

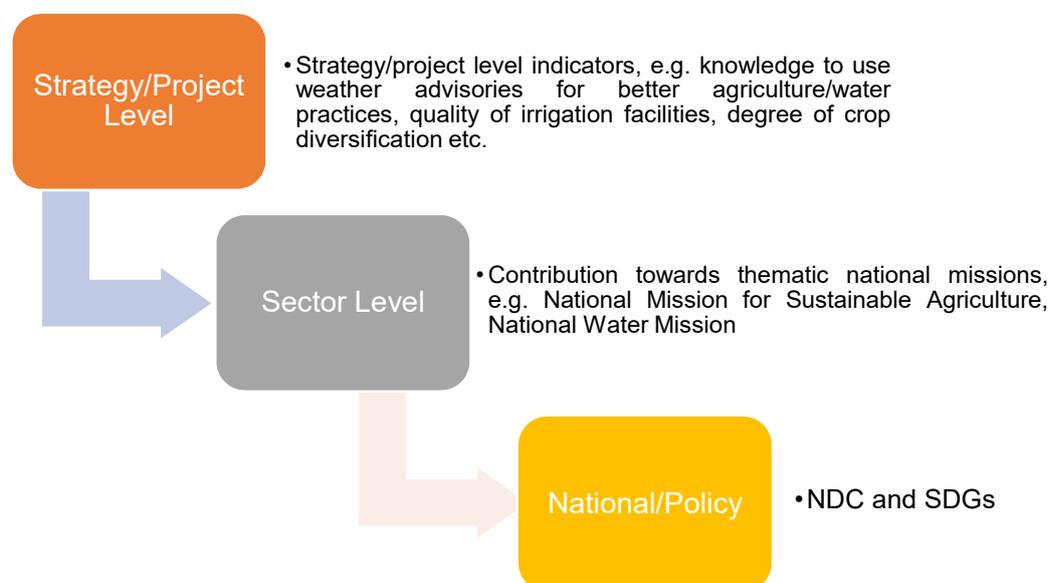
## CHAPTER 9: MONITORING & EVALUATION

This section presents the monitoring and evaluation mechanism for operationalize TNSAPCC. Department of Environment, Government of Tamil Nadu, being the nodal department on climate change will be responsible for monitoring and evaluating the activities envisaged under TNSAPCC with the overall support from multiple implementing departments.

### 9.1 INTRODUCTION

Monitoring and Evaluation (M&E) of climate change interventions is essential to monitor and evaluate the effectiveness of implemented adaptation and mitigation measures. The Paris Agreement has necessitated countries to have harmonized measurement and reporting systems for the countries as per their NDC mitigation commitments. India's NDC also has several areas in adaptation that need systematic monitoring for an assessment of the change in vulnerability that can be attributed to related investments to be made. Some of these investments are through the government budget and some others are off-budget supported through bi-lateral and multilateral agencies, philanthropic bodies, and national and international climate funds. All this information must be consolidated nationally, and a seamless harmonization of measurement and reporting is also required at state level.

M&E for TNSAPCC envisages to determine States' overall progress towards climate resilience and can also help to assess the SAPCCs' contribution for achieving the country's NDCs and SDGs. Individual strategies proposed under respective seven missions in TNSAPCC will have their respective result framework highlighting the output and impacts. In order to aggregate the outputs/impact of each strategy under seven missions proposed under TNSAPCC up to the national level, following approach (provided in Figure 9.1) is envisaged to monitor and evaluate the interventions. This uses a sectoral approach for measuring the achievement towards India's NDC and SDGs.



**Figure 9.1: Approach for measuring impact of proposed intervention and its contribution towards NDC and SDG**

## 9.2: BROAD INDICATORS FOR MONITORING AND EVALUATING CLIMATE CHANGE INTERVENTIONS

### Indicators for climate change adaptation:

India's NDC has a non-quantifiable goal on adaptation which highlights that it is essential to better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management. In order to measure the TNSAPCCs' contribution towards climate change goals of India's NDC and SDGs, eight aggregate indicators have been designed which are as follows:

#### 1. Stability/Increase in Income Levels:

Stability in farmer incomes over time is an important indicator for measuring the effectiveness of adaptation efforts. Stability in farm incomes could imply:

- Knowledge to use weather advisories for better agriculture/water practices
- Better irrigation facilities
- Crops resistant to extreme climate change (drought, flood etc.)
- Implementing crop diversification
- Coverage of crop insurance

#### 2. Number of Government schemes that have been climate-proofed:

This indicator measures the interest generated in the state for considering climate change while planning and implementing various schemes (also called Mainstreaming of Adaptation Strategies into development planning).

#### 3. Reduced Migration of local population directly and indirectly dependent on climate sensitive sectors for their livelihoods:

High migration levels are a sign of agricultural distress and degradation of the natural resources base in a region even if adaptation measures are being implemented. Decreasing levels in migration might reflect:

- Community having potable water available for domestic use
- Communities in a food-secure situation
- Community having alternative livelihood options

#### 4. Enhanced climate resilience of communities towards climate risks:

As it is often the most marginalised that are most vulnerable to the impacts of climate change, it is essential to enhance the resilience of these communities to enhance their adaptive capacity. Examples of indicators which can be measured are listed as follows:

- Community capacitated to use weather advisories for planning activities (food, water etc.)
- Community having potable water available for domestic/occupation use during extreme events

## 5. Mainstreaming of women and other vulnerable sections in adaptation activities

Climate change has an impact on those sections of the population that are mostly reliant on natural resources for their livelihoods and/or who have the least capacity to respond to natural hazards, such as droughts, landslides, floods and hurricanes. Vulnerable population such as women, children, elderly people etc. commonly face higher risks and a greater burden from the impact of climate change than men. Further, members of indigenous communities, due to lack of access to resources such as forest produce, loss of forest rights due to biodiversity loss and because of poor application of laws are more vulnerable to climate risks. Examples of indicators which can be measured are listed as follows:

- Women/vulnerable sections of the population trained on adaptation measures
- Women/vulnerable communities taking part in project planning processes
- Women/vulnerable community are nominee in insurance cover due to loss in activities because of extreme climatic events (drought, flood etc.)

## 6. Community/Farmers having diversified sources of income

An increase in the percentage of farmers who have diversified sources of income is a step towards increasing the resilience of households depending on agriculture/livestock etc. for their incomes to face climate change risks. Diversified sources of income could be stemming from government programmes such as MGNREGAS, Pradhan Mantri Fasal BimaYojana etc. Examples of indicators <sup>1</sup> which can be measured are listed as follows:

- Farmers having their source of income from agriculture and allied sector
- Farmers having their source of income from rearing animals
- Farmers having source of income from forest use

## 7. Capacity building of farmers for implementing CCA measures

Local communities need support to re-orient water management & agricultural systems to counter the risks posed by climate change. Climate change is accompanied by increased weather uncertainty and individuals and communities, especially smallholder farmers, are vulnerable to these fluctuations. Availability of real time weather advisories and other extension services helps them take timely actions to deal with these fluctuations and improve their adaptive capacity. This indicator can be disaggregated by Gender to understand the degree of gender mainstreaming in adaptation. Examples of indicators which can be measured are listed as follows:

- Farmers trained on planning activities based on extreme weather events (drought, flood etc.)
- Farmers trained on climate friendly practices eg: water conserving techniques, knowledge of climate resilient cropping etc.

## 8. Rise in groundwater levels

Healthy ground water levels in a region reflect the prevalence of sustainable agricultural practices, effective and sustainable management of watersheds and awareness levels among members of communities in the region about climate change and its effects.

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<sup>1</sup> In measuring these indicators, duplication should be avoided.

- Enhanced groundwater depth from surface,
- Enhanced groundwater quality i.e. salinity reduction

In order to measure these eight aggregate level indicators, an excel-based Management Information tool highlighting strategy/project-wise indicators has been developed.

### **Aggregate indicators for climate change mitigation:**

India's NDC has three quantified goals on mitigation which includes:

- To reduce the emissions intensity of its GDP by 33 to 35 percent by 2030 from 2005 level.
- To achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 with the help of transfer of technology and low-cost international finance.
- To create an additional carbon sink of 2.5 to 3 billion tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030.

In order to measure the TNSAPCC's contribution towards climate change mitigation goals of India's NDC and SDG, eight aggregate indicators have been designed which are as follows:

#### 1. Enhanced green cover

Extending green cover contribution to the achievement of a climate resilient low-emission pathway. Examples of indicators which can be considered to be measured are listed as follows:

- Setting up of parks
- Increase in forest cover
- Increase in road-side green pathways

#### 2. Increase of renewable energy mix in the total electricity consumption

Switching to renewable energy instead of fossil fuel-based resources leads to a carbon emission-free, healthier environment. Examples of indicators which can be considered to be measured are listed as follows:

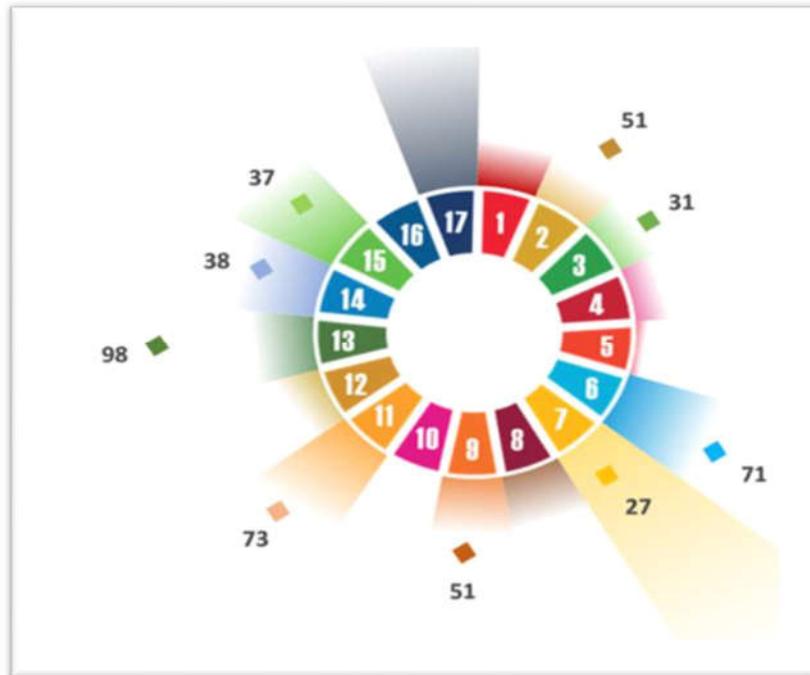
- Establishment of new renewable resources plants/units like solar, hydro, biomass etc.
- Number of buildings adopting renewable resources
- Number of vehicles shifted from non-renewable to renewable resources (electric, cycle etc.)

#### 3. Reduction in waste generation

Waste generation is a major challenge every state is facing which creates an unhealthy environment and has a direct impact on the environment. Managing waste efficiently is an asset for a healthy and sustainable lifestyle. Examples of indicators which can be considered to be measured are listed as follows:

- Number of households segregating waste at source
- Amount of waste segregated at source
- Amount of waste reused and recycled

A preliminary analysis of how TNSAPCC2.0 contributes to the achievement of NDC goals and SDGs is illustrated in Figure 9.2, following a similar methodology as for Figure 1.3.



**Figure 9.2: SDG-NDC-SAPCC linkages for TNSAPCC 2.0**

Note: The number of proposed TNSAPCC activities of relevance to each SDG is illustrated by squares, with squares further from the centre indicating more measures. The total number of proposed identified activities relating to each SDG is given next to the squares. SAPCC-SDG linkages are plotted against SDG-NDC linkages from Figure 1.3.

### 9.3 INSTITUTIONAL MECHANISM

Key to an effective M&E system is the proper institutional arrangement for facilitating and operating it. The M&E system should be grounded in the existing institutional framework driven by the climate change cell within the Department of Environment, Government of Tamil Nadu, with higher-level political and executive bodies providing policy guidance and governance. DoE will act as the technical secretariat and interface with executing departments/line departments for data collection. Each department may constitute a small working group with at least one member in the working group dealing with departmental finance. The working group can be headed by a nodal officer who will interface with the climate change cell for data/MIS up-dation.