Tracking Adaptation and Measuring Development in Pakistan

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ISET-Pakistan

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The Climate Change Group works with partners to help secure fair and equitable solutions to climate change by combining appropriate support for adaptation by the poor in low- and middle-income countries, with ambitious and practical mitigation targets.

The work of the Climate Change Group focuses on achieving the following objectives:

- Supporting public planning processes in delivering climate resilient development outcomes for the poorest.
- Supporting climate change negotiators from poor and vulnerable countries for equitable, balanced and multilateral solutions to climate change.
- Building capacity to act on the implications of changing ecology and economics for equitable and climate resilient development in the drylands.

Partner organisation

Institute for Social and Environmental Transition-Pakistan: ISET-P is a non-profit research institute that focuses on adaptation to climate change and generates evidence and knowledge to bridge the gap between research and practice. It is part of the ISET network of independent sister organisations and researchers who work across South and Southeast Asia through South-South and North-South partnerships.

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Front cover photo: Girl collecting rainwater for washing up
Photo credit: Fawad Khan

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Acronyms

CRM	climate risk management
ERRA	Earthquake Recovery and Rehabilitation Authority
GLOF	Glacial Lake Outburst Floods
IUCN	International Union for Conservation of Nature
IIED	International Institute for Environment and Development
ISET	Institute for Social and Environment Transition
M&E	monitoring and evaluation
PCRET	Pakistan Council for Renewable Energy Technologies
PRWH	Promotion of Rainwater Harvesting Project
PSDP	Public Sector Development Programme
RSPN	Rural Support Programme Network
TAMD	Tracking Adaptation and Measuring Development
UNDP	United Nations Development Programme
WatSan	water and sanitation

Executive summary

While producing only 0.8 per cent of global carbon emissions, Pakistan is one of the top 10 countries that are most vulnerable to the adverse impacts of climate change. The most serious concerns for Pakistan are the threats to water, food and energy security, the vulnerability of coastal areas and the increased risks of extreme events. Pakistan is currently exposed to numerous natural hazards, including cyclones, floods, drought and intense rainfall. Altogether, 40 per cent of Pakistan's population is highly vulnerable and frequently exposed to multiple disasters, which are likely to be exacerbated with impending impacts of climate change. Despite its limited institutional capacity, financial constraints and continued volatile political situation, Pakistan is taking measures, both at policy and institutional level, to deal with climate change impacts in terms of adaptation and mitigation.

As investment in climate change responses have increased (particularly in vulnerable countries like Pakistan which need to adapt to the effects of climate change), so has the need for evaluation frameworks that can determine whether interventions have been effective. Between 2012 and 2014 the International Institute for Environment and Development has worked with research partners and government agencies in several countries across Asia and Africa to pilot a new approach to evaluating the effectiveness of adaptation interventions, entitled Tracking Adaptation and Measuring Development (TAMD).

TAMD is a twin-track framework that evaluates adaptation success as a combination of how widely and how well countries or institutions manage climate risks (Track 1) and how successful adaptation interventions are in reducing climate vulnerability and in keeping development on course (Track 2) (see Figure 1). With this twin-track approach, TAMD can be used to assess whether climate change adaptation leads to effective development and how development interventions can boost communities' capacity to adapt to climate change. Importantly, TAMD offers a flexible framework that can be used to generate bespoke frameworks for individual countries that can be tailored to specific contexts and used at different scales.

Since there is no separate monitoring and evaluation (M&E) system for climate adaptation interventions in Pakistan, a study has been undertaken to assess the feasibility of applying TAMD to the Pakistani context. The TAMD feasibility study in Pakistan focused primarily on developing an M&E system to track the development outcomes of adaptation interventions (Track 2). Key to this assessment was the development of a series of indicators that would be suitable to measure projects for their resilience outcomes, and

could be applied more broadly to a larger-scale adaptation M&E system in the future. In view of the need to develop an evaluation framework to measure Track 2 development performance, two case studies were analysed during the TAMD feasibility study – the Promotion of Rainwater Harvesting Project (PRWH) and the Pakistan Domestic Biogas Project. For both of these interventions, theories of change were developed to determine the ways in which they would be expected to deliver long-term climate resilience. Indicators were developed by the TAMD study team to evaluate the theories of change and retrospective data was collected through household surveys in Bagh and Abbottabad districts to determine whether the interventions led to improved household resilience. Testing of the Track 2 indicators gave very good results – showing that both rainwater harvesting and biogas projects led to improved socio-economic outcomes.

There was also some effort to assess the climate risk management (CRM) performance of institutions at national level (Track 1). For Track 1, the study team led an evaluation exercise with government officials from the Climate Divisions and Planning Department, which used institutional scorecards to measure CRM progress. Although adaptation planning is still in an early stage of development in Pakistan and CRM scores were therefore low, this assessment will be a valuable baseline from which to measure future CRM improvements at national level.

However, with political devolution from the national to provincial level, improvements in CRM in Pakistan will increasingly need to be targeted at provincial level, where existing capacity is low. The TAMD study team sees the potential to apply TAMD at provincial level, where it can help inform local adaptation planning. One of the major strengths of the TAMD study is that is has proven the utility of a number of indicators that can be used to measure resilience at project level. The TAMD feasibility study was developed with the aim of integrating resilience indicators into existing governmental planning systems. Now that the feasibility study has tested and demonstrated the robustness of these indicators, there is potential for these to be combined with existing M&E indicators and included into a more holistic system which would be effective in measuring development and resilience outcomes in all concerned sectors.

1

Testing the feasibility of TAMD in Pakistan

Introduction and country background

Pakistan occupies a land area of over 880,000 square kilometres, with over 1,046 kilometres of coastline along the Arabian Sea. With a latitudinal extent stretching from the sea in the south to the Himalayan Mountains in north, Pakistan includes subtropical to temperate regions. Most of Pakistan is arid and semi-arid, with significant spatial and temporal variability in climatic parameters.

While producing only 0.8 per cent of global carbon emissions, Pakistan is one of the top 10 countries that are most vulnerable to the adverse impacts of climate change. The most serious concerns for Pakistan are the threats to water, food and energy security, the vulnerability of coastal areas and the increased risks of extreme events. Pakistan is currently exposed to numerous natural hazards, including cyclones, floods, drought and intense rainfall. Altogether, 40 per cent of Pakistan's population is highly vulnerable and is frequently exposed to multiple disasters, which are likely to be exacerbated with impending impacts of climate change. Despite its limited institutional capacity, financial constraints and continued volatile political situation, Pakistan is taking measures, both at policy and institutional level, to deal with climate change impacts in terms of adaptation and mitigation.

Pakistan is signatory to 15 multilateral environment and climate-related agreements, which includes the ratification of the UN Framework Convention on Climate Change. On the basis of these international commitments, Pakistan has formulated a number of policies, pieces of legislation, frameworks and action plans to address environmental challenges, including climate risks. The relevant legislation and institutions already in place include: the Prime Minister's Committee on Climate Change at the federal level, to monitor

and take stock of climate-related developments and provide strategic direction; the National Climate Change Policy 2012, which serves as an overarching policy, specifically on climate change, and has a dedicated Climate Change Division to implement the policy; and the Framework for Implementation of Climate Change Policy 2014–2030, with a set of actions in various sectors that address both adaptation and mitigation.

Several institutions support the implementation of these policies. The Planning Commission provides strategic guidance and prepares national plans covering all socio-economic sectors and the M&E of development projects and programmes. Lately, the Commission has formulated a long-term plan, Vision 2025, which focuses on climate change risks and prioritises measures to be undertaken during the next 10 years with regard to mitigation and adaptation. Other ministries and organisations addressing climate change, directly or otherwise, include the Ministries of: Food and Agriculture; Livestock and Dairy Development; Water and Power; Industries and Production; Science and Technology; Foreign Affairs; Defence; and Health; the National Disaster Management Authority; the Global Change Impact Study Centre; and the Pakistan Environmental Protection Agency. Various institutions, established under the different ministries, both at federal and provincial level, have a specific mandate to deal with climate change and environment.

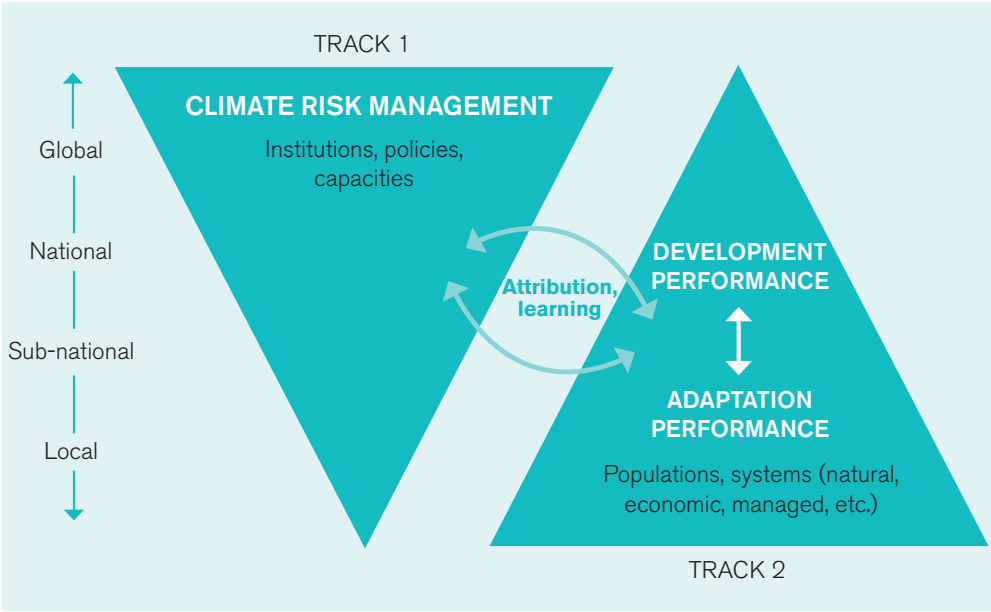
However there are still capacity gaps within many of these institutions. Given the low institutional and financial capacity to adapt to climate change, enhancing adaptive capability is the highest priority. Pakistan requires financial and technical assistance to respond effectively to climate change impacts and develop sound adaptation strategies.

Background on TAMD

As investment in climate change responses have increased (particularly in vulnerable countries like Pakistan which need to adapt to the effects of climate change), so has the need for evaluation frameworks that can determine whether interventions have been effective. Between 2012 and 2014 the International Institute for Environment and Development (IIED) has worked with research partners and government agencies in several countries across Asia and Africa to pilot a new approach to evaluating the effectiveness of adaptation interventions, entitled Tracking Adaptation and Measuring Development.

TAMD is a twin-track framework that evaluates adaptation success as a combination of how widely and how well countries or institutions manage climate risks (Track 1) and how successful adaptation interventions are in reducing climate vulnerability and in keeping development on course (Track 2) (see Figure 1). With this twin-track approach, TAMD can be used to assess whether climate change adaptation leads to effective development and how development interventions can boost communities' capacity to adapt to climate

Figure 1: Overview of the TAMD Framework



change. Importantly, TAMD offers a flexible framework that can be used to generate bespoke frameworks for individual countries that can be tailored to specific contexts and used at different scales.

Evaluation context

In order to describe the degree to which climate change adaptation has been mainstreamed into development planning, the project team carried out research to compare M&E systems for social and economic development, with the systems in place for M&E of climate change and adaptation interventions. The scoping exercise determined that there was no specific evaluation framework for adaptation in Pakistan; but it did identify adaptation interventions being implemented by the public sector and other entities. Based on this scoping, it was deemed necessary to develop an evaluation framework for adaptation in Pakistan and that the TAMD approach would be tested to determine its utility and feasibility.

The first stage of the TAMD feasibility stage in Pakistan focuses on evaluating adaptation interventions to determine their development and resilience outcomes (Track 2). Key to this assessment was the development of a series of indicators through participatory research methods that would be suitable to measure projects for their resilience

outcomes. There were some efforts to assess the CRM performance of institutions at national level (Track 1), but this was not the main emphasis of the TAMD feasibility study. Accordingly, the early focus of the TAMD study focused on identifying adaptation projects that could be used to assess the feasibility of TAMD. A number of criteria were used to shortlist projects:

- that were listed as adaptation/climate change projects;
- with clear adaptation/mitigation benefits; and
- under the Public Sector Development Programme (PSDP) – for example, livelihood diversification, social protection or insurance.

To ensure diversity, the team considered the following additional parameters:

- covers a variety of sectors such as water, agriculture, energy or even multi-sectoral programmes;
- implemented across different scales of governments such as national, provincial or district;[1]
- financed through different sources – for example, funded by government, donors, non-profitsor private sector; and
- being in different phases of implementation – planning, implementation or completed.

Based on these criteria, 17 projects were longlisted, of which three projects were shortlisted – the PRWH Project, the Sustainable Land Management Project and the Glacial Lake Outburst Floods (GLOF) Project. All of these projects are being implemented in collaboration with the Climate Change Division with funds from foreign or national sources.

Among the shortlisted projects, the Earthquake Recovery and Rehabilitation Authority's (ERRA) PRWH project emerged as the most relevant and fit for testing the TAMD framework. The project aims to increase water availability in water-scarce mountainous areas and is the government's first-ever large-scale water harvesting intervention. It is being implemented in Azad Jammu and Kashmir State and Khyber Pakhtunkhwa Province, across 12 districts and 20 union councils. Apart from addressing the water scarcity problem, the project has a number of socio-economic benefits that could help reduce climate impacts.

After the consent of the Climate Change Division to conduct the test on the PRWH project, engagements began with ERRA to seek consent and cooperation to undertake the evaluation. For the scoping exercise, consultations were held with ERRA to work out strategy, including among others, access to existing data and carrying out field research

1 Selection of adaptation projects working with the PSDP was meant to create greater ownership of the TAMD framework by government entities.

to collect primary-level data. ERRA agreed, in principle, to provide relevant data for consumption and analysis, in addition to assisting in field level research. The scoping process then began to assess the impact of this project in terms of climate adaptation.

After the completion of the first TAMD feasibility study, a second testing of the TAMD framework followed. Another review of projects was undertaken to ascertain the relevance, availability of necessary support and requisite data. The consultation began with the relevant stakeholders, which include the Climate Change Division, Planning Commission, Benazir Income Support Programme, ERRA, UNDP and the Pakistan Council of Renewable Energy Technologies (PCRET). Among the shortlisted projects were the Pakistan Domestic Biogas Project, the Benazir Income Support Programme, the GLOF Project, the Sustainable Land Management Project and Mini Dams Project. Meetings and follow-up discussions were held to ascertain the suitability of each project and the willingness of representatives from these projects to share documentation and facilitate field research. As a result of this process, it was decided that the domestic biogas projects were the most suitable for the second testing of the TAMD framework. PCRET funded by the PSDP and the Rural Support Programme Network (RSPN), funded by foreign donors, are involved in implementing these projects. Both PCRET and RSPN showed a keen interest in applying the TAMD framework on their respective projects. The Climate Change Division endorsed the selected project for testing.

The domestic biogas plants projects were conceived mainly as climate mitigation interventions, but with numerous socio-economic benefits and adaptation elements. Around 10 thousand domestic biogas plants have been installed across Pakistan under these projects. Initially, it was planned to do research on both projects, but due to the vast areas covered, as well as time and resource constraints, PCRET's sample had to be dropped. Four villages in the Khushab district, located southwest of Islamabad, were chosen for primary research. Here, the research focused on biogas plants installed by RSPN in mostly lower and middle-income households, with the time lag of minimum three years in order to capture the impact of these interventions for the development of a theory of change. RSPN actively supported and facilitated in terms of finalising the tools, field coordination and other necessary local support.

Stakeholder engagement

A wide range of actors were involved in undertaking the TAMD feasibility study in different capacities and at different stages of TAMD implementation. Stakeholders were from national, sub-national and local levels. The process of stakeholder engagement began in mid-2011 with the visit of Dr Simon Anderson, head of the Climate Change Group at IIED, with the purpose of exploring the possibility of collaboration with different

government and non-governmental entities working on adaptation. Following discussions over the next 18 months, the TAMD Pakistan feasibility study began in January 2013.

The inception workshop of the TAMD project was held at the Ministry of Climate Change in March 2013, where the TAMD concept, design, application and scale were outlined to representatives from the relevant institutions. The key findings of the scoping exercise and the options for prototypes in Pakistan were also shared with workshop participants, who included representatives from the Ministry of Climate Change, the Global Change Impact Study Centre Pakistan, the Centre for Environmental Economics and Climate Change, the Planning Commission, the Pakistan Meteorological Department, IUCN Pakistan, UNDP Pakistan, IIED and ISET Pakistan. In the meeting, it was decided that participating organisations would serve as the Consultative Group during the TAMD implementation, to provide technical guidance and give feedback on the project. It was also decided that ERRA's PRWH Project should undergo for first testing. Periodical briefings and result-sharing with the Climate Change Division and the Consultative Group continued during the first phase.

The network expanded further during the course of the TAMD evaluation, which included evaluating the PRWH and domestic biogas plants projects. During the PRWH feasibility study, ERRA set up a Technical Advisory Group for guidance on WatSan interventions to provide technical input in designing the evaluation, shortlisting the indicators, assisting in field-level research and endorsing the outputs. Likewise, during the evaluation of the Domestic Biogas Plants Project, PCRET provided research material and guidance on issues related to biogas technologies, while the RSPN's M&E unit, field unit and district partners provided technical and logistic support in completing the evaluation.

During the TAMD feasibility study, a number of members of the Consultative Group and implementing staff participated in a TAMD multi-country meeting, held in Meru, Kenya from 23–27 March 2014, which served to strengthen the ownership of TAMD. The delegates from Pakistan agreed to scale up TAMD in a second phase and suggested a set of actions, which include integrating the TAMD framework into development planning documents and building capacity on M&E and the TAMD evaluation framework.

During the second phase of TAMD, mainly sub-national entities will be focused and more stakeholders will be brought into the process.

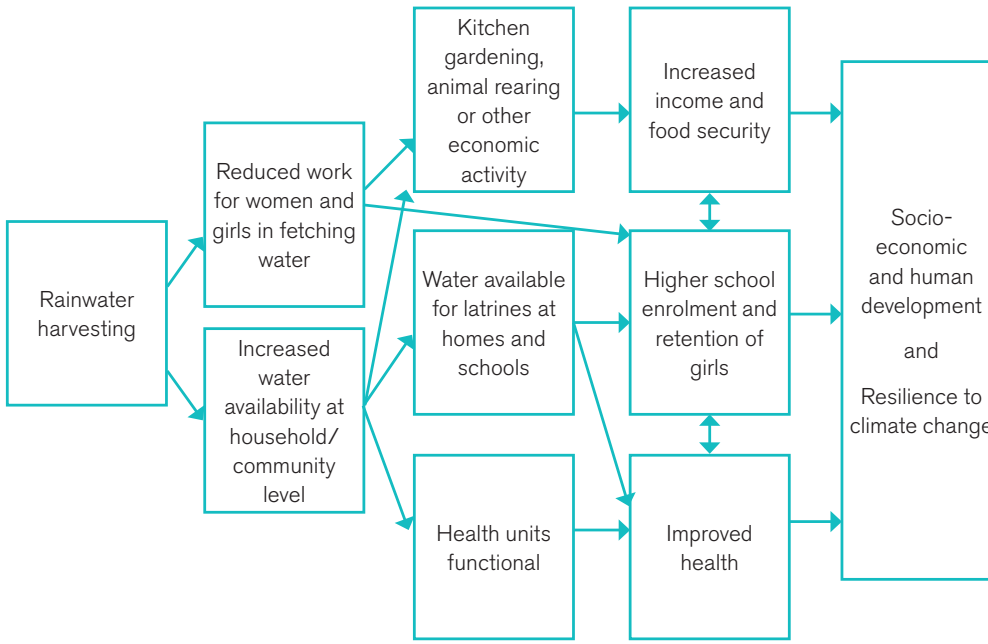
Theory of change

TAMD uses theories of change to attribute improvements in resilience (outcomes and impacts) to specific adaptation interventions. At its simplest, a theory of change is a dialogue-based process intended to generate a "description of a sequence of events that is expected to lead to a particular desired outcome."

The TAMD feasibility study in Pakistan focused on evaluating projects that had already begun implementation before the TAMD process was launched. As such, neither project had a defined theory of change that outlined the pathway towards resilience that the project would create. The TAMD feasibility study therefore used a retrospective evaluation to construct a theory of change, based on a set of hypotheses from existing studies and relevant documents. The project team discussed and refined the theory of change and developed indicators to test it at a special consultation workshop with the technical advisory group, which included representatives from organisations involved in implementing the projects and who therefore had knowledge of their intended and unintended impacts. The team them discussed the theory of change with the communities, in separate group discussions with women, men and schoolchildren. Finally, the team consulted with local schoolteachers and basic health unit staff to refine the theory.

This well-articulated shared learning process to shape and refine the theory of change helped narrow down the long list of outcomes and impact indicators to a more focused list of suitable socio-economic impact indicators that were both available and measureable. Spending time and resources with stakeholders – particularly gender-segregated community groups – made data collection more efficient by focusing the theory of change on fewer and more precise indicators. Figure 2 shows the theory of change flow chart for the PRWH project, which the TAMD project team developed, refined and tested.

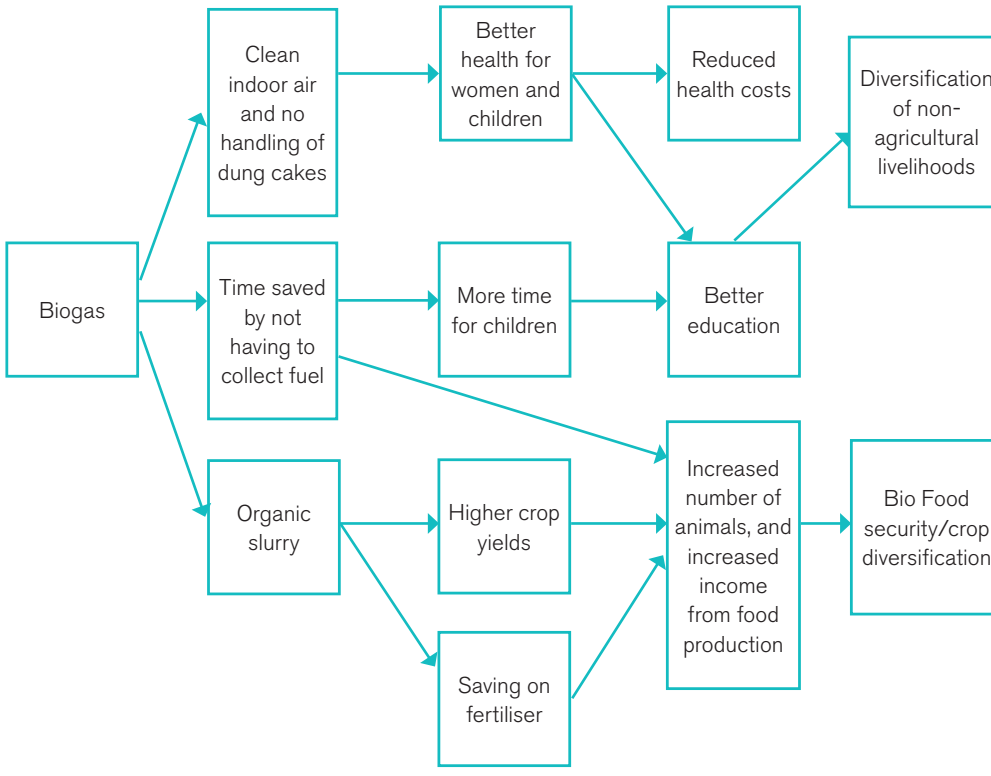
Figure 2: Theory of change for rainwater harvesting interventions



The theory of change shows that rainwater harvesting increases water availability at household and community levels, so climate-related rainfall variability will have less of an effect on households and public buildings than before, which would reduce women's workloads. These combined impacts will lead to several socio-economic benefits and reduce exposure to changes in water availability. For example, women would productively use the extra time and increased water to augment their incomes through increased kitchen gardening and animal rearing. Further, latrines in homes and schools would become more functional due to the increased availability of water to flush toilets. This is particularly important for girls, who avoid school when there are no toilets available, because cultural norms dictate that they cannot relieve themselves in the open during the day. Overall, the theory of change shows that rainwater harvesting will lead to improvements in household income, health and food security and higher school attendance especially among girls.

A similar process for the second test case of biogas production, produced the theory of change shown in Figure 3.

Figure 3: Theory of change for Domestic Biogas Project



Although the biogas intervention was primarily planned as a mitigation project to gain carbon credits, the study team wished to see if the interventions also had any adaptation benefits. In this case, the theory of changes hinges on the assumption that increased incomes and improved health would initially lead to more food security, especially in times of drought and flood. There were two possible ways of achieving this: the farming communities could either diversify their livelihoods by increasing the number of animals they owned or planting different crops, or they used the income to diversify into non-agricultural livelihood strategies that were less likely to be impacted by climate change.

There is a key difference in how adaptation takes place in these two theories of change. Rainwater harvesting is an adaptive measure that leads to better socio-economic outcomes. The biogas project is a mitigation investment that improves socio-economic outcomes by increasing income and creating or increasing assets. Having a more climate-resilient mix of movable and divisible assets such as animals removes communities' primary dependence on land, which is immovable and hard to protect from floods and droughts.

Indicator development

As a next step, the TAMD Pakistan team developed indicators that could be observed and recorded to capture the logical progression from the start of the intervention through to its adaptive socio-economic outcomes. The team selected appropriate indicators for each step in the theories of change, in consultation with stakeholders involved in each both interventions being assessed under Track 2. For the PRWH project, this was done in a session with the Technical Advisory Group; for the biogas project, it was done with project NGO's M&E staff and the heads of the local biogas companies that built and provided technical assistance for the bio plants.

Project assessment methodology

As highlighted above, the TAMD feasibility study in Pakistan focused primarily on developing an M&E system to track the development outcomes of adaptation interventions. With a recently developed Climate Change Policy and only two "adaptation" projects, it is very early to measure the institutionalisation of CRM at the national level in Pakistan. The TAMD project team therefore undertook a simplified assessment of CRM (Track 1) using indicators they had developed, while focusing the majority of their efforts on undertaking a Track 2 analysis of rainwater harvesting and biogas projects.

For Track 1, the study team led an evaluation exercise with government officials from the Climate Divisions and Planning Department, which used institutional scorecards to measure CRM progress. With the passage of time, and more investment in adaptation

programmes, this assessment may serve as a valuable baseline from which to measure future CRM improvements. It could also serve as a model for similar provincial-level assessments in the future.

For an assessment of Track 2 indicators, the team collected data using ISETs shared learning approach, which forms the basis of stakeholder engagement. This process gathers all information on project activities, outputs and outcomes from policy and technical staff and shares it with the communities (in gender-segregated groups) to elicit their perceptions on the project impacts. During these discussions, evaluators also ask whether the communities are aware of climate change or what changes they have experienced in the weather patterns. Standard participatory tools are used for problem rankings, solutions, hazard/vulnerability mapping, and so on.

In designing an evaluation tool for Track 2 indicators, the primary objective was to develop a method that was relatively simple, cost effective and robust. These characteristics would ensure that such testing and evaluation could be conducted with local human and financial capacities and make its widespread use more feasible. To quantitatively test the theory of change for rainwater harvesting and biogas projects, the study team used a quasi-experimental survey design to compare two groups of randomly selected households in the same location – those with rooftop rainwater harvesting or biogas (treatment group) and those without the intervention (control group). The latter acts as a counterfactual.

The TAMD team used a difference-in-difference approach to analyse the indicators and thus attribute impacts to the specific interventions. Using this approach allowed more accurate attribution to the intervention, by subtracting the change in the control population from the change in the treatment group. The difference in indicators over time in the control group is assumed to be a result of other external factors in the area and is therefore subtracted from the difference in indicators over time for the treatment group. The rationale is that the change observed in the control population would have also occurred in the treatment group over time, as a result of external influences such as other programmes.

Since both rainwater harvesting and biogas interventions were still being implemented in some areas, the TAMD team chose interventions that were 2–5 years old. This allowed them to measure impact and recall would still be accurate. This precluded recording impacts over a longer term and highlighted those that were more immediate. For a longer time perspective, the recall methodology would not be feasible. However, now that baseline values for indicators are available, a longer-term impact could be determined with a repeat survey in the future. Therefore, the overall methodology would remain useable for prospective evaluations and planning purposes.

Once the theory of change was validated, the team selected a few evaluation indicators from the theory for statistical testing, to ensure that they would represent the adaptation impact in terms of socio-economic indicators. They used non-parametric testing, which requires a smaller sample and remains robust across a wider variety of conditions since it is not based on the assumption of underlying distribution among the sample. Simple tests – such as Chi-square and Mann-Whitney U tests – were applied and yielded statistically significant results. Once the indicators were statistically tested and proven to be robust, these were recommended for evaluation use in other locations and in the future.

Empirical data collection

Data collection for Track 1 involved a consultative discussion with national-level government officials to fill out institutional scorecards for nine CRM indicators. As mentioned above, Track 1 data collection was a secondary focus of the TAMD Pakistan feasibility study.

Track 2 data was collected through household surveys, designed by the TAMD team in consultation with technical experts from the rainwater harvesting and biogas projects. These surveys were built around the main indicators designed and captured in the theories of change. The study used a sample of 35 households for each of the rainwater harvesting and biogas interventions, with an equal number of households without the two intervention to be used as control groups.[2] The treated samples (in other words, the recipients of an intervention) were randomly selected for evaluation. However, a more purposive approach was used for the comparators: the TAMD team developed a simple criteria for selecting the control group, so they could compare households with similar socio-economic and geographical conditions. The criteria included factors such as geographical proximity to the treated households, size of landholding and number of large animals. Although a perfect match was not always available, most houses were found within an acceptable range. The reason for disparity was the treated households were not initially selected randomly. Each case had a distinct targeting strategy, which included factors such as distance from water sources and dependency ratio for rainwater harvesting and more self-selecting criteria for the biogas initiative, such as membership of a community organisation and willingness to pay for the intervention.

2 The overall sample size was determined by the need for statistical testing of the final indicators. Non-parametric testing allowed to keep it small so that the survey costs and effort were minimised without compromising the robustness of the results in proving the theory of change. However, this was done to develop indicators only and a real evaluation would make sure that the final few indicators would be collected across the board in a fairly large sample. Reducing the number of indicators to 3–7 would make this possible.

In both the rainwater harvesting and biogas assessments, several biases were considered in the analysis. In the rainwater case, treated households were the most water-deficient ones; hence the expected the room for improvement and projected impact of the intervention to be larger. On the other hand, the difference-in-difference analysis underestimated the impact: it was evident from the survey results that households without a formal intervention had adopted some level of rainwater harvesting . Similarly, households with biogas were probably more willing to take risk and innovate; one could expect such households to be more open to changing livelihood strategies in the face of climatic variations.

Challenges and lessons

A continued challenge in developing and applying the TAMD framework in Pakistan relates to the change of focal points and restructuring of organisations associated with TAMD. At the launch of TAMD in Pakistan, the focal Government counterpart was the Ministry of Environment. This Ministry was abolished under the devolution process, but was ultimately reconstituted as the new Ministry of Climate Change, after which it was restructured into the Climate Change Division under the Cabinet Division. This frequent restructuring of the collaborating agency has required repeated engagement with new officials to develop rapport, build understanding of TAMD and move the project towards implementation.

An anticipated second phase of TAMD expected to be launched at the sub-national level. Since numerous subjects and associated powers have been devolved to the provinces from the federal level, sub-national entities are still in transition, putting arrangements in place and mobilising they financial and human resources they need to manage them. While capacity and development priorities vary from province to province, by and large, the requisite capacity to deal with climate issues at the devolved level is currently somewhat inadequate. It will therefore be critical that the Climate Change Division retains strong ownership and that all other stakeholders at the federal level stay on board.

Although climate change is now part of the policy discourse, and is adequately reflected in public documents and mass media, understanding of how to undertake climate change adaptation is limited. With generic understanding, adaptation and mitigation measures are generally mixed up. Using an assessment framework for adaptation (being a soft intervention) becomes difficult, since incumbent officials do not value the importance of the evaluation tool. Since the policy and implementation strategy is still nascent, and little adaptation-related investment is made or planned in the country, it will require consistent efforts and continuing advocacy with the relevant government organisations to adopt an evaluation framework that could help to bring in investment.

In the absence of any adaptation-specific evaluation framework, TAMD – now tested and established – has strong avenues for being integrated and incorporated in development planning and climate adaptation interventions in Pakistan. The government has already formulated the framework for implementing the National Climate Change Policy; and the National Adaptation Plan and Nationally Appropriate Mitigation Actions are currently being prepared. While the TAMD framework may be a bit early in the process, it could be integrated into the evaluation approaches of these national-level policies and programmes.

The process of involving provincial stakeholders in TAMD is expected to be carried out in a second research phase – proposed activities and brainstorming sessions have already taken place. However, relations between the federal and provincial entities are strained, particularly after the devolution of federal ministries to provincial level. Further, capacity to respond to climate change at the sub-national level is low, due to a limited understanding of key issues and interventions.

Given the volatile political situation, prolonged economic downturn, military operation against the militants, and resultant influx of one million internally displaced people in Pakistan, climate change discourse has fallen down the national political agenda. The low priority being accorded to climate change by the sitting government is a serious challenge at the moment, although the impetus may be provided by various funding streams that become available as the government moves towards implementing its Climate Change Policy.

2

Addressing the challenges of adaptation M&E

Climate change adaptation poses challenges of unprecedented scale and scope, which cut across normal programming sectors, levels of intervention and timeframes (Bours *et al. 2013*). The fact that adaptation interventions are conducted across sectors, scales, and long timeframes means that evaluating adaptation is an equally challenging process.

TAMD's Working Paper No. 1 (Brooks et al. 2011) identifies four common challenges in conducting M&E of adaptation, which need to be understood and incorporated into evaluation frameworks in order to ensure that adaptation evaluations are robust. These challenges are:

- the long timescales associated with climate change and adaptation;
- attributing the outcomes of adaptation to specific actions, interventions or policies;
- shifting baseline conditions of climate change over time, which can make it difficult to interpret adaptation results; and
- contextualisation of adaptation outcomes within wider environmental changes, which may impact adaptation interventions and thereby alter the results.

Chapter 2 outlines each of these four challenges in greater detail and examines how these challenges are addressed under the TAMD feasibility study in Pakistan.

Long time scales

Measuring the success of adaptation is difficult because the it can be many years before an individual, household, community, business and so on can be considered to be resilient. This is particularly true of adaptation interventions intended to address longer-term changes in climate that will take many years or decades to unfold, especially those that do not directly address natural risk, but rather build adaptive capacity to respond to unpredictable risks.

In Pakistan, shifting livelihood strategies to those that are less risk-prone may take a generation. For this reason, the evaluation undertaken by the TAMD Pakistan team may not capture all of the adaptation benefits of adaptation policies and programmes. As such, intermediary indicators may be a good proxy for short- and medium-term use to capture the longer-term ability of households to adapt to environmental change. For example, crop diversification or an increase in movable assets or disposable income may lead to better adaptive capacity or resilience in the long term. Ultimately, the problem of long timescales can only truly be resolved with long-term data sets. Their utility may be in the future, but it is a good time to begin to collect baseline information to measure the effect of future adaptation interventions.

Attribution

Adaptation policies, programmes and projects do not occur in a vacuum, but within a broader context of socio-economic, political and environmental change that can influence development and adaptation outcomes. As such, it can be difficult to attribute the impacts and outcomes of a given adaptation intervention. This is an important challenge for evaluations, because policymakers need a strong understanding of attribution to judge the effectiveness of an intervention and learn lessons on how to improve interventions in the future.

Testing attribution was not a major challenge in Pakistan, since the project team used a difference-in-difference approach that was able to attribute socio-economic outcomes to specific interventions. As mentioned in the methodology section in Chapter 1, the difference-in-difference approach compares control populations with treatment groups, measuring the difference between both groups before and after the interventions – or lack thereof, in the case of the control group. The difference in indicators over time in the control group is assumed to be a result of other external factors in the area and is therefore subtracted from the difference in indicators over time for the treatment group. The rationale for this is that the change observed in the control population would have also occurred in the treatment group over time, as a result of external influences such as other programmes. The leftover value in the treatment group is therefore linked explicitly to the adaptation intervention, which demonstrates attribution.

Shifting baselines

With climate change already impacting people's lives in Pakistan, adaptation interventions will take place within a shifting environmental context that will expose vulnerable communities to greater climate-related hazards and risks. This shifting poses a challenge for evaluation, as it has the potential to act as a confounding factor in the assessment of development and adaptation interventions. For instance, an adaptation intervention aiming to improve the productivity of smallholder farmers (thereby improving their asset base and contributing to resilience) may yield no overall increases in crop yields, which would appear to show that adaptation efforts are not succeeding. However, if the project were implemented during a period that coincided with an increase in intensity of droughts, then the fact that productivity has not declined would actually indicate success in building resilient food systems. This example shows that, if the adaptation intervention is not contextualised within changes in baseline environmental conditions and events, M&E assessments could misinterpret the effectiveness of these interventions. Shifting baselines therefore need to be incorporated into evaluations in both the forward-looking design of evaluative tools and the retrospective analysis of data from specific interventions.

For the TAMD feasibility study in Pakistan, having a control group eliminates most of the exogenous impacts of socio-economic and environmental changes that occur outside the interventions and mask the true results of the data. However, finding and measuring a good counterfactual may not always be possible. For a good comparator, one would need to find another community with the similar risk (biophysical and social) without the intervention. If this is not available, it might be possible to analyse localised climate data, such as rainfall variability. However, these data sources also have limitations in terms of availability, reliability and statistical relevance. In these types of situation, it may only be possible to make a comparison with assumptions on the impact of extreme weather events that have occurred during the lifespan of the adaptation intervention. Fortunately, these types of analyses did not need to be conducted during the TAMD feasibility study, due to the selection of reliable control groups.

Normalisation and contextualisation

Brooks *et al.* (2013) state that, when undertaking adaptation evaluations, "indicators need to be normalised to account for changes and variations in the frequency and severity of extremes, particularly where these extremes are becoming more or less prevalent and where the extremes in question are infrequent."

As with shifting baselines, normalisation of data from the TAMD feasibility study in Pakistan was not necessary since the difference-in-difference approach was able to control for external factors with the selection of good counterfactuals. In the absence of control groups to act as counterfactuals, time series data on key socio-economic indicators in each region, along with data on variance in climate extremes, may be an alternative methodology to measure the effectiveness of adaptation strategies within different contexts.

3

Assessing the potential to scale-up TAMD

The purpose of piloting the TAMD framework in Pakistan was to determine whether TAMD could be adapted to local circumstances in a way that supports long-term adaptation planning at the provincial level. Given that climate change impacts are projected to increase in the years ahead, and that developing adaptive capacity is a long-term process, it is essential that TAMD is mainstreamed and embedded in planning systems beyond the short-term timescale of the TAMD Pakistan project. Chapter 3 focuses on three critical success factors – sustainability, stakeholder acceptance and cost effectiveness – to determine the potential for replicating TAMD more broadly at the provincial level in Pakistan in the years ahead.

Sustainability

For TAMD to be self-sustaining, it has to be built into the programme development process. However, due to a lack of capacity at national and local levels to implement climate change adaptation policies, mainstreaming adaptation and TAMD evaluations into the programme development process will still require continued research partner support. This could be targeted to advising on indicator development and preparing manuals and guidelines to help those using the TAMD framework to engage stakeholders in indicator development.

Like the carbon cell in the Climate Change Division, the TAMD research team can envision a TAMD unit being established at federal and provincial levels to facilitate the integration of adaptation into the policy and planning process. However, this would require additional resources and buy-in from government. If training and establishment of the TAMD unit can be externally funded, the chances of mainstreaming TAMD would be

higher; at present, governments at all scales are unlikely to see TAMD as useful, given the relatively low level of investment in adaptation. However, with increased funds flowing into adaptation activities, the demand for TAMD is likely to increase.

Stakeholder acceptance

As mentioned above, the demand for a framework like TAMD is still relatively low, though some key government stakeholders are convinced of its utility. The main issue affecting the acceptance of TAMD is the broader lack of awareness on climate change adaptation issues – a concern which is exacerbated by a general resistance to being evaluated and to adding new tools and procedures to government planning. It is therefore important for the TAMD study team to engage with a wider group of stakeholders in Pakistan to show the results of the study and progress on indicator development. If government stakeholders can be convinced that using TAMD will bring additional resources for adaptation – for example, through improved donor reporting – they would be more willing to mainstream adaptation evaluation into the national planning process.

Cost effectiveness

The process of developing specific TAMD indicators to evaluate rainwater harvesting and biogas projects was very cost effective. Given the large scale of these projects, the cost of developing indicators through field visits and participatory workshops was relatively small – particularly since the indicators can now be added to existing M&E activities and collected at negligible additional costs in the future.

Replicability

The TAMD Pakistan research team sees TAMD as a highly replicable framework in the project evaluation context, which is the building block of most policies and strategies. Testing of TAMD showed that it was applicable at different scales of government and in the non-governmental sector. By keeping the framework simple, usable and aligned with the project cycle process in Pakistan, using TAMD would not require significant additionality to current government processes. The project team therefore envisions that TAMD could be sustainably integrated into the PSDP design and implementation procedures at national or sub-national levels. For this purpose, the indicator development methodology that was used during the TAMD feasibility study should be integrated as best practice for project and programme proposals, particularly for climate-related projects. Further to its application within governmental planning systems, the TAMD framework would be equally useful for climate resilience projects and programmes implemented by non-state agencies and organisations.

4

Results from the TAMD feasibility study

Outcomes of Track 1 assessment

The primary focus of the TAMD feasibility study in Pakistan was to develop indicators that could be used for a retrospective assessment of whether rainwater harvesting and biogas projects brought resilience benefits to households in Pakistan. Chapter 4 presents the results of this assessment.

The TAMD feasibility study also undertook an initial assessment of Track 1 indicators at national and provincial levels. Conducting this assessment was challenging, as climate change issues – particularly adaptation – are not well understood by all stakeholders. The results from this assessment reflect the fact that Pakistan is at an early stage of mainstreaming CRM into public policy response. This assessment is a valid first step in understanding CRM processes in Pakistan and will be useful as a baseline point of reference for future evaluations.

Table 1 provides a summary of the results from the Track 1 assessment. Officials from national and provincial levels used scorecards to assess CRM mainstreaming across eight indicators, with a minimum score of 0 and a maximum of 10 for each indicator. Appendix I has a more detailed summary of each score. In general, the scores show that CRM is still in a nascent stage in Pakistan, particularly at provincial level, where most indicators yielded no score.

Table 1: Overview of Track 1 scorecard in Pakistan

Indicator	Scorecard results
1. Climate change integration into planning	Dedicated climate change policies and implementation frameworks are in place. However, mechanisms for integrating and screening climate risks in development planning processes are not yet in place. Specific adaptation and mitigation measures and funds have been made available for identifying climate risks, but this is partial and sporadic.
2. Institutional coordination for integration	A Climate Change Division (previously a ministry) has been established, with the Prime Minister as the incumbent minister. The division is mandated to deal with climate-related subjects, including coordination and planning. The mandated role, however, has limited hierarchical importance, with no regular mechanism to coordinate the relevant entities or dedicated long-term funding.
3. Budgeting and finance	Some funds are available for pilot measures for both adaptation and mitigation. There are no dedicated funds for integration, mainstreaming, screening and other such actions.
4. Institutional knowledge/ capacity	In general, there is limited capacity and knowledge on climate change among planning institutions. There are individuals with in-depth knowledge or specialisation.
5. Use of climate information	Climate projections – from national or international sources – are taken into account on a limited scale. Access to climate information from foreign/international sources is inadequate.
6. Planning under uncertainty	This capacity does not exist within the planning entities.
7. Participation	There is only partial participation of relevant stakeholders in the planning processes at national and provincial levels. There is no local or community-level participation in climate-related decision making. Some NGOs perform better on participation.
8. Awareness among stakeholders	There is an adequate level of awareness in different climate-sensitive sectors. Funding for awareness-raising in other sectors is inadequate.

Outcomes of Track 2 assessment

For the Track 2 assessments, the team used indicators developed through participatory methodologies to assess the resilience outcomes of rainwater harvesting and biogas projects. The results confirm the assumptions made in the theories of change for both interventions, confirming that TAMD is a useful framework for measuring development and resilience in Pakistan.

Rooftop rainwater harvesting

Increased rainfall variability in a context of existing surface water scarcity poses a serious threat to communities living in Pakistan's mountainous areas. Rainwater scarcity forces women and children to spend many hours fetching water from several kilometres away, often in hazardous conditions on steep slopes. The PRWH Project has made large quantities of water available to households, which they can store for a long time and use for most purposes besides drinking. As predicted in the project's theory of change (see Figure 2, Chapter 1), the TAMD study team found that women and children from households that harvest rainwater saved considerable time fetching water, while household water usage also increased. Table 2 shows a summary of output indicators highlighting the household benefits of rainwater harvesting in Chitra Topi in Bagh district and Nathiagali in Abbottabad district.

Table 2: Outputs from rainwater harvesting in Bagh and Abbottabad

Variables	Indicators	Bagh	Abbottabad
Water availability	Household water usage (litres per day)	28	15
Fetching water – time	Average reduction in household time spent fetching water (minutes per day)	162	60
Fetching water – girls	Reduction in number of school-age girls fetching water per household	1.6	0.7
Kitchen gardening	Increased percentage of households doing kitchen gardening	27%	0%
Livestock holding	Increase in number of cattle per household	1.2	0.6
Sanitation	Reduction in open defecation	53%	41%
Sanitation	Increase in use of functional toilet	20%	14%
Hygiene	Increase in frequency of showers (per week)	1	0.7
Health improvement	Decrease in frequency of illness among water fetching women (per month)	3	3

These results show that households divert the time they save by collecting rainwater to kitchen gardening and livestock rearing, both activities that also benefit from increased water availability at household level. Increased access to water also led to improved hygiene, increased use of toilets, decreased water fetching-related ailments and improved school attendance. This was particularly important for female children, because rainwater harvesting also made school toilets functional.

When these output indicators are converted into socio-economic outcome indicators, it is possible to see that the rainwater harvesting interventions strengthened household security in Bagh and Abbottabad. Table 3 outlines these results.

In order to examine the robustness of these findings, the study team carried out a statistical analysis of the results, applying Chi-Square and Mann-Whitney tests to some of the main socio-economic outcome indicators for the rainwater harvest projects. Table 4 confirms that the findings are robust in terms of their precision and accuracy, and could therefore be used to assess rainwater harvesting projects in similar geographic and socio-economic conditions.

Table 3: Socio-economic outcomes from rainwater harvesting in Bagh and Abbottabad

Sector	Indicator	Bagh	Abbottabad
Livelihood/food security	Average savings and diversification of household: total value of kitchen gardening and animal rearing production at household level (Rs. per month)	2,696	659
Health	Average decrease in household medical costs of (Rs. per month) – includes water fetching-related ailments and hygiene-related diseases.	2,309	2,712
Education	Average reduction in absenteeism (number of days per child per month)	1.5	1.1

Table 4: Statistical testing of key indicators

District	Variable	Chi-Square test	2-tailed value	Mann-Whitney test	2-tailed value	Significance
Bagh	Livelihood	214.514	0.000	287.500	0.000	99.9%
	Medical costs	58.143	0.000	43.500	0.000	99.9%
	Girls' school attendance	79.800	0.000	248.000	0.000	99.9%
Abbotabad	Livelihood	295.143	0.000	336.000	0.000	99.9%
	Medical costs	75.200	0.000	38.500	0.000	99.9%
	Girls' school attendance	106.400	0.000	511.500	0.015	95%

Biogas projects

After repeated failures since the 1970s, biogas has been successfully introduced in Pakistan, with over 4,000 units installed across the country. While the mitigation aspects of biogas are well documented, the TAMD study team was interested in assessing the adaptation benefits of cheaper alternative energy sources.

The TAMD assessment found that biogas had several socio-economic benefits:

- It saved time as households no longer collected biomass or spent time lighting a fire.
- There was a marked improvement in indoor air quality and hygiene because they no longer made dung cakes for fuel.
- Parents (especially women) were able to spend more time with their children, which in turn improved school enrolment.
- There were savings in fuel costs. The by-product of biogas units, bio-slurry, is an excellent fertiliser, so households also saved money on organic fertilisers.
- Using bio-slurry also dramatically increased productivity by improving soil quality and moisture retention (especially in drier *kharif* crop period).
- Households invested savings from the installation of biogas units into more mobile assets such as animals, which not only produced more dung for the biogas units, but also provided an income through sales of animal-related products. Women had more spare time, enabling them to take care of more animals.

As outlined in Chapter 2, the TAMD feasibility study used a difference-in-difference methodology to measure the attribution of interventions to outputs and outcomes. The team compared key indicators from the biogas project's theory of change among the treated and control populations. Table 5 outlines improvements in output indicators between these two groups.

The results in Table 5 show that as a result of biogas interventions, households increased their movable assets in terms of animals, which is a common strategy for improving food security and adaptation to natural calamities. In times of excessive rain and floods, animals can be taken to safer ground, while in times of drought or other calamities they can be slaughtered or sold to survive through the event and recover immovable assets such as the shelter and land.

The TAMD study team had predicted that the biogas interventions would have led to a change towards non-agricultural sources of livelihood; however, this has not yet been observed. There are several possible explanations for this. First, with current climatic conditions, it may still be more practical to invest excess income into more animals. Second, diversification into non-agricultural livelihoods requires more time, because it may involve building capacity in terms of education, language and professional skills, and

Table 5: Difference-in-difference output indicators for biogas interventions

Variables	Indicator (average per household)	Difference-in-difference
Time saved	Time saved by men (hours per month)	46.7
Time saved	Time saved by women (hours per month)	19.9
Time saved	Time saved by children (hours per month)	2.2
Education	Time spent with school-going children by adults (hours per month)	55.6
Education	Decreased absenteeism (child days per month)	0.5
Food security	Increase in rabi crop yield (munds per acre)	0.8
Food security	Increase in kharif crop yield (munds per acre)	2.8
Food security	Reduction in fertiliser used (kg per acre)	11.2
Food security	Increase in number of animals (per year)	2.7
Improved health	Decrease in smoke-related diseases such as eye infection, respiratory infections, fire burns, backache and fatigue (incidents per month)	0.7
Improved health	Decrease in dung-related diseases such as diarrhoea, cholera, worms and others (incidents per month)	0.3

access to non-farm urban markets. Finally, current climate conditions are yet to put a limit on land productivity to warrant a more radical adaptation strategy such as migration to undertake other non-farming activities.

Based on improvements in output indicators among treated groups for biogas interventions, the TAMD study team was able to show overall improvements for socio-economic outcome indicators. For the purpose of future TAMD evaluations in similar circumstances, selected indicators that highlight these improvements are outlined in Table 6. The data shows that the biogas interventions led to an average increase in household income of Rs. 5,069 and an average annual increase of 2.7 animals per household.

Table 6: Socio-economic outcome indicators for biogas interventions

Variables	Indicator	Difference-in-difference
Energy savings	Total saving (Rs. per month)	131
Agriculture production*	Total increase in income (Rs. per month)	1,576
Livestock sale income	Total increase in income (Rs. per month)	3,236
Total health cost saving	Reduction in expenditure (Rs. per month)	126
Total income impact	Increased household savings and income (Rs. per month)	5,069

Note: * includes increased agricultural yield and animal products

Linkages between Track 1 and Track 2

The study team found it very difficult to link the two tracks at this early stage in testing TAMD in Pakistan. For Track 1, the policy and implementation framework is too new, and a continual process of changing institutional arrangements at the national level has not allowed any consistent processes to take root. Furthermore, limited investment is currently being made in adaptation, which makes it difficult to judge whether CRM processes are progressing. With these challenges, it is not surprising that there is very little formal connection between the policy, its custodians and the investments that have been considered for the Track 2 analysis in this study. Once the implementation mechanisms for adaptation-related investments are streamlined, it is possible that the Track 1 and Track 2 linkages would become clearer.

Conclusions

Analysis from Chapter 4 shows that the TAMD feasibility study in Pakistan was successful in developing a robust series of Track 2 indicators that can measure resilience for specific adaptation and development interventions. These indicators show strong potential to be included in future evaluations of development interventions in Pakistan, and can help to generate a longer-term understanding of resilience over time.

An analysis of CRM at national and provincial levels in Pakistan shows that there is still a low level of understanding of climate change issues in government, and that low levels of adaptation investment cause there to be little demand for a framework such as TAMD at present. Despite this slow progress, the Track 1 assessment of CRM is an important first step to collect baseline data on the institutionalisation of adaptation in Pakistan. Track 1 indicators can now be recorded in the future, to see whether climate change policy, strategy and planning have improved over time. With a slowly growing understanding of adaptation in Pakistan, there is likely to be a push for investment in adaptation in the years ahead, which the study team expects will lead to better CRM planning in the country.

The TAMD feasibility study was developed with the aim of integrating resilience indicators into existing governmental planning systems. One of the major strengths of the TAMD study is that is has proven the utility of a number of indicators that can be used to measure resilience at the project level. Now that the feasibility study has tested and demonstrated the robustness of these indicators, there is potential for these to be combined with existing M&E indicators and included in a more holistic system which would effectively measure development and resilience outcomes in all concerned sectors.

An analysis of the institutional management of climate change at the national level in Pakistan shows that the TAMD framework would fit well within existing tracking initiatives housed in the Climate Change Division. TAMD indicators could be integrated alongside databases on climatic and environmental indicators, and could support complementary activities such as the Climate Public Expenditure and Institutional Review and the work of the Planning Commission's environmental cell. In the longer term, this type of system could capture data at district level, comparing adaptation-related investment and its return in terms of supporting socio-economic development. Such feedback would very useful in steering the implementation of climate change policy in Pakistan.

With political devolution in Pakistan from the national to provincial level, the TAMD study team sees the potential to apply TAMD at provincial level, where it can help inform local adaptation planning. This would require effort to raise awareness of TAMD at provincial planning and environmental protection departments, and a training programme to build the capacity of provincial officials to improve CRM and adaptation planning.

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Annex I: Scorecard for Track 1 categorical indicators at national and provincial levels

Indicator 1: Climate change integration into planning *Representation of strategies that address climate change in relevant planning documents and processes*	**National**			**Provincial**		
	NO	PAR	YES	NO	PAR	YES
Is there a climate change plan or strategy set out in a dedicated strategy document and/or embedded in the principal planning documents at the level being assessed (e.g. national, sector, ministry)?			2	0		
Is there a formal (e.g. legal) requirement for climate change (adaptation/mitigation) to be integrated or mainstreamed into development planning?		1			1	
Have specific measures to address climate change (adaptation/mitigation) been identified and funded?		1		0		
Are climate-relevant initiatives routinely screened for climate risks?	0			0		
Is there a formal climate safeguards system in place that integrates climate risk screening, climate risk assessment (where required), climate risk reduction measures (identification, prioritisation, implementation), evaluation and learning into planning?	0			0		
SCORE (number of "YES" answers x 2 + number of "PARTIAL" answers. NB: 'PAR' refers to partial answers)		**4**			**1**	

Indicator 2: Institutional coordination for integration *Extent and quality of coordination of CRM across relevant institutions*	**National**			**Provincial**		
	NO	PAR	YES	NO	PAR	YES
Has an authoritative body been tasked with coordinating climate change planning and actions?			2			2
Does the coordinating body have high convening authority/hierarchical importance across other cross-sectoral departments or ministries?		1			1	
Has a dedicated institutional mechanism been defined for coordination and implementation across sectors?		1		0		
Is there dedicated funding or certainty of long-term funding for sustaining this institutional coordination mechanism?		1		0		
Is there regular contact between the coordinating body and relevant ministries and agencies (e.g. in key climate-sensitive sectors)?		1		0		
SCORE (number of "YES" answers x 2 + number of "PARTIAL" answers)		**6**			**3**	

Indicator 3: Budgeting and financing *Financial support for climate change mainstreaming and initiatives – funding available for local initiatives, locally owned/driven*	**National**			**Provincial**		
	NO	PAR	YES	NO	PAR	YES
Is funding available to pilot measures that address climate change (e.g. adaptation, risk management, mitigation, low-carbon development)?		1		0		
Is funding available to roll out/support mainstreaming/ integration of climate change?	0			0		
Do mechanisms/capacities exist for assessing the costs associated with measures to address climate change, such as those identified during climate screening/risk assessment?	0			0		
Is funding available to cover the costs of the necessary climate change measures identified (and costed) during climate screening/risk assessment?		1		0		
Are actions to address climate change supported by an authoritative financial entity (e.g. at national level, Ministry of Finance)?	0			0		
SCORE (No. of "YES" answers x 2, plus no. of "PARTIAL" answers x 1)		**2**			**0**	

Indicator 4: Institutional knowledge/ capacity *Level of knowledge and training of key personnel in climate change issues and mainstreaming processes*	**National**			**Provincial**		
	NO	PAR	YES	NO	PAR	YES
Does planning involve individuals with some awareness of climate change?		1		0		
Does planning involve individuals with formal training in climate change issues?		1		0		
Does planning involve individuals who have attended accredited courses on climate change, development, planning and "mainstreaming" issues?		1		0		
Is integration of climate change into planning overseen by individuals with in-depth knowledge of integration/ mainstreaming processes?		1		0		
Are enough people with the required training involved in planning processes?	0			0		
SCORE (number of "YES" answers x 2 + number of "PARTIAL" answers)		**4**			**0**	

Indicator 5: Use of climate information *Extent to which climate information is used to inform responses to climate change and generated at all levels of society*	**National**			**Provincial**		
	NO	PAR	YES	NO	PAR	YES
Does planning take account of observational data relating to climate trends and variability?	0			0		
Does planning take account of climate projections? Is climate information (e.g. forecasts, projections, information on responses) readily accessible via information sharing platforms or networks (e.g. for screening)?		1		0		
Is sufficient access to climate information being generated by foreign and international organisations (e.g. IPCC, research bodies, academic institutions)?		1		0		
Is the use of scientific information from external sources complemented by the use of domestically generated information, including local/traditional/ indigenous knowledge?	0			0		
Is there capacity to interpret and use climate information (e.g. in scenario planning, risk frameworks, vulnerability assessments)?	0			0		
SCORE (number. of "YES" answers x 2 + number of "PARTIAL" answers)		**2**			**0**	

Indicator 6: Planning under uncertainty *Institutional capacity for decision making under climatic uncertainty*	**National**			**Provincial**		
	NO	PAR	YES	NO	PAR	YES
Does planning (and wider climate change dialogue) incorporate "envelopes of uncertainty", defined as plausible ranges of key climatic parameters over relevant timescales, informed by climate projections where feasible?	0			0		
Does planning make use of scenario-planning exercises, preferably based on "envelopes of uncertainty"?	0			0		
Does planning explicitly address risks associated with maladaptation?	0			0		
Is planning guided by well-developed frameworks and methodologies that address uncertainty?	0			0		
Are there mechanisms for ensuring that planning guidance is updated with new information on climate change as it becomes available?	0			0		
SCORE (number. of "YES" answers x 2 + number of "PARTIAL" answers)		**0**			**0**	

Indicator 7: Participation *Quality of stakeholder engagement in decision making to address climate change*	**National**			**Provincial**		
	NO	PAR	YES	NO	PAR	YES
Are all relevant levels of governance (national, provincial/district, local/community) (required to be) represented in the planning process?		1			1	
Are those who might be adversely affected by climate change initiatives represented in planning/decision making?	0			0		
Are those most in need of / most likely to benefit from measures to address climate change represented?	0			0		
Are the poorest and most marginalised members of society represented?	0			0		
Is the participation of all the above groups sustained throughout planning and implementation (i.e. at the start, end and throughout an initiative)?	0			0		
SCORE (number. of "YES" answers x 2 + number of "PARTIAL" answers)		**1**			**1**	

Indicator 8: Awareness among stakeholders *Level of awareness of climate change issues, risks and responses*	**National**			**Provincial**		
	NO	PAR	YES	NO	PAR	YES
Are stakeholders aware of climate change and its potential implications (e.g. for their sector, for society at large)?		1		0		
Are stakeholders aware of potential, available, or ongoing climate change response options?		1		0		
Does relevant information reach key stakeholders in climate-sensitive sectors?		1		0		
Do institutional mandates raise awareness of, and disseminate information about, climate change (risks, impacts, responses, etc.)?		1		0		
Is adequate funding available for awareness-raising among relevant stakeholders and the public at large?	0			0		
SCORE (number of "YES" answers x 2 + number. of "PARTIAL" answers)		**4**			**0**	

Knowledge Products

Research Report

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Climate change

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TAMD is a twin-track framework that evaluates adaptation effectiveness. The TAMD feasibility study in Pakistan focused on developing an M&E approach to track the resilience and development outcomes of two interventions – the Promotion of Rainwater Harvesting Project (PRWH) and the Pakistan Domestic Biogas Project. Theories of change were developed to determine the ways in which the projects would be expected to deliver long-term climate resilience. Indicators were then developed to evaluate the theories of change and data was collected through household surveys to determine whether the interventions led to improved household resilience. Testing of the Track 2 indicators gave very good results – showing that both projects led to improved socio-economic outcomes. The indicators therefore show strong potential to be used in future national and provincial M&E systems to measure improvements in climate change resilience.

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