPTATION RESULTS ON THE GROUND?

Four of the StARCK+ components – ACT!, KCIC, REACT and FICCF – deliver products and services to individuals and communities 'on the ground', packaged with varying degrees of technical support. The review of the activities supported by these components of StARCK+ indicates that they can be divided into the six categories of: capacity building, policy influencing/advocacy, strengthening existing livelihoods, livelihood diversification or substitution, environmental conservation or rehabilitation, and addressing climate risks. The last of these can be subdivided into actions that (i) address existing climate risks and thus promote resilience or address the 'adaptation deficit', (ii) deliver 'incremental' adaptation to changes in / intensification of familiar climate hazards and risks, and (iii) promote 'transformational' adaptation that involves replacing or augmenting existing systems or practices that are threatened by climate change with ones that are more suitable under new or emerging conditions. There is, of course, some overlap between these categories. For example, livelihood diversification or substitution can involve the replacement of one type of crop with another, which may represent transformational adaptation (if the new crop is better suited to emerging climatic conditions). Livelihood strengthening may or may not make existing systems more resilient to existing climate hazards, or help them cope with an intensification of these hazards, and conservation measures are likely to make coupled socio-ecological systems more resilient to climate change and variability.

A total of 54 projects/initiatives were examined across the ACT!, REACT and KCIC portfolios, through desk review, interviews, workshops and field visits. The desk review identified the activities associated with each of these initiatives and mapped these against the six categories (and three sub-categories associated with addressing climate risks), with the caveat that this mapping might be conservative where the desk review did not identify any activities omitted from the available documentation that were not picked up in other interactions with stakeholders. Based on this mapping, it is possible to describe the distribution of activities and their relevance to the resilience and adaptation remit of StARCK+ (Table 10).

Out of these 54 initiatives, just over half explicitly involve capacity building (Table 10). Most of these are in the ACT! portfolio. However, capacity building in the form of support for business development, proof of concept and commercialisation is an important aspect of the KCIC and REACT portfolios, as well as the FICCF-CSA work.

A smaller number of initiatives explicitly involve policy influencing or advocacy related activities, all of which are associated with ACT! However, other components also seek to influence policy generally (i.e. outside of individual initiatives or partnerships), while the TA and ADA work is directly focused on policy influencing.

More than half the initiatives under the combined ACT!, KCIC and REACT portfolio involve the strengthening of existing livelihoods. Just under half involve some form of livelihood diversification or substitution, and a smaller but still very significant number involve environmental conservation or rehabilitation. These numbers do not change much when initiatives that *may* include these activities or produce similar results are counted (numbers in brackets in Table 10).

About half to two thirds of the initiatives in the combined ACT!, KCIC and REACT portfolio can be said to include activities that address the adaptation deficit i.e. help build resilience to existing climate hazards.

Table 10. Numbers of initiatives with explicit adaptation or resilience (as opposed to mitigation/low-carbon development/renewable energy) focus per component of StARCK+, and in total, associated with different categories of activities and results. Numbers in brackets indicate numbers of initiatives that may involve a particular activity or lead to a particular result, but where this is indirect or uncertain.

Component	Capacity building	Policy influencing	L/hood support, strengthening	Diversification /substitution	Conservation, env. rehab., NRM	Directly addressing specific climate risks		
						Adaptation Deficit	Incremental	Transfor-mational
ACT!	26	22	14(15)	17	16(17)	15(20)	11(20)	(5)
KCIC			12(14)	6(7)	2(3)	10(11)	5(12)	
REACT	3		7(8)	2	1(2)	4(5)	2(6)	1(2)
TOTAL	29	22	33(37)	25(26)	19(22)	29(36)	18(38)	1(7)

Again, this number rises only slightly when initiatives with uncertain aspects or results are included.

The situation changes dramatically when adaptation to climate change is considered. Less than a third of the initiatives in the combined portfolio can be said with any confidence to deliver incremental adaptation benefits, although over two thirds of the initiatives may deliver, or have the potential to deliver, such benefits. This uncertainty highlights the need for further, detailed learning about the relationship between general resilience building (which delivers benefits in terms of existing risks) and adaptation to climate change. To what extent do general resilience building activities translate into climate change adaptation? This issue could be investigated through more detailed field research, and longitudinal studies of beneficiary populations/groups, and would make a significant contribution to our understanding of adaptation and what constitutes effective adaptation programming.

In summary, it can be stated confidently that over half of the initiatives working 'on the ground' appear to be directly improving resilience to existing or emerging climate hazards. Most of these have potential benefits in terms of 'incremental' adaptation to climate change, although such adaptation benefits can be identified confidently for only a handful of initiatives. A small number of initiatives may be associated with transformational adaptation (see below), particularly where they are piloting new crops or value chains that allow people move away from the production of crops that are increasingly at risk from climate change, to the production of crops that are better suited to drier or more variable conditions likely to result from climate change.

Up to around half of the initiatives in the combined ACT!, KCIC and REACT portfolio do not appear to include activities that will, by themselves, improve resilience or result in adaptation on the ground. These initiatives focus on:

- capacity building, which is an important foundation for resilience building and adaptation but which does not guarantee it (this requires capacity to be translated into actions);
- policy influencing and advocacy (policies may not be effective, or may not be implemented effectively), and;
- livelihood strengthening and diversification, the resilience and adaptation impacts of which will depend on the nature of the livelihood activities supported, which may or may not be climate resilient.

It should be stressed that these initiatives may have significant indirect or 'downstream' effects on resilience and adaptation. For example, capacity building should result in better decision-making with respect to climate risks, and policy reforms might make it easier for people to take adaptation actions. Improved incomes from more productive livelihoods may allow people to invest in resilience and adaptation. While none of these outcomes are guaranteed, the intention is not to dismiss these initiatives, as they can help create enabling governance and economic environments in which action to improve resilience and pursue adaptation is easier, provided they do not inadvertently drive maladaptation.

6.1.1 TRANSFORMATIONAL ADAPTATION IN THE STARCK+ PORTFOLIO

Only one initiative is confidently interpreted as successfully and demonstrably delivering actual or potential transformational adaptation, in which existing systems or practices threatened by climate change are replaced by new systems or activities that are better able to cope with new conditions. This is Tosheka Textiles (REACT), which allows people to move into climate resilient silk production as an alternative to climate vulnerable cotton.

A further six initiatives may involve transformational adaptation, or the potential for such adaptation:

- TILT (ACT!) may allow people to move into fish farming as an alternative to other, more climate-sensitive livelihood activities;
- KOEE Foundation (ACT!) promotes the rearing of drought tolerant goats for milk production, which might allow a transition to drought-tolerant livestock;

- BIFORAD (ACT!) promotes the production of sandalwood, the transformational aspects of which require further assessment;
- HAK (ACT!) supports the promotion of drought tolerant crops, which may be transformational if these are new crop species (as opposed to new varieties of species already grown), are adopted at a sufficient scale to significantly replace previous crop types;
- SUPPA (ACT!) has promoted a suite of farm-level innovations which together may represent a transformation to more diverse and resilient livelihoods, but the extent to which this constitutes transformational adaptation, involving replacing systems that are failing because of climate change with ones that are better suited to new conditions, is arguable, as it is not clear that climate change has been the main driver of change;
- Equator Kenya Ltd (REACT) promotes the growing of chilies which may be analogous to Tosheka in that it involves the establishment of a market for a new crop that grows in drier conditions, but relies on irrigation and is associated with uncertainties around the robustness of the market;

The FICCF CSA initiatives around cassava and sorghum may be viewed as transformational in terms of changes to livelihoods, incomes, market access and local economies, as they are creating new value chains around crops that, while they have been grown locally for many years, have not been produced commercially. These are allowing people to move away from a dependence on maize, which appears to be failing in large part due to climate change[9], to more climate-resilient value chains based on sorghum and cassava, which are more drought resistant than the maize grown in these areas historically. These initiatives may thus also be seen as involving transformational adaptation, as a result of the wider transformational changes in livelihoods, markets and value chains. However, they are at a relatively early stage, and their longer-term effectiveness and sustainability still needs to be demonstrated.

The work by ADA on the CAFs may or may not be helping to deliver transformational adaptation on the ground. However, the example of the Isiolo CAF clearly demonstrates how this work can deliver transformational changes in governance and policy regimes that have facilitated actions to improve resilience to familiar climate hazards, and which are likely to increase the resilience of existing systems to climate change.

6.2 LEARNING AROUND DELIVERY MECHANISMS AND THE PRIVATE SECTOR

StARCK+ supports five broad approaches to the delivery of its results, involving different delivery mechanisms, which map onto its six components as follows:

1. **Policy and governance interventions** at the national and sub-national levels to support the creation of enabling environments for resilience and adaptation actions, involving technical assistance as provided by the TA component and the work of ADA with the CAFs and other aspects of policy;
2. **Conventional project-type initiatives** involving partnerships between communities, local institutions, NGOs and county or ward-level government, with StARCK+ financing training, workshops, the provision of technical expertise, and materials (e.g. farm inputs), as exemplified by ACT!;
3. **The development of markets and value chains** through partnerships and coordination with microfinance organisations, aggregators, insurers, and providers of technical assistance and climate information, as pursued by FICCF-CSA.
4. **Hybrid approaches involving the provision of finance to individual private sector** entities, to support the delivery of services that build capacity and deliver resilience benefits, through a more project-type approach as pursued many REACT initiatives;
5. **Support (including finance and technical assistance) to individual businesses** for the development of specific commercial products and value chains, as pursued by KCIC.

Of course, there is some overlap between these approaches. Technical assistance is a key element of all five approaches, although this takes different forms, ranging from assistance to government for policy development, to assistance to private firms for proof-of-concept. The development of value chains is central to approach 3, but is also a critical aspect of approach 5 and an important element of approaches 2 and 4. However, there are differences in in the way the development of these value chains is approached. The FICCF-CSA component works with multiple actors to establish value chains by linking producers, aggregators and purchasers, and supporting them through technical assistance, microfinance, climate information and insurance. FICCF-CSA therefore creates or strengthens value chains by coordinating a number of different actors. In contrast, the much more commercially oriented KCIC supports individual business to create or enhance value chains through the development of effective business models. This approach is also reflected in some of the REACT initiatives.

FICCF-CSA, KCIC and REACT all involve partnerships with the private sector. Together, they therefore represent a de facto body of learning around the role of the private sector in delivering resilience and adaptation, and in channelling climate finance to where it is needed. This evidence is very valuable, given the increasing emphasis on private sector delivery mechanisms for climate change mitigation

[9] A comprehensive study of the impacts of climate on maize production in western Kenya to date is outside the scope of this assignment. Nonetheless, multiple local informants indicated that maize is becoming less productive and reliable, and associated this trend with changes in rainfall amounts and (more importantly) variability. Model based studies of the projected impacts of climate change on maize production in Africa at large suggest that declines in maize yield of 5-40% by the 2050s over western Kenya (Ramirez-Villegas and Thornton 2015).

and adaptation[10]. For example, the Green Climate Fund (GCF) has established a private sector facility (PSF) to maximise private sector engagement and to catalyse private sector finance through investments in institutions, and in and micro and small-medium sized enterprises (MSMEs)[11]. Private firms can also be Accredited Entities under the GCF. There is a particular need for learning around how the private sector can play a role in adaptation, an area in which progress has been slow; for example, the private sector portfolio of the GCF is mostly focused on mitigation[10], and engaging the private sector in adaptation, which often focuses on support to the poor and vulnerable, is generally seen as much more challenging than engaging in mitigation, which tends to involve investments in infra-structure which represents more familiar territory for private firms.

StARCK+'s work with the private sector through KCIC, REACT and FICCF-CSA demonstrates that partnerships with the private sector can indeed deliver resilience and adaptation benefits. Both the FICCF-CSA activities and the REACT initiatives include some elements based on contractual relations between private sector actors and producers. While the adaptation benefits of many of the KCIC and REACT initiatives are uncertain or arguable, most of these initiatives can be associated with clear livelihood benefits, and many with resilience benefits (in the context of coping better with existing climate variability).

The extent to which adaptation benefits are realised from private sector partnerships/initiatives depends very much on the nature of the practices, products and value chains supported. The most effective way of ensuring that initiatives involving the private sector deliver adaptation benefits is to ensure that these initiatives support practices, products and value chains that are resilient to emerging and anticipated climatic conditions. The private sector can play a key role in transitions to new commodities, products and value chains that fit this description, as evidenced by initiatives such as Tosheka. Indeed, Tosheka is the initiative that provides one of the most convincing examples of actual or potential transformational adaptation, and it is notable that this has been driven by private sector commercialisation of a climate (change) resilient value chain in the form of caterpillars fed on the drought-resistant castor plant, that produce cocoons that are processed into silk.

Other notable private sector initiatives that appear to be delivering clear resilience and adaptation results include the dairy-related work of the FICCF (improving the resilience of input chains), the FICCF sorghum and cassava initiatives (developing more climate-resilient livelihoods and value chains via transitions to climate-resilient crops), and Mara Beef (reducing livelihood impacts of drought for pastoralists). A significant number of other initiatives by KCIC and REACT have potential resilience and adaptation benefits.

A common theme of the private sector initiatives is contract farming, in which producers form partnerships with purchasers, processors and distributors who provide them with inputs and buy the resulting products. The costs of inputs (seeds, equipment and other materials) can be recouped from sales, providing a mechanism through which finance for resilience and adaptation can be channelled through private sector firms to client producers. Where firms are confident of returns, this mechanism can, in principle, be used to channel climate finance even to the poor and vulnerable, without the need for initial investment by the latter. Again, the key is to ensure that this finance is invested in value chains that are resilient to emerging and anticipated climatic conditions and associated hazards. To improve the likelihood that private sector (and other) initiatives deliver real adaptation benefits, they might be subjected to a screening process using criteria based on the categories of activity identified in Table 2 above.

Further assessment would be required to examine the relative successes and merits of different ways of delivering climate finance and support for adaptation via the private sector, for example grants versus loans. However, the most appropriate mechanisms are very likely to be dependent on context, and there may be limits to the utility of such generalisations.

6.3 LEARNING AROUND REPORTING

Adaptation and resilience results are currently captured by reporting the number of people supported to cope with the effects of climate change, against ICF KPI 1. This measures project and programme outputs, and there is no guarantee that support will translate into resilience or adaptation outcomes. These outcomes might be captured by assessing the numbers of people receiving support, emulating those receiving support, or otherwise influenced by an intervention, whose behaviour or circumstances change in a way that makes them more resilient to climate variability and change, as mandated by ICF KPI 4 (numbers of people with improved resilience as a result of support). This would involve identifying and tracking the factors that help people anticipate, avoid, plan for, cope with, recover from and adapt to evolving climate stresses and shocks, through the use of participatory and other processes. Indicators of resilience might include access to certain assets and resources, and the extent to which people have taken up and sustained practices supported by interventions.

There is significant potential within StARCK+ for reporting against ICF KPI 4. The programme is not reporting against this KPI because it was still in development when the progamme started. It is not expected or suggested that StARCK+ report against KPI 4 at this stage, but an assessment of how this might be done could deliver valuable lessons that enhance reporting and programming under future interventions. Reporting against KPI 4 could be involve the identification of factors

[10] Nations 2015. Trends in Private Sector Climate Finance: Report prepared by the Climate Change Support Team of the United Nations Secretary General on the progress made since the 2014 Climate Summit. United Nations, New York.

[11] http://www.acclimatise.uk.com/network/article/green-climate-fund-a-message-to-the-board-unlocking-private-sector-finance-can-the-gcf-rise-to-the-challenge

that help people to anticipate, avoid, plan for, cope with, recover from and adapt to evolving climate hazards, and tracking how these factors are affected by project outputs. ACT!, KCIC, REACT and the FICCF CSA activities lend themselves to reporting against KPI 4, as does ADA, although ADA resilience results will be less 'direct'. Any element of StARCK+ reporting against ICF KPI 1 (numbers of people supported to cope with the effects of climate change) should, in principle, be able to report against KPI 4.

StARCK+ partners have been addressing how to report against ICF KPIs 13 and 14, which seek to measure the level of integration of climate change into national planning, and the level of institutional knowledge of climate change, respectively. DFID has requested that StARCK+ report against KPI 13, and the programme has undertaken to explore the potential for reporting against KPI 14.

Both KPI 13 and KPI 14 are effectively designed to track changes within a given institutional context rather than assess the results of individual interventions, and both should be approached in this manner. Any reporting against them should be complemented with qualitative narratives around StARCK+'s contribution to these changes.

KPI 13 lends itself to reporting at both the country and county level. It is recommended that StARCK+ reports against KPI 13 at the country level for the programme as a whole, with a focus on the results of the TA component. There might be additional, 'optional' reporting at the county level against KPI 13. KPI 14 is more challenging, as it is very simplistic and does not acknowledge the multiplicity of institutional contexts that are relevant to programmes such as StARCK+. It is extremely difficult to see how StARCK+ would report against KPI 14 at the programme level, and it is recommended that this is not attempted. KPI 14 might be used for reporting at the level of individual projects focused on capacity building targeting individual institutions.

The programme level impact of StARCK+ might better be captured by KPI 15, which assesses the likelihood that a programme will have a transformational impact, based on criteria relating to political will and local ownership, capacity built, innovation, the sharing of evidence of effectiveness, the creation of leverage and incentives for action by others, replicability, the scale of a programme's influence, and the sustainability of results. StARCK+ has already helped to change policy and governance contexts, at the national level by supporting the development of the Climate Change Act, NCCAP and other mechanisms, and at the county level through the County Adaptation Funds and associated policies, plans and legislation. StARCK+ has also supported considerable technological and market innovation. Most if not all of the KPI 15 criteria are met by at least some elements of the StARCK+ programme, and it should be straightforward to demonstrate StARCK+'s transformational impact based on these criteria, by drawing together evidence from across the programme.

KPIs 13 and 14 have counterparts in the set of eight TAMD institutional climate risk management indicators, which also address other elements of institutional climate change mainstreaming and risk management. TAMD also provides a framework for linking institutional changes with changes in resilience 'on the ground', which in turn should contribute to sustained or improved human well-being in the face of climate change. The development of context-specific resilience indicators, and the tracking of these alongside standard development and wellbeing metrics contextualised using climate information, can tell us about the success of adaptation. Mapping StARCK+ activities and results to the TAMD framework is a useful exercise in assessing how the various elements of the programme 'join up.

6.4 GENERAL LESSONS, OBSERVATIONS AND RECOMMENDATIONS

In addition to the learning around which initiatives are most likely to deliver resilience and adaptation benefits, delivery mechanisms and the private sector, and reporting on resilience and adaptation, a number of other lessons and observations can be identified from the learning assignment.

1. The extent to which initiatives can be said to involve adaptation depends on the extent to which they are addressing changes in climatic conditions and associated climate hazards. To understand whether results represent adaptation, we therefore need to understand whether, and how, local climatic conditions are changing. This requires climate information at appropriate spatial and temporal scales, covering periods of sufficient duration to identify trends. Such information is scarce. It is therefore important to improve climate observing networks, and access to locally relevant climate data.

2. Contradictory narratives regarding the nature of observed changes in climate were encountered in some instances, for example between beneficiaries and providers of climate information. This reinforces the need for better, locally relevant climate observations and records.

3. There is a tendency among stakeholders to describe activities that focus on general livelihood strengthening and the reduction of risks associated with existing/historical climate variability in terms of climate change adaptation. This is misleading, and may even be counterproductive if it results in assumptions that adaptation is being addressed when it is not. There appeared to be an over-eagerness on the part of some stakeholders to ascribe changes in environmental conditions and livelihood practices to climate change.

4. Many likely or potential adaptation benefits in the StARCK+ portfolio derive coincidentally from activities that do not directly address adaptation. While this is welcome, more needs to be done to explicitly address risks associated with climate change, as well as climate variability.

5. Where adaptation was observed as a result of StARCK+ initiatives, this was only partly driven by climate change, with changes in

markets and market access often being more important. The role of markets in facilitating adaptation by allowing people to move into more climate resilient livelihood activities was strikingly apparent. The development of markets for climate-friendly products, services and livelihoods is therefore critical for successful adaptation.

6. Renewable energy initiatives often have ancillary adaptation and resilience benefits, such as: allowing the more efficient rearing of chicks in association with the installation of jikos; the improvement of soil quality through the addition of slurry produced by biogas digesters; and reductions in deforestation that slow erosion, maintain ecosystem health, sustain groundwater resources, and reduce flood risk. These links could be explored further, and more explicitly.

7. More needs to be done to ensure that adaptation and mitigation are complementary. While renewable energy initiatives often have positive resilience benefits, instances were observed in which resilience and adaptation initiatives led to greater use of non-renewable energy, including diesel generators for preserving fish, and the use of fuel wood for on-farm processing of crops (which also resulted in exposure to indoor air pollution). Resilience and adaptation initiatives should be screened to assess their potential impacts on energy use, emissions and health. These initiatives should mainstream low-carbon development better than they appear to be doing at present.

8. The success of the StARCK+ programme derives in large part from its 'embeddedness' in the areas in which it is working, which has been made possible by the forging of strong relationships with local organisations and communities, facilitated by partnership with a diverse range of Kenyan organisations who manage projects and initiatives based on their knowledge of the national and sub-national contexts.

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ANNEX 1. DETAILS OF DFID-FUNDED ACT! PROJECTS

Table A1.1. List of all 26 ACT! projects funded by DFID, with details and summaries of measures supported, and potential relevance to resilience and adaptation. Rows with shading indicate project/organisations represented at the ACT! partners' meeting on 17 November 2016. Letter in square brackets in the final column indicate whether, and what type of, resilience/adaptation relevance has been identified, with R indicating resilience/ addressing the adaptation deficit, IR indicating incremental adaptation, and TA indicating transformational adaptation. A question mark indicates that the identification is uncertain.

Project, organisation	Details	Measures/results	Adaptation/resilience relevance
1. Adaptive Climate Change Mitigation for Improved Livelihood in Laikipia and Nyandarua Counties Tree Is Life Trust (TILT)	Strengthen communities'/SH's participation in sustainable NRM hence improved climate change mitigation and adaptation for improved livelihoods through use of various approaches such as capacity building, awareness creation campaigns/events, advocacy, visual presentations (murals), consultative forums, technology transfer through demonstrations and social/public events such as environmental games and open/field/market days	Tech transfer –energy saving ceramic liners, biogas units, demonstration gardens in schools; training, open days, radio programmes, posters. Save time collecting firewood – reduce wood consumption & save money – forest restoration	[R, IA?] General good environmental management & development outcomes. Possible resilience benefits from use of biogas slurry on fields (better water retention in dry periods - incremental), covered fish ponds increase resilience to cold periods (adaptation deficit).
2. Domestication and propagation of Osyris lanceolata (sandalwood) seedlings on-farm for mitigation and adaptation measures on climate change impacts in arid and semi-arid lands of Kenya project (Baringo) BIFORAD	Contribute to conservation & management of sandalwood and host closely associated plants species On-Farm Lands in Baringo County for improved livelihoods". Activities: Enhance community awareness on reducing pressure on Osyris lanceolata harvesting natural populations, building capacity of local communities on sustainable development	Demonstration plots, nurseries, resource maps, legislation, awareness raising. Provision of additional/ alternative livelihood/ income stream Landscape conservation/rehab. if management succeeds as intended	[IR?, TA?] If sandalwood is more resilient to drought and climate variability than existing/previous activities, a shift to greater exploitation of it might represent adaptation. Could be transformational if it replaces activities becoming less viable. Could be incremental if about managing sandalwood and increasing existing exploitation . More information needed – speculative.
3. Emergency pastoralists assistance group (Wajir) EPAG-K	Enhance community resilience through development of climate smart policies, action plans and promotion of sustainable livelihoods Activities: Community engagement for climate change resilience	Cash work, pan desilting, community fora for policy influence, lobbying, training (advocacy) CC in county planning, policy influence. Cash allowed purchase of food, animals, education fees; desilting increased dam capacity	[R] Pan desilting likely to increase resilience to existing variability (adaptation deficit) Cash work best seen as short-term/transitory coping? Most important result likely to be **greater pastoralist influence on policy & planning**, if realised.
4. Enactment of climate change policy and legislation in Kenya - Target of Opportunity (TOO) KCCWG	To implement enactment of climate change policy and legislation in Kenya through Target of Opportunity (TOO) Activities: Lobby for a climate change Act and policy framework that is responsive to the development needs of Kenya	Sensitisation across scales, engagement	CC bill passed Steps towards ensuring CC addressed in planning
5. Enhancing food security and climate change adaptation through faith-based non-formal education for sustainable development (Target of Opportunity – TOO)	Capacity build youth and leaders from two major religious communities in western Kenya with practical knowledge, values, attitudes and skills through non-formal faith based education for sustainable development (ESD) to enable them to develop competence in adoption of ecosystem based technologies for food security and adaptation to climate change. Activities: increase awareness of climate change and its effect on development in faith based communities, build capacity of religious communities through training to promote food security and climate change adaptation.	Faith-based training of trainers n CSA Advocacy for sustainable farming as adaptation, training manuals in farming methods & CC, **drought tolerant crops**, **rainwater harvesting**	[R?, IA?, TA?] Unclear to what extent this has changed things 'on the ground', rather than just being about capacity building. Rainwater harvesting will improve resilience – will address adaptation deficit and likely also increase resilience to climate change (depending on extent/ capacity of harvesting). Adoption of drought-tolerant crops may be incremental (if just strains of existing crops), or transformational (if novel crops)

Project, organisation	Details	Measures/results	Adaptation/resilience relevance
6. Enhancement of Tawa community's response to climate change through alternative livelihood (Makueni) ZINDUKA AFRIKA	Improve participation by citizens, including the poor in the governance and sustainable utilization of natural resources in Kenya Activities: To promote diversified alternative livelihood sources for enhanced food security and environmental conservation Claimed farmers "gained knowledge & skill on modern farming technologies…to better respond & address CC issues…through alternative livelihoods"	'Modern farming' - pigs, beehives, seeds, fertiliser & pesticides, **water harvesting**, storage, marketing, advocacy, other tech (**zip pit**), training of trainers, extension Fertilisers & pesticides presumably to increase productivity of existing crops – livelihood strengthening.	[R, IA?] General development activities including some likely to increase resilience to climate variability and change Water harvesting & storage will address drought & may help address climate change depending on extent/capacity (adaptation deficit and possible incremental adaptation) Beekeeping represents resilient income stream. May be some additional adaptation depending on what seeds promoted, whether these are intended to address drier, shorter, more unpredictable growing seasons.
7. Enhancing communities' adaptive capacities through sustainable land management and environment management in the face of climate change (Garissa & Tana River) HAK	Improve community livelihood security through good governance and mainstreaming climate change adaptation **HHs moving to higher ground during rains, increased water availability & drought resilience**	DRR & EWS, radio shows on CC. agro-irrigation, **drought-tolerant crops**, **sand dam**, desilting, sensitisation, training on DRR/ EWS, marketing & storage workshop. Description suggests positive impacts already being seen.	[R, IA, TA?] Mix of development & adaptation measures, benefits of irrigation and desilting ambiguous Drought-tolerant crops represent incremental adaptation if new strains of existing crops, transformational if new crops to that to large extent replace previously grown crops.
8. Enhancing Community Resilience to the effects of Climate Change ECoReC in Tharaka Nithi and Machakos Counties (Tharaka Nithi & Machakos) Institute for Culture & Ecology	Improve land use practice for sustainable community livelihoods in Machakos and Tharaka Nithi counties Activities: Improve community livelihoods through capacity building and awareness creation	Forums, workshops, tree planting, capacity building, institutional actions CC network formed, gaps in agriculture Bill identified & presented to committee	Consists of capacity building, conservation, advocacy. No measures to directly address specific climate risks.
9. Humanitarian International Voluntary Association (HIVA) Project (Mandera) HIVA	Resilient woman to the impacts of climate change supported by the gender responsive policy environment in Lafey constituency Activities: Improve community livelihoods through advocacy and training in Mandera County	Advocacy, gender, forums, influencing of county govt. Training (livestock pop. Size), water saving	[R?] Mostly consists of capacity building If it has happened, water saving should help to improve resilience/ address the adaptation deficit.
10. Improved participation of citizens and marginalized groups in governance, management and utilization of natural resources in Lafey and Mandera East sub-counties (Mandera) NEEDO	To get the root cause of continued marginalization of pastoralists Activities: To promote diversified alternative livelihood sources for enhanced food security and environmental conservation	LH diversification, feed, advocacy, training, bees, poultry, **hay storage**, policy input	[R, IA?] Likely general development benefits and first steps in increasing voice, enhancing planning capacity; hay storage may confer real resilience benefits for livestock – focused on adaptation deficit but may help to address climate change as an incremental adaptation measure; LH diversification may improve resilience, depending on details

Project, organisation	Details	Measures/results	Adaptation/resilience relevance
11. Kenya organization for environmental education (KOEE) (Machakos & Marsabit) KOEE	Sustainable utilization of natural resources for improved livelihoods of communities in Machakos and Marsabit counties Activities: faith based climate change education for sustainable development (FB-CCESD)	LH diversification, **shift to goats**, training, sensitisation, radio shows	[R, IA?, TA?] LH diversification may improve resilience, depending on details Shift to goats arguably represents a transformational adaptation, based on past analogues, but unclear if this is drive by climate change, and what it replaces. May be that drivers are mostly developmental and economic (e.g. new livelihood activity for women)
12. Kilifi integrated climate change adaptation project (Kilifi) USTADI	To improve community livelihood through Climate Smart Agriculture (CSA) and marketing in Kilifi County Activities: to increase climate change advocacy and resilience in four sub counties in Kilifi	CSA – value chains & markets, advocacy, ag, demo farms, training of trainers	[R?, IA?] General LH & dev. benefits (presumed) – may confer resilience benefits and support adaptation, but more information needed on details of diversification and what has been realised beyond training.
13. Marsabit Drought Resistance project Green Cross Kenya	To have an efficient and effective system that supports communities resilience in marsabit county by march 2015 Activities: to improve capacity and citizen voice	Knowledge building, participation, seeds, pan rehab., training on dryland farming	[R, IA?] Training on dryland farming may improve resilience and contribute to adaptation but is most likely addressing adaptation deficit, depending on what it involves, and it may not have translated into changes on the ground. Pan rehabilitation address adaptation deficit
14. Mainstreaming youth Action in Climate change adaptation processes at county levels (Lamu, Kajiado and Tana River) Norwegian Aid	Enhancing capacity of Youth and county government to adapt to negative impacts of climate change	Meetings, forums, sensitisation, training on **vertical gardens & Zai pits**, savings promotion, NCCAP dissemination	[R?, IA?] If vertical gardens and zai pits have been taken up they may represent resilience or incremental adaptation measures.
15. Nomadic Assistance for Peace and Development (Mandera) NAPAD	To empower vulnerable community of Mandera county to adapt to the effects of climate change through improved livelihood, food security and better EBRM policy Activities: to promote diversified alternative livelihood sources for enhanced food security and environmental conservation	Sust. Farming, beekeeping, DRR (sandbags), training, tree planting/landscape rehab., solar pumps, CC awareness raising Reduced water fees & increased use	[R, IA?] Various measures to improve resilience and address adaptation deficit, some of which may confer resilience benefits with respect to climate change (e.g. beekeeping, DRR, farming depending on details) Increased water use may be good for wellbeing but is this sustainable under CC (maladaptation risks)?
16. Pastoralist Girls Initiative (Garissa & Tana River) PGI	to contribute to increased resilience and reduce vulnerability of targeted communities Activities: Empower pastoralists women to innovatively and adaptively venture into community resilience and provide alternative livelihood	Training on sust. farming & **pasture management**, **DRR**, **EWS**, diverse **contingency planning**, DRR committees, tree nurseries, advocacy at county level	Mix of general development & likely adaptation/resilience benefits, if what looks like mostly training/capacity building translates int changes in the ground.

Project, organisation	Details	Measures/results	Adaptation/resilience relevance
17. Participatory approach to Empower communities to control and manage their Local (Natural) Resources Relevant to the county's harsh climatic conditions and Remoteness (Mandera) Rural Agency for Community Development and Assistance (RACIDA)	To build pastoralist communities resilience to adapt to effects of climate change Activities: 1) strengthen 25,000 pastoralist communities in the management of natural resources for sustainable development; 2) promote diversification of livelihoods to enhance household incomes in five projects in Mandera	Awareness raising, beehives, lobbying, irrigation canal, **underground water tank**, non-state actor (NSA) formation & capacity building, cookstoves, **DRR**, **EWS**, water resource users assoc. training, **pasture management**, **flood preparation**, reduced charcoal impact	[R, IA?] Mixture of capacity building, measures to address the adaptation deficit (improving resilience to familiar hazards), some of which may also confer incremental adaptation benefits. Reports that people move to higher ground during floods suggest changes in behaviour have occurred – adaptation?
18. Pokot Adaptation Climate Change (PACC) (West Pokot) Reformed Church of East Africa	To enhance role of county government in environmental and natural resource management by integrating climate change in their policies and development plans Activities: to promote diversified alternative livelihood sources for enhanced food security and environmental conservation	**Sand dams**, stream diversion(?), training (business), beekeeping training, poultry, livestock trading, veg, aloe vera, County CC network formed, consultations with gov, CC info diss.	[R, IA?] Many measures to address adaptation deficit, some of which may confer incremental adaptation benefits (e.g. less climate sensitive beekeeping, chickens, aloe vera?)
19. Promoting climate change adaptation for natural resources dependent communities in Narok County Indigenous Information Network (IIN)	To strengthen climate change adaptive capacity of Narok county communities Activities: effective planning and implementation of advocacy action in climate change adaptation when dealing with stakeholders	School WASH, jikos, training, advocacy capacity, action plan, awareness forums. media	Likely development benefits, capacity development – first steps
20. Rain water harvesting along dry river valleys for small scale irrigation and livestock use in arid areas of Taita Taveta County MAZIDO	To reduce vulnerability of community from effects of climate change in Tausa Division, Taita Taveta county. Activities: 1) increase food security in 1200 households in Tausa Division, Taita Taveta County by 2015; improve water availability for 2000 households in Tausa Division, Taita Taveta County by 2015; strengthen community participation to improve natural resources management in Tausa Division, Taita Taveta County by 2015.	**Fodder, pasture & livestock management**, water, soil cons., **sand dams**, **short cycle crops**, training of trainers, demo farms, school sensitisation, awareness, farmer networks, **rainwater harvesting** & irrigation, river bank rehab., **policy influence**	[R, IA] Many measures to address resilience/ adaptation deficit, with some (short cycle crops) representing incremental adaptation.
21. Strengthening Community Resilience to Impacts of Climate Change and Stewardship of Natural Resources in Baringo, Kajiado and Laikipia Counties Arid Lands Information Network (ALIN)	Enhanced community resilience to adapt to the impacts of climate change for improved livelihoods Activities: 1)Lobbying for the development of a climate change adaptation framework, 2) enhancing community's capacity to adopt climate smart agriculture practices and 3) increasing access to information on climate change adaptation.	Demo farms, solar drip irrigation + water storage (tanks & pits), info production & sharing, CC advisory committees in each county, review of CC bill, policy briefs, radio programmes, CCVA. Note little progress on advocacy of CC policy/leg.	[R, IA?] Lots of capacity building, mixed with measures related to water that will improve resilience to existing climate hazards, and likely also climate change (adaptation deficit and incremental adaptation)
22. Strengthening community based resilience to climate change through governance and management of natural resources (CRCC-GM) (Makueni & Machakos) INADES Formation Kenya	To increase the resilience of communities particularly women and youth in Makueni and Machakos counties Activities: enhancing effective governance and citizens participation in management of natural resources	Tree nurseries, kitchen gardens, **water harvesting learning**, conservation sensitisation/ comm groups, **sand dam**, sand harvesting bill, stove construction, energy saving, media	[R, IA?] Development benefits with some resilience actions (e.g. sand dams gardens) that will address existing climate hazards and possibly climate change (adaptation deficit with some possible incremental adaptation benefits)

Project, organisation	Details	Measures/results	Adaptation/resilience relevance
23. Strengthening communities and ecosystem resilience to climate related impacts through alternative livelihoods to charcoal production in Kajiado and Kwale counties EAWLS	To improved community adaptation to climate change through promotion of alternative livelihoods to charcoal production in Kajiado and Kwale counties. Activities: To lobby for climate change adaptation mainstreaming in county frameworks, policies, plans and projects that promote alternative livelihoods and to improve entrepreneurial, organizational and technological capacities of charcoal producers in Kajiado and Kwale Counties	Worskhops, sensitisation, training, NCCAP scrutiny, advice, encouragement of adoption of alternative LH sources to reduce charcoal production	Mostly capacity building with some possible landscape resilience benefits if reduced pressure from charcoal
24. Sustainable community-based management and utilization of rehabilitated land in the districts of East Pokot and Marigat in Baringo County Rehablitation of Arid Lands (RAL)	To enable communities and individuals to sustainably manage and utilise rehabilitated grassland pastures. Activities: Promote 300 acres of pasture development in Baringo County by 2015, 2) lobby livestock for friendly county legislative framework on effective dry-land management and utilisation at Baringo County by 2015	Pasture rehab., better grazing & livestock survival outcomes, lobbying to recognise grass as crop, reform of grazing bye laws **Direct impacts on livestock survival**	[R, IA?] Capacity building with some apparent real and potential adaptation benefits Addressing adaptation deficit linked to better NRM as move (back) to sustainable pasture management. Better pasture management may help address climate change but uncertain to what extent, depending on severity of climate change.
25. Waso River Alliance for Climate Resilient Communities (WARA-CLIREC) (Isiolo) Wetland International Kenyan office WIKO	To build resilience of communities' livelihoods to climate change in Isiolo county Activities: 1) Enhance the capacities on climate smart livelihoods through ecosystem-based adaptation by promoting participation of sixty local non-state actors in lower EwasoNyiro in advocating for climate proof water governance in Isiolo county,	Sensitisation, capacity building, WRUAs, part. Comm. Action planning, climate proofing advocacy, **planting drought resistant trees for riparian rehabilitation**, irrigation, invasive species management, solar lamps, pumps, NRM plan, CCVA, resource maps	[R, IA?] Capacity building and development benefits with elements of ecosystem based adaptation. Irrigation should help address adaptation deficit, but sustainability needs to be considered. If drought resistant trees ae indigenous and rehabilitation is of human impacts, then this is simply rehabilitation to status quo ante. However, if these are novel species introduced because of changes that mean local species are less successful, it is adaptation.
26. strengthening institutional capacity to mainstream gender and social issues in climate change in Nakuru County The Institute of Environment and Water Management (IEWM)	strengthen national climate change policies and programs in response to the needs and concerns of women and men Activities: mainstream climate change in county development policies and programs	Training & action plans to make NCCAP more gender response	Capacity building, first steps

Table A1.2. ACT! Initiatives/projects of particular interest from an adaptation and resilience learning perspective, with associated resilience/ adaptation issues/questions. Rows with shading indicate project/organisations represented at the ACT! partners' meeting on 17 November 2016.

	Project, organisation	Details, likely results & adaptation/resilience questions
2	Domestication & propagation of Osyris lanceolata (sandalwood) seedlings on-farm for mitigation & adaptation measures on climate change impacts in ASAL of Kenya (Baringo) - BIFORAD	• Demonstration plots, nurseries, resource maps, legislation, awareness raising • Provision of additional/ alternative livelihood/ income stream • Is sandalwood more resilient that other livelihoods it replaces or augments? If so how/ why? Are there any other resilience or adaptation benefits?
3	Emergency pastoralists assistance group (Wajir) - EPAG-K	• Cash work, pan desilting, community for a for policy influence, lobbying, training (advocacy) CC in counting planning, policy influence • Cash allowed purchase of food, animals, education fees; desilting increased dam capacity; **greater pastoralist influence on policy & planning** • To what extent is the emphasis on short-term/transitory coping? What influence have pastoralists had on policy & planning, and to what extent has this helped create a more enabling environment for pastoralist adaptation?
5	Enhancing food security and climate change adaptation through faith-based non-formal education for sustainable development (Target of Opportunity – TOO)	• Faith-based training of trainers in Climate Smart Agriculture (CSA) • Advocacy for sustainable farming as adaptation, training manuals in farming methods & CC**, drought tolerant crops, rainwater harvesting** • High confidence adaptation measures mixed with more general capacity building.
6	Enhancement of Tawa community's response to climate change through alternative livelihood ((Makueni)) - ZINDUKA AFRIKA	• 'Modern farming' - pigs, beehives, seeds, fertiliser & pesticides, **water harvesting**, storage, marketing, advocacy, other tech (**zip pit**), training of trainers, extension • *High confidence adaptation measures mixed with more general capacity building.*
7	Enhancing communities' adaptive capacities through sustainable land management and environment management in the face of climate change (Garissa & Tana River) - HAK	• DRR & EWS, radio shows on CC. agro-irrigation, **drought-tolerant crops**, **sand dam**, desilting, sensitisation, training on DRR/ EWS, marketing & storage workshop • *High confidence adaptation measures mixed with more general capacity building.* • How sustainable is irrigation under potential future climate change?
10	Improved participation of citizens and marginalized groups in governance, management and utilization of natural resources in Lafey and Mandera East sub-counties (Mandera) - NEEDO	• LH diversification, feed, advocacy, training, bees, poultry, **hay storage**, policy input • Likely general development benefits and first steps in increasing voice, enhancing planning capacity; hay storage may confer real resilience benefits for livestock; LH diversification may improve resilience
11	Kenya organization for environmental education (KOEE) (Machakos & Marsabit)	• LH diversification**, shift to goats** • Likely adaptation benefits based on past analogues
12	Kilifi integrated climate change adaptation project (Kilifi) - USTADI	• CSA – value chains & markets, advocacy, ag, demo farms, training of trainers • How do these activities translate into adaptation/resilience?
15	Nomadic Assistance for peace and development (Mandera) - NAPAD	• Sust. Farming, beekeeping, DRR (sandbags), training, tree planting/landscape rehab., solar pumps, CC awareness raising • Reduced water fees & increased use • Development with some likely adaptation/resilience measures (DRR, rehab). • increased water use may be good for wellbeing but is this sustainable under CC?
16	Pastoralist Girls Initiative (Garissa & Tana River) - PGI	• Training on sust. farming & **pasture management**, **DRR**, **EWS**, diverse **contingency planning**, DRR committees, tree nurseries, advocacy @ county level • Mix of general development & likely adaptation/resilience benefits

17	Participatory approach to Empower communities to control and manage their Local (Natural) Resources Relevant to the county's harsh climatic conditions and Remoteness (Mandera) - Rural Agency for Community Development and Assistance (RACIDA)	• Awareness raising, beehives, lobbying, irrigation canal, **underground water tank**, NSA formation & capacity building, , cookstoves, **DRR**, **EWS**, water resource users assoc. training, **pasture management**, **flood preparation**, reduced charcoal impact • Mix of general development & likely adaptation/resilience benefits. Lots of general LH interventions and capacity building here, **moves to higher ground to address floods** look like actual adaptation results, water interventions may be mixed (irrigation ambiguous).
18	Pokot Adaptation Climate Change (PACC) (West Pokot) - Reformed Church of East Africa	• **Sand dams**, stream diversion(?), training (business), beekeeping training, poultry, livestock trading, veg, aloe vera, County CC network formed, consultations with gov, CC info diss. • Lots of livelihood diversification & strengthening; and dams may deliver tanglble adaptation benefits • To what extent does aloe vera increase climate resilience?
20	Rain water harvesting along dry river valleys for small scale irrigation and livestock use in arid areas of TaitaTaveta County - MAZIDO	• Fodder, pasture & livestock management, water, soil cons., sand dams, short cycle crops, training of trainers, demo farms, school sensitisation, awareness, farmer networks, rainwater harvesting & irrigation, river bank rehab., policy influence • Multiple activities likely to contribute to resilience with some very specific measures likely to deliver direct adaptation benefits.
21	Strengthening Community Resilience to Impacts of Climate Change and Stewardship of Natural Resources in Baringo, Kajiado and Laikipia Counties Arid Lands Information Network (ALIN)	• Demo farms, **solar drip irrigation** + **water storage (tanks & pits)**, info production & sharing, CC advisory committees in each county, review of CC bill, policy briefs, radio programmes, CCVA. Note little progress on advocacy of CC policy/leg. • **Water & irrigation** interventions likely to confer resilience benefits; rest represents first steps / capacity building.
22	Strengthening community based resilience to climate change through governance and management of natural resources (CRCC-GM) (Makueni and Machakos) - INADES Formation Kenya	• Tree nurseries, kitchen gardens, **water harvesting learning**, conservation sensitisation/comm groups, **sand dam**, sand harvesting bill, stove construction, energy saving, media • Development benefits with some likely resilience/adaptation benefits
24	Sustainable community-based management and utilization of rehabilitated land in the districts of East Pokot and Marigat in Baringo County Rehablitation of Arid Lands (RAL)	• Pasture rehab., better grazing & livestock survival outcomes, lobbying to recognise grass as crop, reform of grazing bye laws • **Direct impacts on livestock survival** • Capacity building with some apparent real and potential adaptation benefits • **How have these measured worked together, and what lessons can be drawn from efforts to influence regulatory system & foster enabling environments?**
25	Waso River Alliance for Climate Resilient Communities (WARA- CLIREC) (Isiolo) Wetland International Kenyan office WIKO	• Sensitisation, capacity building, WRUAs, participatory communications, action planning, climate proofing advocacy, **planting drought resistant trees for riparian rehabilitation**, irrigation, invasive species management, solar lamps, **pumps**, NRM plan, CCVA, resource maps • How does riparian landscape rehabilitation translate into resilience, and to what extent does it support adaptation? How sustainable is irrigation under potential future climate change?

ANNEX 2. ADAPTATION AND RESILIENCE LEARNING QUESTIONNAIRE FOR ACT!

Project/business (*title and brief description – sector, activities*)		
Location	Start date	End date
Adaptation/resilience context		
Resilience of whom (beneficiaries)?	To what (climate stresses & shocks)?	With respect to what consequences (e.g. losses)?
Activities supported by project (tick those that apply)		
Activity	How does activity improve resilience or deliver adaptation benefits?	
Capacity building (*indirect, downstream resilience benefits*)	*Whose capacity it being developed, to do what, and how will this help them cope better with (specific) climate stresses & shocks?*	
Policy influencing, advocacy (*indirect, downstream resilience benefits*)	*What are the intended outcomes and how will these support resilience?*	
General livelihood strengthening (e.g. improved productivity, income, market access, value addition) (*indirect, downstream resilience benefits*)	*Do these activities help people to cope better with climate stresses and shocks, and if so, how?*	
Livelihood diversification or substitution (*potential direct and indirect resilience benefits)*	*Do these activities help people to cope better with climate stresses and shocks, and if so, how?*	
Conservation/rehabilitation of natural resources (*potential direct and indirect resilience benefits)*	*Do these activities help people to cope better with climate stresses and shocks, and if so, how?*	
Reducing specific climate risks to existing livelihoods (e.g. risks to inputs such as feed, water) (*direct adaptation benefits*)	*How do these activities help people to cope better with climate stresses and shocks?*	

RESPONSES TO QUESTIONNAIRE AT MEETING WITH ACT! PARTNERS ON 17 NOVEMBER 2016

The questionnaire on the previous page was used with ACT! project partners during a meeting on 17 November 2016, to examine how DFID-funded ACT! projects might be contributing to resilience and adaptation through six categories of activities. Representatives from five projects completed the questionnaire. These projects were:

- **Indigenous Information Network (IIN)** - Promoting climate change adaptation for natural resources dependent communities in Narok County
- **Nomadic Assistance for peace and development (NAPAD)** - Mandera
- **NEEDO** - Improved participation of citizens and marginalised groups in governance, management and utilisation of natural resources in Lafey and Mandera East sub-counties (Mandera)
- **INADES** - Strengthening community based resilience to climate change through governance and management of natural resources (CRCC-GM) (Makueni & Machakos)
- **Arid Lands Information Network (ALIN)** - Strengthening Community Resilience to Impacts of Climate Change and Stewardship of Natural Resources in Baringo, Kajiado and Laikipia Counties

The measures and mechanisms they identified under each of the six categories are summarised below.

Capacity building

- Energy, land management, natural resource protection, promotion and implementation of environmental policies, fodder management, destocking, knowledge management (IIN)
- CA, beekeeping, better NRM, policymakers create enabling environments (NAPAD)
- Community livelihood diversification and environmental management, assistance for enhancing skills and improving household food security (HAK)
- Local community members to be able to harvest water during rainy season and use it during dry season for domestic & agricultural use (INADES)
- Pastoral field school to crop fodder crops to save livestock during critical dry periods, beekeeping cooperative for alternative livelihood, women's group for raising drought resistant goats for milk production (NEEDO)
- Awareness raising and training on food security and climate change (KOEE)

Policy influencing

- Ensure adaptation and resilience building activities are sustainable, reduce dependence on natural resources (especially forests), better land management and use, developing laws and policies governing natural resources (IIN), use participatory approaches, promote food security and alternative livelihoods (IIN)
- Formulation of county bill that encourages conservation of natural resources, adoption of renewable energy, provision/conservation of pasture, and more affordable water (NAPAD)
- Improve livelihood security through good governance & mainstreaming of CC adaptation and resilience, strong CSO networks and lobbying capacity, improved access to government services (HAK)
- Promotion of sustainable sand harvesting, restriction of sand harvesting in degraded areas, sharing of financial benefits of sales of sand (INADES)
- Advocacy for climate change policy in Mandera intended to lead to mainstreaming of CC in all sectoral programming and allocation of resources by authorities (e.g. County government) and other development partners (NEEDO)
- Improved non-state actors' involvement in policy formulation, improved intra-county agency cooperation in policy, sensitisation workshop on draft Machakos County Environment Action Plan (KOEE)

General livelihood strengthening

- Communities are planting more for sale (income), women are building more(?), energy saving devices (cost savings), better fodder and livestock management (IIN)
- Conservation farming & optimisation of inputs, solar water pumps to reduce cost of water provision for livestock (NAPAD)
- Improved food security and incomes, sustainable land use, mainstreaming CC adaptation (HAK)
- Tree planting, adoption of drought tolerant crops (INADES)
- Fodder has generated income, maintain milk production during dry period and preventing loss of livestock (NEEDO)
- Promotion of climate-friendly farming techniques through demonstrations, micro-projects to enhance food security and add value (KOEE)

Livelihood diversification/substitution

- Communities no longer depend only on livestock but have diversified to farming for sale and consumption, more trees being planted that produce forest products (farm-family-forest) (IIN)
- Beekeeping (NAPAD)

- Farming & agro-irrigation help improve food production & income (HAK)
- Kitchen gardens produce vegetables saving money as people do not have to buy them, manufacture of eco-friendly interlocking bricks (INADES)
- Beekeeping has helped communities with livelihood alternatives to pastoralism, drought resistant goats improved milk production, poultry groups rearing chickens for income (NEEDO)
- Goat milk production, greenhouses, manufacture and sale of jikos, sales of solar energy products (KOEE)

Conservation/rehabilitation of natural resources

- Planting more indigenous trees (also being sold), using indigenous knowledge to conserve natural resources, less firewood collected due to energy innovations (IIN)
- Planting fruit & indigenous trees along river to reduce bank erosion & crop damage by floods (NAPAD)
- Capacity building and training on 'sustainable charcoal burning' & alternative water sources has reduced risk of deforestation & improved water access, desilting of pans has improved water access (HAK)
- Training of community groups on water harvesting, rehabilitation of degraded rivers (INADES)
- Tree planting along Dana river maintained vegetation cover, awareness creation to prevent tree cutting to maintain vegetation (NEEDO)
- Tree planting to conserve and rehabilitate forest, water harvesting, associated awareness creation/raising (KOEE)

Reducing specific climate risks

- Fodder management – no more queues(?) for pasture, protection of water resources & conserving/harvesting so adequate availability, communities "now aware of how to deal with stress & shock of CC" (IIN)
- Solar water pumping, provision of affordable water for livestock during drought (NAPAD)
- Enhance skills of beneficiaries for sustainable land use and adaptive capacities, improve access to water and food security, desilting of pans reduces disaster risk (HAK)
- Reduced fuel requirements due to energy saving technologies (INADES)
- Fodder production (Sudan grass) for use during dry periods (NEEDO)
- Reducing risks of water shortages through installation of water tanks, rainwater harvesting from roofs, crop production projects to help address food security issues (KOEE)

NOTES FROM MEETING WITH ACT! ON 17 NOVEMBER 2016 (SUBJECT TO LIGHT EDITING)

Present

Nick Brooks (Consultant)
Joab Osumba – FICCF
Julius Wairoma – ACT!
Lucy Molike – Indigenous Information Network
Sinke – Indigenous Information Network – Project coordinator
James – ACT!
Noah – Arid Lands Info Network (ALIN)
Francis – Nomadic Assistance for Peace and Development (NAPAD)
Nancy Rapando – ACT!
Abdullahi – NEEDO
Alvin – awareness, promoting food security & CC adaptation, policy influencing
Noelle O'Brien - FICCF/DAI (joined towards end of meeting)

Indigenous Knowledge Network

- Promoting climate change adaptation – Narok County 2014-15
- Community but mostly women & youth, schoolchildren
- Floods, droughts, loss of NR
- Low farm production forest depletion, livestock loss, land degradation
- Tree planting, innovation, jikos – prevent depletion of forest
- Diversification – no longer depending just on livestock but now also farming, selling produce, 3F: farm, family, forest – includes food trees, sell seedlings
- Documentation of indigenous knowledge; planting more indigenous trees
- On-farm demo – fodder management, protection of water resources – fewer complaints about lack pasture & lack of water
- Water source protection – no longer using same point for cattle & domestic use – taking out separately

NAPAD – Francis

- Capacity building, alt energy (solar), county policy of NRM – villages, livestock keepers, mitigating results of drought. Preventing loss of livestock during drought & crops from flooding. Trained farmer on conservation ag/CSA, beekeeping (diversification) – main aim to increase production through better management. Targeted policy makers particularly on NRM, creating awareness among county representatives, better policy environment for CCA; worked with county gov. Capacity building on rangeland management to conserve pasture; more affordable water through solar pumps. Trained farmers on irrigation farming to increase production, also conserving soil nutrients. Solar water pumps reduced expenditure for water for livestock. Beekeeping more resilient as still some flowers etc. along river in drought. Addressed river bank erosion to reduce damage to crop from floods.
- Solar pumps allow affordable water for livestock in drought. Also dry conditions (heat, dust) are when diesel pumps more likely to break down so more resilient. Cost of water reduced by half as result of installation of hybrid solar pump. Many people managed to save a lot of money so indirect benefits in terms of income. If generator fails in drought people need to cross border to Somalia to find water.
- Note solar pumps are *hybrids* i.e. mix of solar and diesel, so people can still use generator – this is because of resistance to complete change to solar as new, 'untested' technology. People also use generators at night when solar pump doesn't work. System has been bombed by al-Shabaab. Two boreholes where people have adopted the same – hope to propagate throughout ASAL areas. Also potential in Somalia – have some funding to do this also to reduce conflict, but cannot work there at present due to security issues. Also get solar system failure so mix is resilient.
- Conflict is a consequence of climate change (Ruth) so also addressing this.
- More details on solar pump – where, what scale – seems more like centralized than small-scale: how do people pay – are they paying for water from centralized borehole or paying to buy small pumps and then just extracting water autonomously?
- Issues of harmonisation and enforcement – county-national level (came out of discussion)

NEEDO - Abdille

- Policy experience at county level – recent CC policy at national level – came out late – had already collected details of what county wants in terms of policy. Counties don't have technical people. CC policy needed at county level because of unique character and needs of each county.
- Pastoralists
- Agro-pastoralists
- Town dwellers
- Resilience, milk yields through livestock breeds and feed
- Fodder production for milk yields
- Water sites
- Beekeeping – most relevant for 'pure pastoralists'?
- Tree planting – protection of natural trees
- Drought assistance – goats for milk, particularly targeting single mothers. More than 200.
- 2 women's groups supported for poultry production
- Fodder production – December to March Mandera is almost pure desert. Used to import hay. Recent introduction of Sudan grass irrigated from river. Dries in 2 days. Supported to construct
- Capacity support for pastoralists – subsidy and seeds (Sudan grass) - 60% women – fodder – bales of hay, each costs up to 500-700 Ksh. So saves livestock and also provides income. Example – someone built 2 rooms with money from hay.
- Example – someone's son needed to pay bills at university before they could sit exam – Ksh 65,000 – paid by SMS from hay proceeds.
- Another woman 900,000 Ksh to pay school fees
- Examples of villages earning 8 million, 6.5 million Ksh
- Noelle asked about goats being more destructive, and general shift across Kenya from cattle to goats – Abdullahi(?) – planning is key issue – production of fodder. Destructive as eat more indiscriminately and pull up roots. Julius – answer is rotation of grazing and pasture management
- This is an adaptation issue – shift to goats may be adaptation; this needs to be accompanied by adaptation in form of changes in pasture management
- Francis – improved breeds of goats to meet needs of family when left at home as others move to find pasture. Communities have

ways of getting fodder for these animals, e.g. in Mandera may grow maize but not let it mature and instead use if for fodder. Pastoralists already do rotational grazing.

Nancy (in response to raising project to increase pastoralist influence on policy) - RAI trust – dealing with formal and informal regulation – grass as a crop and as a value chain

Abdille – project also about improving & building on traditional pasture management (e.g. which areas are (not) rain-time grazing?). Traditional elders who know about historical rainfall patterns – are training these people. They can tell you about rainfall going back up to 50 years.

Sometimes grazing remains where water is far away, so water can be main issue.

Can we improve breeds to so can get same benefits from smaller numbers?

Livestock insurance provision coupled with sensitisation on reducing livestock numbers.

Garissa and Tana River – capacity sustainable land and river management.

- Agropastoralists, drought LH risk, food insec. Training on sust. Management to reduce impact & improve incomes. County gov. to mainstream CC into county level integrated dev. plans.
- Championing for alt livelihoods to improve food sec & income to buy new H items and take children to school.
- Drought resistant crops – maize, cow peas, watermelon in river Tana area – best practices & storage facilities, desilting. Alt water sources: sand dams, etc.
- Addressing climate risks: desilting

Anthony – INADES

- Makueni – not a pastoral but a dry cropping area
- Comm based res to CC – water res users assocs., catchment protection, etc.; sand harvesting (Machakos, Makueni)
- Capacity of local institutions, provide alternative incomes
- Rocket stoves – more fuel efficient, reduced cutting down of trees
- Interlocking brick making machine – makes bricks which don't require kilning so saves fuel, wood, energy
- Kitchen gardening using waste water – saves money as buying fewer vegetables
- Water harvesting – sand dams
- Village – up to 1000 people or 200 HHs – one sand dam
- Tree enterprise – (Julius) – tree planting not just for conservation but trees represent a value chain

Noah – ALIN

- Strengthening comm res to CC
- Baringo, Kaijado & Laikipia
- CSA, comm sens., vulnerability analysis, documentation
- Farmers & pastoralists
- Drought & water scarcity
- Low yields, famine, loss of income, etc.
- CB: knowledge & skills on water harvesting for food production – 3 sites working with communities on CSA via solar power drip irrigation; first time pastoralists in some sites practicing crop production; agro-forestry; use of manure (have a lot, weren't using it); community sensitisation forums
- Policy: policy briefs for 3 counties on CC- counties developed CC policy frameworks – long process; inclusion of CC strategies in county budgets
- People calling to say they were enjoying eating produce for first time in dry season
- Laikipia – group made losses as elephants destroyed crop – as only crop in that season
- Baringo – reported using much less water compared to previous inefficient and high use
- Water is a big issue in areas with livestock as will often give water to livestock rather than crops
- Access to local markets – did not need to get from Nairobi so better price for consumers
- Reduced soil erosion and increased fertility – not so much splash off with drip irrigation – increased ecosystem benefits – animals coming to water points etc.
- Pilot to influence as many as possible. Indications of desire of other actors to replicate
- Training in maintenance as sometimes water pumps can break down and need to get someone from Nairobi to repair it – by time they arrive crop can already be suffering.
- Baringo – tapping water from one particular channel – during driest period level was below tapping level so didn't work – learning.
- Mobile irrigation systems heavily water intensive, labour intensive (women pushing!). Saved 28,000 Ksh previously spent on petrol water pumps for 1 acre for tomatoes and onions over one season – now zero with solar pump (entirely solar).

Alvin

- Faith based CC education, 4 counties, CC & effects on FB comms.
- Promote climate friendly farming for resilience & adaptation
- Tree planting
- Training of faith leaders on CCA (ToT)
- Micro-projects: poultry, dairy goats & cows, greenhouses, natural farming with no pesticides, composting & mulching to control soil erosion; bring leaders from all faiths together – apply faith-based principles in relation to environment – the same across faiths.
- Sales of produce from micro-projects in churches. Pastors and Imams would integrate lessons/material in book produced by project into their services to promote this kind of agriculture.
- People were previously using a lot of fertilisers and not doing proper crop rotation. E.g. lots of sugar cane but after training found could do much more and get more income from same land.
- Lots of tree planting, indigenous and fruit trees – schools, given responsibility to take care of trees – 90-95% tree survival rate.
- Installed water harvesting in schools – didn't previously have good access – better water & sanitation.
- Through this project members of different faiths worked together – at first difficult to get them to do this but now they are – bring people of different faiths together
- Beneficiary experience sharing workshop on agriculture, water, energy
- Advice on how to market and where to sell

ANNEX 3. KCIC PROJECTS/BUSINESSES

Table A3.1 Summaries of the business supported by KCIC, the activities and results associated with each business, and the relevance of these activities and results to resilience and adaptation.

Business	Details	Activities/results	Adaptation/ resilience relevance
1. Proactive Merit, Makueni	Engage community in contract farming for honey – buys raw honey from producers. Hives suspended from Acacia trees which are normally felled for charcoal. One tree produces 5 bags of charcoal fetching Ksh 350; 3 hives can generate Ksh 18000	Income, tree preservation, pollination & resulting increased tree yield, jobs with business expansion. Social, economic & environmental impact	Preservation of acacia cover helps to sustain environment & promote landscape resilience. Is honey production less sensitive climate stress than other livelihoods? If so there are wide resilience/adaptation benefits
2. Eco Agribusiness Ltd (EAL)	Buys fruit (strawberries, tree tomatoes, passion, pineapple, mango, orange) from producers – creates market for producers. Initiates cultivation of strawberries & tree tomatoes in forest-adjacent areas	Fruit cultivation can produce more income than convention agriculture previously practices, if well managed	Livelihood and income benefits, but difficult to see specific adaptation relevance
3. Kuku Bora Indigenous Chicken, Bungoma	Established commercial indigenous chicken processing plant – products to large network of markets in Kenya & EAC; procures chicken from smallholders	Sustainable income stream, job creation, supply chain improvement	Described as potential major adaptation opportunity via Resilience benefits if chicken demonstrably less climate sensitive than other livelihoods
4. Classic Foods	Market access to farmers through value addition (processing & distribution). Partnership with farmers to increase output & provide market	More secure and higher incomes, better market access	Claims farmers benefit from CC resilience but no details. Potential opportunities to build resilience but how - details?
5. Lisha Bora	Innovation & education in dairy sector	New dairy feed to increase milk yields	Improved livelihoods and incomes – where is resilience story? Does new feed reduce dependence on climate-sensitive pasture?
6. Nyangora Banana Processing, Kisili	Purchases bananas from farmers	Access to markets, income	Livelihood and income benefits but difficult to see specific adaptation relevance
7. Farm Capital Africa – Angel funding, Machakos, elsewhere?	Linking agri-entrepreneurs with investors - Business & TA, extension, marketing services, funds	Improved yields, jobs along value chain – claimed will lead to more sustainable food sec.	No indication of resilience benefits, but definitely opportunity to deliver these. What elements focus on resilience/ adaptation?
8. East African Roselle, Kirinyaga	Hibiscus juice & tea bags – works with growers, process & distribute	Access to market/new market, income. Alternative income source	Livelihood and income benefits but difficult to see specific adaptation relevance Unless Hibiscus is more climate resilient that other livelihoods?
9. TSS	Solar powered milk chilling & collection equipment (rural mobile solar generator & block ice machine)	Reduced milk losses, incomes, jobs, investment	Makes milk production more efficient & productive, but are there specific adaptation benefits?
10. Wanda Organic	Organic soil fertility tech., collect & replenish soils	Oil improvement, greater productivity, incomes, jobs	Increased organic content may help retain moisture & deliver benefits under drier conditions
11. Kenya Biologics Ltd	Bio insecticides for bollworm & diamondback moth	Increased outputs, reduced pesticide risks, soil fertility	Potential adaptation benefits if climate change likely to make these pests more prevalent
12. Meisham Intl.	Adding value to raw manure – dried, crushed, packaged for sale	Income to suppliers, advantages to users – productivity, soil quality	Increased organic content may help retain moisture & deliver benefits under drier conditions

Business	Details	Activities/results	Adaptation/ resilience relevance
13. Safi Intl., Kibera	Ethanol from sugar cane as renewable fuel to replace charcoal	Better health, reduced emissions & deforestation saves money & time	Shift away from charcoal will help sustain landscapes (ecological resilience) But how resilient is sugar to climate shocks/stresses? More or less than other options?
14. Maj Milele Ltd, country-wide	Subsidiary of Water Forever – water meters for public water points, prepaid metres for domestic connections, online monitoring	Expanded water access	Does this increase water availability during times of increased water stress?
15. Human Needs Project	Provision of clean water, sanitation, energy to slums around world through creation of replicable, self-sustaining town centres.	Looks like early days for this project	Does this increase water availability as above *and* help reduce water pollution, disease during high rainfall?
16. Future pump	Sunflower irrigation pump for seasonal veg. farmers. Alternative to petrol/diesel pumps to irrigate crops on demand	Irrigation enables production out of season with economic benefits	Resilience benefits if this enables more farmers to irrigate and thus cope with reduced/erratic rainfall
17. Solimpexs Africa	Solar water heaters	Better health, reduced emissions & deforestation saves money & time	
18. Kenya Power, Mt. Kenya (producers)	Feed in tariff, power purchase from CBO based on min-hydro	Jobs, community income, emissions	
19. Green Link	Off-grid solar PV, solar water pumps, heaters, power backup systems, financing		
20. Schutter Energy PAYG Biogas	Mobile payments & metering, plastic biogas units, lease to own		
21. Maa Briquette, Narok	Char dust & agro waste to make briquettes sold at half market price of charcoal, smokeless	Better health, reduced emissions & deforestation saves money & time; ecotourism	
22. Keekonyokie slaughterhouse abattoir gas	Package & sale of biogas from slaughterhouse, biogas digester, powers abattoir operations, surplus packaged & dole like normal LPG	Reduced emissions, availability of clean energy with benefits as per other renewables	
23. Global Supply Solutions Ltd	Biomass briquettes from pineapple feedstock; processes pineapple agri-waste	Reduced emissions, availability of clean energy with benefits as per other renewables	
24. Strauss Energy	Building Integrated PV Roofing (BIPR), BIPR tiles incorporating solar cells	Reduced emissions, jobs, usual renewables advantages	

ANNEX 4. REACT PROJECTS/BUSINESSES

Table A4.1. Summaries of the businesses supported by REACT in Round 3 with a focus on adaptation that are operating in Kenya, the actual or potential results of their activities, and the relevance of these results to resilience and adaptation.

Business	Details	Actual or potential results	Adaptation/resilience relevance
Futurepump	Marketing & distribution of a new design of solar pump suitable for small-holder farm irrigation	Once purchased, no or minimal running costs compared with diesel or petrol powered pumps. Pumps can provide sustained performance in contrast to more intermittent performance of diesel powered pumps. Future Pump has technicians who provide support to clients in the form of servicing and maintenance.	
Equator Kenya Ltd	Low-use drip irrigation for birds eye chillies in Malindi for hottest months Apr-Nov. via govt. water points. April to early November is hot season; irrigation required from end of June to early November. Chilli farming by farmers who used to be involved in casual labour. Planning to move into Makueni and Machakos. Numerous requests from other areas, but chillies don't thrive in wetter conditions.	Secures crop suited to very hot conditions unsuitable for most other crops & provides more predictable income than casual labour which is main alternative.	Promotes apparent resilient crop but resilience of related livelihoods depends on security of value chain – currently just one buyer & future uncertain. Could represent incremental or even transformational adaptation if secures livelihoods that would otherwise be threatened. But note chilli market is quite narrow (sauces, tear gas(!)). Sustainability
Takaful Insurance of Africa Ltd	Sharia compliant index based livestock insurance in dryland areas.		
Mara Beef	Mara Beef Holistic Management Programme buys cows from Maasai herders around Meru, fattens them and sells meat in supermarkets around Nairobi. Maasai now adapting to selling cattle, as many die during drought and this provides alternative to losing assets. Areas in reserves are allocated for feeding before onset of dry conditions, with irrigation from dams during dry periods to produce fodder. Price depends on quality of animal – by selling cattle before dry periods when they are in better condition Maasai can get a better price than if they are forced to sell during drought.	Livestock and financial losses are reduced. One of the proposed results is that this will improve relationship between pastoralists and reserves to promote sustainability of latter, as reserves now serve a livelihood function by presenting market for cattle. Still likely to be some drop in price during periods of stress. 1st year, so still seeing how this works.	Should help build resilience to drought by providing Maasai with mechanism for reducing livestock numbers in advance or during early stages of drought in exchange for income, reducing economic impacts of drought. May help to sustain reserves and contribute to landscape resilience. Somewhere between reducing adaption deficit and incremental adaptation, helping people cope with increased drought and rainfall/ pasture variability.
Water Forever International Ltd (Maji Milele)	Sustainable pre-paid water meters/supply in arid and semi-arid Kenya. Currently communal points but looking at HH scale. Collects data on usage for scenario planning. Partners with NGOs, private sector, county govt. Money goes to provider that manages system – can be CBO/NGO that might reinvest. REACT contract with Water Forever (MM is subsidiary)Water Forever is also looking at potential for prepaid irrigation, and water meters for cattle troughs.	Creates business (water vendors selling credits), reduces wastage, delivers long-lasting predictable access. During droughts prices increase; involvement of CBOs/ NGOs to ensure most vulnerable don't pay (free tokens). 1st year so these issues not tested yet.	Likely to increase resilience by ensuring access to water. Best described as addressing adaptation deficit.
Bell Industries Ltd	Upscaling herm PICS bags outreach services – post-harvest hermetic storage bags for grain storage. Promotion throughout country with Min. of Ag., 1st round just completed. Poorest get free access.	Reduced need for pesticide, grain lasts longer. User practice influences success (has been early issue).	Resilience benefits as grain can be stored for longer during dry/lean periods. May have some incremental adaptation benefits if these get longer.
Quite Bright Films Ltd	TV series on green climate and clean energy in Africa		

Business	Details	Actual or potential results	Adaptation/resilience relevance
Tosheka Textiles Ltd	Dryland silk and cotton production for high quality fabrics in arid Makueni. Provides eggs to farmers who hatch them and raise eri silk worms on local castor plant to produce silk & sell it to Tosheka. These are mixed with locally grown cotton to produce fabric. Some worms retained for brreding, others sold for pwani oil products for animal feed. Other activities here include fruit trees and some livestock.	Cotton requires high irrigation and pesticide inputs, lots of space, and was in decline. Still required but partial shift to silk, generally managed by women.	More resilient and sustainable than cotton, but cotton remains part of mix and is potentially vulnerable; particular benefits to women. Significant and regular income that is very resilient to climatic conditions.
EA Fruits and Farm Co.			
Drylands Ltd	Grass seed production (improved varieties of indigenous grass) for livestock in ASAL area of Baringo, to rehabilitate grasslands. Households harvest grass seeds and sell them to the company, which provides them with assistance with animal husbandry. Seed is also sold to UN.		
Seal Towers	Installing telecoms. infrastructure in under-served areas. Service provides Safaricom & Airtel) are obliged to co-locate along with new infrastructure. Opens door for provision of climate information, data, TV etc. through mobile phones.	Expansion of access to mobile communications and potentially data, which would include TV, internet, etc.	Potential increased access to climate information – forecasts, etc. Improved capacity for adaptation

ANNEX 5. MINUTES FROM 29 NOVEMBER 2016 WORKSHOP ON REPORTING

Minutes prepared and circulated by Deborah Murphy, Technical Adviser to the Technical Assistance to the Government of Kenya component of the StARCK+ programme.

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StARCK+

Strengthening Adaptation and Resilience to Climate Change in Kenya Plus

STARCK+ ADAPTATION & RESILIENCE LEARNING MEETING FAIRVIEW HOTEL, NAIROBI, TUESDAY 29 NOVEMBER 2016

Session 1: Reporting on Policy Impacts: Key Performance indicator (KPIs) and Tracking Adaptation and Measuring Development (TAMD) indicators

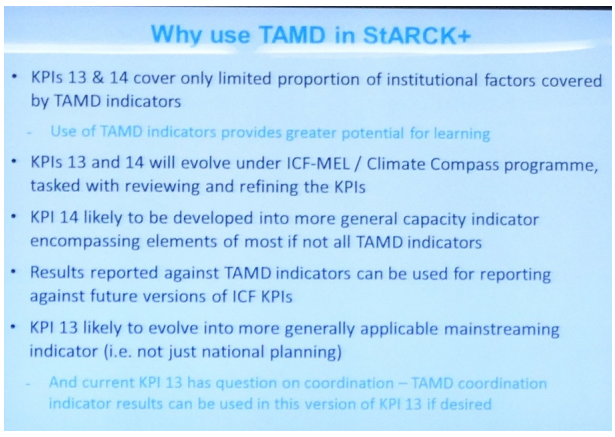
The meeting was officially opened by **Deborah Murphy**, Technical Advisor of the Technical Assistance (TA) Component of StARCK+ Program. She provided an overview of expectations for Session 1, which was to begin to identity how to tell a better story about StARCK+ policy impacts. Session 1 was a working session for StARCK+ partners, and included representatives from DFID, ACT!, Adaptation Consortium, REACT, FICCF, ClimateCare and UNDP.

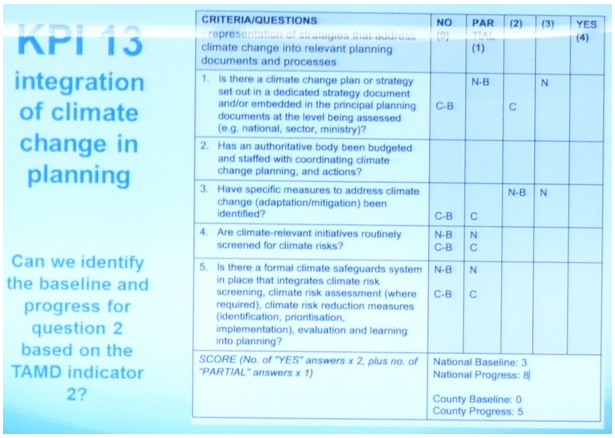
PRESENTATION BY NICK BROOKS, ADAPTATION LEARNING CONSULTANT

Nick provided an overview of KPIs 13, 14 and 15 under the United Kingdom's International Climate Fund (ICF) and explained the relationship with TAMD indicators.

DISCUSSION

- ***Telling a story on governance and policy support can be challenging.*** It may be helpful to consider KPI 15 - the extent to which the ICF intervention is likely to have transformational impact.
- ADA consortium has been using TAMD indicators. Experience indicate that it is easier to report on TAMD indicators that can be modified to suit the purposes of the project.





PRESENTATION BY DEBORAH MURPHY

Deborah provided an overview of the baseline data on KPI 13 developed during the previous StARCK+ partners session, as well as the information provided by StARCK+ partners on TAMD indicators 1, 2, 3 and 4 (baseline, progress, evidence, and level of influence StARCK+ partner activities).

DISCUSSION

- ***How do we determine the degree/level of influence of StARCK+ activities***? Is it possible to rank the degree of influence, as often there are many players that have contribute to an outcome?
- ***Should the focus be at the national level (as required in KPI 13) as many StARCK+ activities have taken place with county governments?*** Lots of activities at the county level get missed by reporting against KPI 13 at the national level.
- ***StARCK+ is multidimensional in regard to the partners and the sectors involved, but KPIs 13 and 14 and TAMD are not really relevant to certain components, i.e., those not focusing on policy by on business incubation/innovation (e.g., REACT, KCIC, ClimateCare).*** It was noted that the private sector can be influenced by the government. For example, REACT noted that the private sector has been catalytic over the past three years in influencing the Solar Home Systems business and availability of finance, including influencing policy change and regulatory development. Recent changes include the removal of import taxes on improved cookstoves and a reduced tax on ethanol – both of which have been influenced by the private sector. KPI 13 and 14 do not provide space for the story of private sector influence on policy and regulation.
- ***KPI 15 may be a better indicator for the StARCK+ story***, providing more flexibility to relate a policy story in a multi-dimensional project.
- ***Is a baseline needed (as we are backtracking to identify because StARCK+ partners were not initially required to report on KPIs 13 and 14)?*** The baseline informs on the status at project start-up, and it helps the project identify achievement of transformation, impacts or outcomes.
- ***How do we determine if the climate change plan or strategies formulated have been implemented?*** KPI 13 focused on the adoption/ formulation of a climate change plan or strategy. The National Climate Change Action Plan (NCCAP) was in place in Kenya in 2013, and StARCK+ work has been focused on implementation. How do we measure/capture implementation once the institutional architecture (KPI 13) is in place?
- ***KPI 13 does not capture the richness or institutional reality in Kenya.*** The NCCAP is in place, but many other activities and initiatives have arisen since 2013, such as the Climate Change Act, climate change policy and Green Economy Strategy.
- ***Reporting against KPIs 13, 14 and 15 tends to be in terms of activities and contributions, rather than in terms of the changes in the systems these activities target***. It was noted that some of the UN joint programmes will have difficulty reporting any transformative change. For example, the first CIDPs are almost a baseline for UNDP's work, and only after seeing the 2017 CIDPs will we be able to determine if the UNDP work has contributed to transformation.
- It is possible to develop sub-indicators for the KPIs, or StARCK+ could suggest more appropriate indicators.
- ***KPI 14 / TAMD indicator 4 were difficult for STARCK+ partners to report against***. They are quite subjective, and partners have not worked on direct capacity building initiatives with individuals in the government. The indicator might be useful for ACT! to report on how non-state actors who have received sensitisation and training. It could be useful to differentiate between sensitisation and formal training.
- ***We need to think about the various roles in regard to policy influence.*** The TA works directly with national government: Adaptation Consortium works with county governments; ACT! assists CSOs in various way, both as a "watch dog" and facilitator.

KEY QUESTIONS AND ISSUES NEEDING ATTENTION

- StARCK+ appears to have contributed to some very significant policy changes, and had a positive impact on policy processes leading to outcomes at the National and County level.
- How do we track the implementation /effects of policies?
- How do we capture policy lessons and impacts using existing reporting tools and frameworks? Are the reporting frameworks and programme level reports adequate for multi-dimensional projects?
- How do we address the diverse, multi-dimensional nature of StARCK+ work in individual indicators reporting at the programme level?
- How do we address reporting at programme level when we are working at multiple scales? E.g. working with national governments versus non-state actors? How do we combine reporting from these different scales and entities at the programme level for reporting against a specific indicator?
- KPI 15 (likelihood of transformational change) is very flexible, and could be used instead of KPI 13 and KPI 14 to convey the policy story, or used to fills gaps in KPIs 13 and 14. Many in ICF see KPI 15 as most relevant.
- Existing KPIs are rather naïve and simplistic, and assume single target entity, scale. General mismatch between policy work/goals and available indicators under ICF reporting framework.
- KPI 14 could be approached in a different way that might provide more useful information. For example, did formal capacity building processes play a role in /contribute to the outcome?

Session 2: Policy Lessons

Noelle O'Brien, Team Leader, FICCF, welcomed new participants to the meeting, including representatives from DFID Governance, Ministry of Agriculture, Livestock and Fisheries (MALF), Kenya Markets Trust (KMT), Trademark East Africa, Deepening Democracy programme, Kenya Association of Manufacturers (KAM), Kenya Climate Innovation Centre (KCIC). Participants briefly described their activities in the policy space.

TA Component – focused on policy at the national level, including assistance with drafting of the Climate Change Act and policy, and climate finance policy; Nationally Determined Contribution (NDC) sector analysis; tracking tool for National Climate Change Action Plan (NCCAP), communication products (e.g., success stories and briefing notes).

FICCF - worked closely with the Ministry of Agriculture on Climate Smart Strategy and Climate Smart Framework. FICCF was involved in mapping of CIS providers in Kenya, with World Bank and Kenya Met. Not direct policy development process but exercise geared towards influencing policy – where is public sector in CI space, where is private sector in climate information? FICCF was involved in mainstreaming climate change in National Adaptation Plans (NAP), Climate Change Act 2016 and other consultations with Ministry of Agriculture.

UN – including CC in budget coding to enable tracking of climate investment in infrastructure. UNDP is working both at the National level (with Kenya Devolution Support Programme, Ministry of Devolution, Ministry of Environment) and at the County level with all the 47 Counties. UNDP is trying to ensure that the National and County governments are communicating to each other constructively. UNDP did capacity building on mainstreaming climate change in CIDP in the all the 47 Counties in Kenya. The second CIDPs will indicate how the Counties have mainstreamed climate change.

KAM – development of sustainable energy plans in Mombasa, Machakos, Kisumu, Uasin Gishu, Nakuru and Kiambu.

ADA consortium - focusing on legislation related to finance (County Adaptation Funds) in 5 counties in Isiolo, Kitui, Makueni, Wajir and Garissa. Engage with county government to set up committees at county and ward level and develop resilience interventions. Climate finance regulations passed in Wajir and Makueni (and likely Isiolo) setting aside 2% of county development budgets for climate change activities. ADA in collaboration with NDMA are working with county government in developing county policies in line with vision 2030. Kenya Meteorological Services (KMS) is planning to replicate ADA county policy formulation in all 47 counties. ADA work has had positive outcomes in Isiolo, Makueni and Kitui, they are planning to have National Workshop in January/ February 2017.

ACT! – working with CSO's to build capacity and integrate various national CC frameworks at county level, develop CC policies and mainstream in programmes. At the national level, brought together CSOs to drive process around CC Act, supported CSOs in the build-up to Paris, and supported non-state actors in implementing CSA initiatives in 22 counties. ACT! has an Advocacy Tracking Tool that it shares with partners.

Climate Care – large proportion of proposed 30% GHG reduction (below projected baseline) in Kenya's NDC to come from reductions in household energy demand – cooking, charcoal, etc.

REACT – support companies in solar sector and biomass; and have supported industry forums around VAT, regulations (e.g., charcoal not taxed where renewable energy firms are). REACT facilitated forums but now industry running these themselves. CSA – companies are still young – Tosheka, Takaful, had company in agriculture insurance but failed. REACT has a policy story but don't have don't know how to make it relevant to ICF KPI reporting.

MALF – The Ministry has a climate change unit, and has developed a Climate Smart Agriculture (CSA) Framework, and CSA strategy. They noted the need for a platform showing all climate change activities in Kenya.

KMT – programme is about transformation – markets, value chains; and they are grappling with how to apply KPIs and to mainstream climate change.

TMEA – greening of Mombasa port

DFID – provided information about the Devolution and Governance Programme, and interested in StARCK+ learning around KPIs and measuring impact of policy process.

DISCUSSION:

- UNDP noted that reporting focused on KPIs 1-4, focusing on the numbers, and now need to report on KPIs 13/14/15 in regard to policy. The question is how do you measure policy-related results, and participation. There is a need for a clear methodology. It was suggested that the implementation of the NCCAP could be a framework to report against.
- FICCF – CSA work fits completely with KPI 15 and could be an example of transformative change. Implementation of CSA component since 2014 and just starting to document lessons, and bringing together actors in roundtables on CIS. Convening national level workshop on CSA before close of StARCK+ programme in May or June.
- Adaptation Consortium remarked that there is a need to domesticate the KPI indicators. What does an indicator mean in a particular context?

Nick Brooks, Adaptation Learning Consultant, summarised some key questions and issues emerging from the discussion.

- How do you report KPI 13 and 14. DFID noted that StARCK+ is required to report on KPI 13 using the current methodology.
- How do we report and integrate work at National and County Level? For example, we might tell a story around CAF – how decision-making was decentralised to the county and community level, while influenced by the national climate change action plan.
- KPI 15 focuses on transformational change, and is influenced by the theory of change. What is the criteria for transformational change? Can we tell a story around policy – showing a change of mindset in the government?
- What is the enabling environment to enable people to be resilient? What is the role of institutions?
- How do you attribute the outcome to your actions when, there are other players in the sphere/field?

Session 3: Initial Findings on Adaptation and Resilience Learning

Nick, Brooks, Adaptation Learning Consultant, provided an overview of preliminary results of the adaptation and resilience assignment (see attached presentation).

DISCUSSION:

- ***How do we determine that a project addresses adaptation, as compared to a regular development project?*** Adaptation is ambiguous, and many think that an intervention that contributes to resilience is an adaptation project.
- ***What is maladaptation***? How do / should we consider this in reporting? For example, how does one deal with an increase in goats (shift of livestock) in ASALs?
- ***Linkages between adaptation and mitigation?***
- KPI 2 - it is important to have ***numbers on both direct and indirect support*** on building resilience to climate change.

NEXT STEPS

- Nick Brooks will deliver the adaptation learning report in mid-January. The report will be distributed to StARCK+ partners. The report will held identify potential learning products (e.g., policy briefs, peer review papers).
- Energy and emissions reduction learning to begin in January. Consultant to meet with StARCK+ partners in January or February.
- StARCK+ evaluation team will be in Nairobi in January 2017. A StARCK+ partners meeting with the evaluation team will be held on 10th January.
- Nick to provide learning on use of KPIs to Compass Review of ICF KPIs.
- Deborah to compile StARCK+ partner inputs on KPIs 13 and 14 and provide to partners. Deborah to compile list of StARCK+ policy-relevant activities (as provided by StARCK+ partners as inputs to the KPI 13 and 14 analysis), and provide to StARCK+ partners and DFID CC and governance teams.

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