

Policy Framework & Preparedness

for Implementing Measures to Effectively
Deal with Climate Change

An Analysis of four states in India



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Executive Summary

The last year (2015) saw certain historical decisions taken at the global level that could put countries on not only the path to sustainable development, but also help in addressing climate change on a "war footing."

The first of these was the adoption of the 2030 Agenda for Sustainable Development, including the Sustainable Development Goals, in September 2015 by 173 countries. This was followed very soon by the adoption of the Paris Agreement by Parties to the United Nations Framework Convention to Climate Change in December 2015. The most recent development was the Paris Agreement coming into force on the 4th of November this year, with 114 countries ratifying the agreement, accounting for 78.97 percent of the total global emissions.

In view of this, nations are now obliged to put in place policies and programmes, which would ensure effective implementation of the Paris Agreement, and also place themselves on a path to achieve their 2030 Sustainable Development Agenda.

Specific to India, the effective implementation of the Paris Agreement would require both the states and the national governments to come together to formulate policies and design new programmes, where required or strengthen existing policies or alter design of existing programmes, as appropriate.

India and various states of India have already started to put in place policy frameworks and programmes with budgetary allocation, that could effectively address various issues of climate change. Furthermore, there are various programmes and policy frameworks that are in the pipeline to be implemented, and is contained in the State Climate Action Plans and many of these are in line with the recommendations of the Inter-Governmental Panel on Climate Change in its 5th Report (IPCC AR5) as well as the report of the Global Commission on the Economy and Climate.

This report, primarily has mapped the various relevant policies of the states of Tamil Nadu, Undivided Andhra Pradesh (Telegana and Seemandhara), Goa and Karnataka, from the perspective of assessing their state of preparedness as recommended by the IPCC AR5 and other global reports in the climate change space.

Our study, as contained in this report, reveals that, for most issue areas, under the broad head of mitigation, namely, renewable energy, energy efficiency, sustainable urban infrastructure, sustainable transport, afforestation and reforestation (creation of carbon sinks) and addressing agriculture emissions, states do have in place broad policy framework and have some programmes to address them. However, on matters related to adaptation, there are very few policies and programmes that actually address the various recommendations of the IPCC and NCE reports. However, having said this, our assessment, is that there are existing programmes that could be modified to bring in the policy elements required to address climate change.

To elaborate, the IPCC AR5 along with the NCE report has a total of 210 recommendations. At the national level, our assessment is that close to 50 percent of the recommendations of the IPCC AR5 and NCE have either been addressed through policy framework at the national level or if not fully addressed, there is at least an acknowledgment of these recommendations in the various policy framework. The table below, gives a broad overview of the same.

Table 1: Number and Percentage of Recommendations addressed according to their respective categories

Categories	Total recommendations	Number of recommendations addressed through budgetary measures	Number of recommendations addressed through budgetary measures (percentage)	Number of recommendations taken cognizance of through policy statements and other measures	Number of recommendations taken cognizance of through policy statements and other measures (percentage)	Number of recommendations not addressed	Number of recommendations not addressed (percentage)
Legal and Institutional Reforms	36	4	11%	8	22%	24	67%
Fiscal and Monetary Policy Measures	28	1	4%	9	32%	18	64%
Integrated Planning and Decision Making	20	0	0%	0	0%	20	100%
Climate Resilient Infrastructure	19	4	21%	9	47%	6	32%
Climate Resilient Ecosystem	18	14	78%	3	17%	1	6%
Climate Resilient Agriculture	14	14	100%		0%	0	0%
Social Sector Reforms and Safety Nets	10	6	60%	0	0%	4	40%
Energy Efficiency	10	8	80%	0	0%	2	20%
Education and Awareness	8	5	63%	0	0%	3	38%
Climate Resilient Water Mangement	8	7	88%	0	0%	1	13%

Disaster Risk Reduction	8	3	38%	1	13%	4	50%
GHG Emissions Reduction	6	1	17%	4	67%	1	17%
Decentralised Decision Making	6	1	17%	2	33%	3	50%
International Cooperation	4	0	0%	4	100%	0	0%
Climate Resilience Through Livelihood Security	4	4	100%		0%	0	0%
Renewable Energy	2	1	50%	1	50%	0	0%
Green and/or Smart Cities	2	1	50%	1	50%	0	0%
Disaster Preparedness	2	0	0%	0	0%	2	100%
Capacity Building	2	0	0%	0	0%	2	100%
Artificial Carbon Sequestration Through Geo Engineering	2	0	0%	0	0%	2	100%
Natural Resource Management	1	1	100%		0%	0	0%
Total	210	74	35%	42	20%	94	45%

Further, we also looked at the status of implementation of the IPCC AR5 and NCE recommendations in our four project states. In this analysis, our assessment was based on themes and issue specific actions. The following table gives a broad overview of the status of implementation.

Table 2: State-wise Percentage of Recommendations addressed according to their respective categories

		Total Recommendations	Andhra Pradesh		Goa		Karnataka		Tamil Nadu	
			Recommendation/s addressed through policy framework and budgetary support (%)	Recommendation/s not addressed (%)	Recommendation/s addressed through policy framework and budgetary support (%)	Recommendation/s not addressed (%)	Recommendation/s addressed through policy framework and budgetary support (%)	Recommendation/s not addressed (%)	Recommendation/s addressed through policy framework and budgetary support (%)	Recommendation/s not addressed (%)
Mitigation	Carbon Sink	2	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	100.00%	0.00%
	Renewable Energy	5	60.00%	0.00%	60.00%	40.00%	40.00%	20.00%	60.00%	20.00%
	Energy Efficiency	16	25.00%	43.75%	31.25%	43.75%	25.00%	18.75%	31.25%	50.00%
	Smart and Sustainable Cities	6	16.67%	66.67%	33.33%	66.67%	16.67%	66.67%	16.67%	66.67%
	Improved Livestock Management	3	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%	66.67%	0.00%
	Legal and institutional reforms for low carbon development	2	50.00%	0.00%	0.00%	50.00%	0.00%	100.00%	0.00%	100.00%

*There are only policy framework that just acknowledge the recommendations - these are not reflected in this table, but contained in the detailed table contained in the key findings.

	Power sector reforms (transmission, distribution, generation, infrastructure and reforms)	17	11.76%	82.35%	5.88%	0.00%	11.76%	70.59%	11.76%	88.24%
	Technological Mitigation Measures	5	40.00%	40.00%	40.00%	20.00%	40.00%	20.00%	100.00%	0.00%
	Other Mitigation measures	4	0.00%	75.00%	0.00%	100.00%	0.00%	75.00%	0.00%	100.00%
Adaptation	Climate Resilient Agriculture	16	37.50%	50.00%	50.00%	43.75%	25.00%	43.75%	56.25%	37.50%
	Climate Resilient Ecosystem	25	36.00%	4.00%	29.63%	11.11%	28.00%	36.00%	51.85%	18.52%
	Climate Resilient Livelihood	6	50.00%	16.67%	66.67%	16.67%	83.33%	16.67%	50.00%	33.33%
	Sustainable Water Management	11	63.64%	18.18%	36.36%	36.36%	9.09%	18.18%	81.82%	9.09%
	Legal and institutional reforms for low carbon development	3	0.00%	66.67%	66.67%	33.33%	66.67%	0.00%	33.33%	66.67%
	Social Adaptation	21	42.86%	23.81%	38.10%	38.10%	33.33%	33.33%	61.90%	23.81%
	Climate Resilient Infrastructure	21	23.81%	38.10%	52.38%	42.86%	9.52%	57.14%	42.86%	47.62%
	Disaster Preparedness	11	72.73%	18.18%	36.36%	27.27%	18.18%	54.55%	63.64%	27.27%
	Technological Adaptation measures	7	57.14%	0.00%	14.29%	42.86%	28.57%	28.57%	42.86%	42.86%
	Other issue areas	17	23.53%	64.71%	0.00%	100.00%	0.00%	52.94%	11.76%	76.47%
Cross cutting	International Cooperation	4	0.00%	25.00%	0.00%	0.00%	50.00%	50.00%	75.00%	25.00%
	Enhanced Capacities for Mitigation and Adaptation	14	7.14%	78.57%	0.00%	64.29%	7.14%	64.29%	64.29%	21.43%
Total		216	34.26%	37.96%	30.56%	38.89%	23.61%	42.59%	47.22%	40.74%

In short, even in the case of states, roughly 33% of the total recommendations of the IPCC AR5 and NCE reports seem to be adopted either in the form of policy framework or at the very least find an acknowledgment in policy framework/programmes of the various states in question.

To sum up, one key finding of our analysis, is that, India and the states in question have in place various policy framework and programmes that could easily be adapted to address many of the recommendations of the IPCC AR5 and the NCE. Therefore, putting in place policy framework will not necessarily be a major issue for the states, the key question will be on ensuring effective implementation of the policies.

Introduction

The world right now is in a state of increasing risk, with natural disasters affecting various parts of the globe at increased frequency and intensities which have caused immense destruction in its wake. Further, many of these natural disasters, which range from floods, typhoons, cyclones and drought are increasingly being attributed to climate change. Other risks that face various countries globally is immense pressure on land and natural resources, due to rising consumption patterns coupled with rising population.

However, at the same time, the world right now also has great opportunities to leap frog towards cleaner and more sustainable development pathways that have the propensity to help in addressing climate change and perhaps result in reducing the intensities and frequencies of natural disasters, in addition to reducing the burden on land and natural resources.

For example, new technological solutions in the energy space, in the form of renewable energy and energy efficiency solutions, has the ability to transform the entire energy sector, by ensuring low carbon energy for all and thereby reduce the dependence on coal and fossil fuels.

In short, the opportunity is to harness the expanding capacities of human intelligence and technological progress to improve the lives of the people across the globe.

Specific to India: India is among the most vulnerable countries in the world to the impacts of climate change. This has been amply demonstrated several times over. The recent deluge in Chennai, shows that there is no part of the country that is not vulnerable to the impacts of climate change. Further, the impacts of climate change in the recent past have been so severe as to wipe out livelihoods of perhaps the bulk of the people living in the areas impacted by climate change. Thus, Chennai's floods resulting from unusually severe rainfall in a short span of time seems to have resulted in damage and destruction of houses and other fixed assets of the bulk of the population, and not just the poor. The same was the case in the Jammu and Kashmir floods as well as the Uttarakhand floods earlier, and the people of these two states are yet to recover from the devastating losses that they suffered from. To illustrate further, even states such as Assam, which have historically been adapted to floods, are finding the intensity of recent floods more and more damaging.

India's GDP when compared with other countries in the world in terms of purchasing power parity, is now the third highest after China and the USA [www.datacatalog.worldbank.org: latest data for 2014]. Its per capita GNI in terms of purchasing power parity is, however, 149th in the world [www.datacatalog.worldbank.org: latest data for 2014]. In addition, despite the high growth rates that India has been clocking up, and the large number of people that have been lifted out of poverty, around 300 million people in India still live below the internationally defined poverty line [http://data.worldbank.org/indicator/SI.POV.DDAY]. Further, according to work done by Branko Milanovic, an economist at the World Bank's Development Research Group, "although there are in India some very rich, and even some extravagantly rich people, their numbers are not statistically significant, and the number of people who have the standard of living of the American middle class is still very limited" [Milanovic B, Global Income Inequality by the Numbers: in History and Now - An Overview, November 2012]. India is thus a large economy in gross terms, but still populated by a large number of very poor people. This adds to the level of its vulnerability.

Apart from poverty, there is also large development deficits that India suffers from when compared with the developed world. Vasudha Foundation had carried out a recent study comparing development attainments in India with a set of developed countries that have high HDI values. These were:

Highest HDI Country Cluster– The countries whose data was included for the purpose of this analysis were Norway, Australia, USA, Netherlands, Germany, New Zealand, Ireland, Sweden

Medium-High HDI Country Cluster – The countries whose data were included were Switzerland, Japan, Canada, Denmark, Belgium, Austria, and France

Low-High HDI Cluster– The countries included were Finland, Slovenia, Spain, Liechtenstein, Italy, Luxembourg, UK, Czech Republic, Greece

India's existing development attainments were then juxtaposed against the thresholds exhibited by the above-mentioned groups of countries for the representative indicators identified by us.

Table 1 shows the difference of India's attainments with these developed countries. India, thus, has lots of catching up to do.

Table 3: Sector wise comparison of India with other developed economies in terms of HDI

Sector	Indicator	First data point: 2011 unless otherwise specified			
		Highest HDI Country Clusters	Medium High HDI Country Clusters	Low-High HDI Country Clusters	India
Education	Net Enrolment Ratio at the Primary Levels ¹	98	96.38	95.56	81.9
Education	Net Enrolment Ratio at Secondary Level [%] ²	90.86	87.36	91.78	19.97
Water and Sanitation	Latrine facility at Home (% of total HH)	99.75	100	99.6	58.85
Food and Nutrition	Calorie Intake (KCal/person/day) ³	3374.36	3428.5	3360.86	2625.52
Infrastructure	Roads (kms per 1000 population)	16.47	12.33	15.83	1.25
Energy Access	Per Capita Electricity Consumption (KWH/yr/person)	11297.36	14304	7960	861
Household Assets	Telephony (landlines and mobiles) ⁴	100	100	100	63.98
Household Assets	Refrigerators (per 1000 households) ^{5,6}	1000	1000	1000	26.28
Health	Life Expectancy	81.13	81.75	81.11	67.3

1-Data points are 1999, and 2011
2-Data is for 2010-11
3-Data is for 2009-10
4-These thresholds were assumed levels. All High HDI country Clusters have attained full access to mobiles or landline telephones
5-Data is for 2009-10
6-These are assumed levels. We assume that all High HDI countries have access to refrigerators.

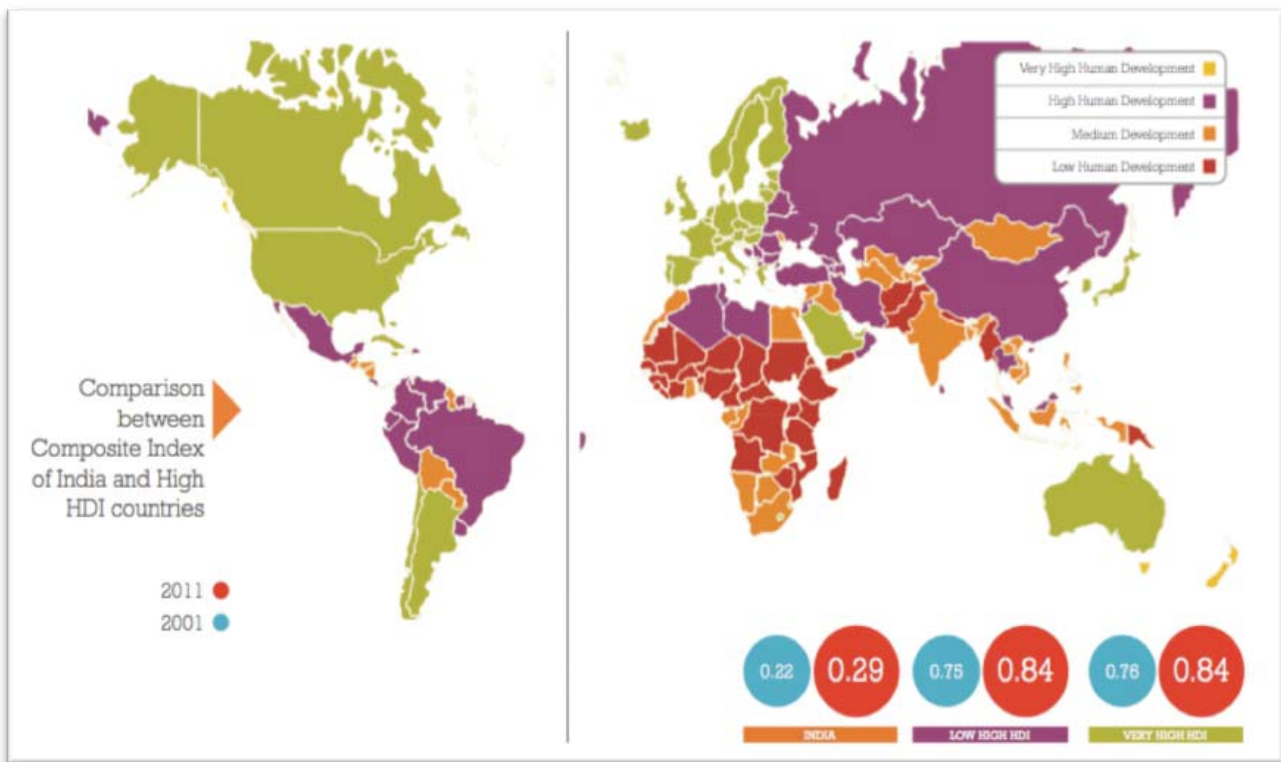


Figure 1: Comparison of India and other developed economies.

Source: <http://equity.vasudha-foundation.org/wp-content/uploads/2015/03/Full-Report.pdf>

However, India needs to catch up in a manner that doesn't leave it vulnerable to a blowback from impacts of climate change that are expected to become more and more severe with time. Instead, India needs to develop in a manner that would make it resilient to the unfolding impacts of climate change.

We are already seeing India take on ambitious targets for renewable energy and energy efficiency deployment, that could reduce its dependence on fossil fuel to meet its electricity requirements by close to 40 percent by 2030 at the minimum. Other areas that India has started to make fast strides, is in promoting public transportation and sustainable urban infrastructure. However, there are still areas that India could make substantial progress to put it on a sustainable development pathway.

This report is a second product of a three year project which was conceptualized to assess India's preparedness to address climate change and embrace a sustainable development pathway. The first product, which was released last year looked at the preparedness of India to address climate change from an economy wide, and country wide perspective, while this report, zeroes down on four states, namely, Tamil Nadu, Karnataka, Goa and Combined Andhra Pradesh (Andhra Pradesh and Telangana) to look at the preparedness of these states in addressing climate change. The report also identifies possible gaps in the preparedness and comes up with a set of recommendations to address the possible gaps.

Methodology

Objective and Methodology

- a) To assess the climate change vulnerability status of Indian States.
- b) To compare and contrast the distinct profiles of vulnerability to climate change among Indian states along with changes that may have occurred overtime.
- c) To understand the implications of the predicted Climate Vulnerability and Mitigation. Potential under various IPCC scenarios from the Indian States Perspective.
- d) Gap analysis of the current policies in the states and policy framework in India considering the IPCC and NCE recommendations.

This report is an outcome of Phase II of the project titled “India's Policy framework and a state of Preparedness for implementing measures to Effectively deal with Climate Change” which looked at the recommendations and their status of implementation from the countries prospective. The recommendations were sieved from the “Summary for Policy Makers” of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (AR5) published in 2014 and the report on “Better Growth, Better Climate: Charting a new path for low-carbon growth and a safer climate” (NCE).

In this phase, we delved deeper to understand some selected individual states' (Andhra Pradesh, before bifurcation; Goa, Karnataka and Tamil Nadu) capacity and potential to address the issues of climate change along with their respective vulnerabilities. For this purpose, we first studied the energy and vulnerability profile of the state. We then attempted to understand their State of Preparedness by closely examining the state Action Plan on Climate Change across five states in India and whether the recommendation of the state action plan as well as of the AR5 and NCE reports were being addressed.

To understand the current status of the states and their vulnerability to climate change we prepared the state profiles, with a focus on their energy provisioning and vulnerabilities. Specifically, the energy profile provides an overview of the energy sector in the state, focusing on parameters such as current energy mix, energy demand and consumption details. We further explored existing mitigation efforts, through initiatives implemented in the state for promoting renewable energy and energy efficiency. The vulnerability profiles try and explore the impacts of various climatic and geographical parameters on the states to obtain a scenario of vulnerability for the selected states. The data that was gathered for this included rainfall, droughts, cyclones and ground water. Vulnerability maps were prepared on these parameters in order to have a geographical perspective of the vulnerabilities of the selected states. The maps were prepared using Arc GIS and Quantum GIS software. The data sources have been listed below. Wherever possible, the data has been mapped in different points of time to show the progressive changes in the vulnerabilities of the states.

Table 4: Vulnerability Indicators

Indicator	Data Source	Time Series
Rainfall fluctuations	IMD	2000-2010
Cyclones	IMD	1891-2008
Droughts	IMD	2002-2014
Ground water Stress	CGWB	2010-2050 (Projections)

Gap analysis and state of preparedness

The Ministry of Environment Forest and Climate Change has mandated that every state prepare a state action plan on climate change, consistent with the National Action Plan on Climate Change.

Through our study, we did a detailed gap analysis to understand which actions, intervention and solutions mentioned by the state in its Climate Change Action Plan are aligned with and address the recommendations mentioned in the “Summary for Policymakers” as per the IPCC’s Assessment Report 5 and the recommendations to the states in New Climate Economy’s “Better Growth, Better Climate: Charting a new path for low-carbon growth and a safer climate” Report. Further, we also looked at the states’ ongoing schemes and policies that address some of the climate vulnerabilities and aspects of dealing with climate change.

For the four states that this report considers, the status of the action plans is as under:

State Action Plan on Climate Change for Andhra Pradesh

Prepared By: Environment Protection Training and Research Institute

Year Published: March 2012

State Action Plan on Climate Change for Goa

Prepared by: -

Year Published: Yet to be submitted

State Action Plan on Climate Change for Karnataka

Prepared by: Environmental Management and Policy Research Institute and The Energy Research Institute (TERI)

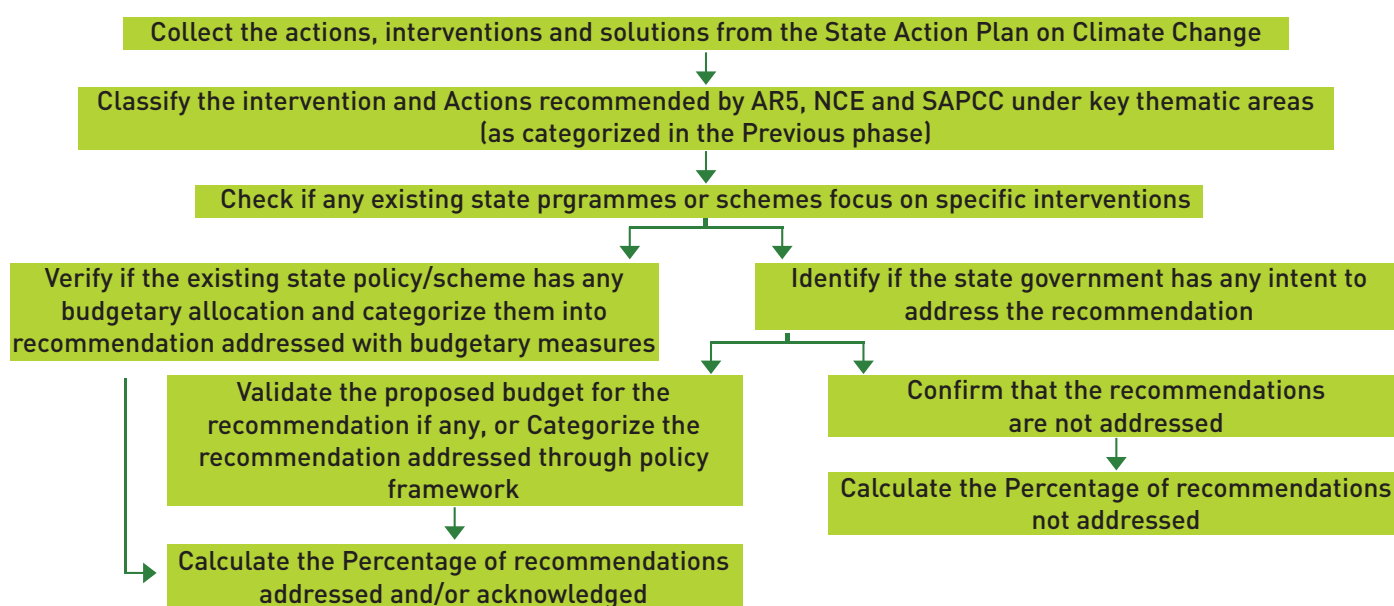
Year published: December 2013

State Action Plan on Climate Change for Tamil Nadu

Prepared by: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Year Published: March 2015

The process that was followed to carry out this analysis is depicted below in a diagram.

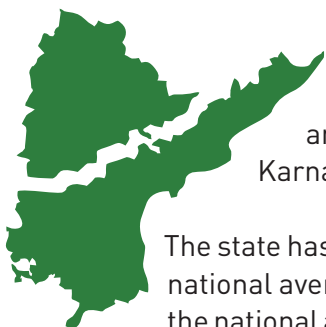


State Profiles

About the states

Andhra Pradesh

(This profile is for unified Andhra Pradesh before its division into Telangana and Seemandhra)



Andhra Pradesh is located on the southeastern coast of the Indian sub-continent, having a geographical area of 2,75,045 sq. km. Situated between 12°41' and 22° N latitude and 77° and 84°40' E longitude and is bordered by Maharashtra, Chhattisgarh and Orissa in the north, the Bay of Bengal in the east, Tamil Nadu to the south and Karnataka to the west.

The state has a population of 8.46 crore, with a population growth rate of 11% that is well below the national average. The population density of Andhra Pradesh i.e. 308/sq. km is actually lower than the national average of 382/sq. km. During 2007-2012, the state accounted for a GSDP growth rate of approximately 8.3%, higher than India's GDP growth of 7.9%. The sectoral share of Agriculture at the constant prices of 2004-05 was 25.1%, industries account for 24.3% and the services sector accounts for the highest proportion of GSDP (50.6%). Agriculture has a negative growth (-1.54%). Thus, the sector has a declining share in the overall state domestic product, which had come down to 19% in 2013-14. However, the share of employment in agriculture sector was still over 50% in 2009-10, thus reflecting vulnerabilities of the bulk of the population directly employed in this sector⁷.

In terms of irrigation infrastructure, 20.90 Lakh acres of Irrigation Potential has been developed through projects and bolstered through various schemes such as Modernization of Delta systems, Accelerated Irrigation Benefit Programme etc. In the rural development sector, focus has been placed on watershed development, land development and wage employment programs (Socio-Economic Survey 2015-16). The power sector has seen improvement in reduction of interruptions in supply as well as a fall in the transmission and distribution losses through improved infrastructure pertaining to the sector and introduction of schemes such as Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) for the rural areas.

Goa

Goa is the smallest state in India by area and the fourth smallest by population. It is situated between 14°53' and 15°18' N latitude and 73° and 75°E longitude along Konkan coast of India. Goa has a coastline of 131 kms. The state has geographical area of 3702 Sq. Km with its capital at Panjim⁸. The state is bestowed by nature with coastal tracks along the Arabian Sea to its west. It has a partly hilly terrain with the Western Ghats rising to nearly 1200 meters on the east. In the North, the Terekhol river separate Goa and Maharashtra, Karnataka lies to the south.



Goa has impressive socioeconomic indicators, as compared to the other states of the country. The State has a population of 14.6 Lakh, with a population growth of about 8.23%. The state has a population density of 394/sq. km and ranks 4th in the country with regard to literacy rate as per the 2011 census⁹.

7- Databook for PC: 22nd December, 2014

8- <http://nidm.gov.in/PDF/DP/GOA.PDF>

9- http://goadpse.gov.in/publications/Economic_survey_2014-15.pdf

The Goa State Domestic Product or State Income grew at 7.71% as per the provisional estimates for 2013-14. This was mainly due to the improvement in agriculture, forestry and fishing sector. Fishing has traditionally been one of the chief occupations and the source of livelihood of the people living in the coastal areas of Goa. The Sector-wise composition of GSDP for 2013-14 indicates that, the agriculture sector accounted for 4.93 %, industry sector for 31.86 % and services sector accounted for 63.21% of the total GSDP.

Goa state is taking initiatives for infrastructure development through various national schemes, such as MGNREGA and Rajiv Aavas Yojna. The total irrigation potential of 34989.20 Ha has been created in the state upto 2014 . Urban development initiatives focus mainly on waste management and upliftment of urban poor through subsidy support through micro enterprises. The state ranks 4th in the country with regard to literacy rate at 87.4%¹⁰.

Karnataka



Karnataka state, located at the south-western coast of Deccan Peninsular region of India covers a geographical area close to 1,92,000 sq. km. It is essentially located between 15° 00' N latitude and 75° 00' E longitude and is bordered by Maharashtra in the north, the Arabian Sea in the west, Tamil Nadu and Kerala to the south and Goa to the west. The state has a population of 6.1 crore people. The population growth rate for the decade 2001-2011 was estimated at 15.6% as opposed to a comparable national estimate of 17.7%. The population density was marked at 319/sq. km in 2011 and is well below the national estimate (Economic Survey 2015-16).

The Gross State Domestic Product (at constant prices) of Karnataka is expected to grow at 6.2% according to the advance estimates based on the new base year 2011-12. The agricultural sector experienced a growth rate of 1.6% in the previous fiscal year (2014-15) as against a consistently plummeting agrarian sector in other states of India. The industrial sector, on the other hand, was expected to grow rather slow but consistently at growth rate of 4.5% during 2015-16. The services sector experienced a slight reduction in its growth since 2014-15 and was expected to grow at 9.2% ,which would further drive the GSDP growth rate of the state. The sectoral composition of GSDP includes agriculture & allied activities, industry sector and the services sector at 12.3%, 23.6% and 64.1% was observed in 2015-16. Share of agriculture sector in GSDP declined from 18.7% to 12.3% as reported above. However, the share of people employed in agriculture was a whopping 57.3% in 2009-10, thereby enhancing the vulnerability of the bulk of the population of the state.

Perhaps, as a response to this situation, rural development has been boosted by integrating development across various sectors such as, water supply, sanitation, energy access, rural infrastructure and employment (MGNREGA). Similarly, urban infrastructure including housing has been promoted through schemes like Integrated Housing and Slum Development Programme, Rajiv Awas Yojna etc. In terms of the economic infrastructure, the installed generation capacity has been increased for the power sector as well as a significant minimization of losses from transmission and distribution structure has been achieved in 2014-15.

The Cumulative Irrigation Potential under irrigation projects is expected to reach 39.77lakh hectare in 2015-16 accounting for an increase of 2.45% from the previous year. Various health initiatives such as National Vector Borne Disease Control programme, Integrated Disease Surveillance Project and Programme of Pulse Polio have been initiated in order to improve the health situation. In addition, strengthening of health education and training programs has also been done.

10- http://goadpse.gov.in/publications/Economic_survey_2014-15.pdf

Tamil Nadu



Tamil Nadu is located in the extreme southernmost part of Indian Peninsula and lies between north latitudes of 8°50' and 13°35' and east longitudes of 76°15' and 80°20'. Total 13 districts of Tamil Nadu are sharing its vast 1070 km long coastline. Nilgiri hills are the main geographical feature of Tamil Nadu, which is meet point of Eastern and Western Ghats. Tamil Nadu shares borders with Andhra Pradesh to the north, Kerala to the west and Karnataka to the northwest (State Profile NIDM). With total geographical area of 130058 Km Sq. Tamil Nadu is 11th largest state of India (State Profile NIDM). The total population of state is 7.2 crore. Population density of Tamil Nadu is 555/sq. km that is much higher than the national average of 382/ sq. km. population growth rate of state is 15.6%. (Census 2011).

In year 2013-14 the growth in Gross State Domestic Product GSDP at constant price was 7.29% mainly supported by services sector (9.31%) and agriculture sector (7.24%) (Economic Survey).

While the contribution of agriculture, industry and services respectively to the GSDP in 2004-05 was 11.12%, 31.65% and 57.23% this proportion had changed in 2013-14 to 7.28%, 29.02 and 63.7%. Thus, the share of agriculture in Tamil Nadu's GSDP had declined from 11.12% to 7.28%. The share of employment, however, was still the highest at 41.8%, thus leading to vulnerabilities of the bulk of the population of the state.

In 2001-05 Life Expectancy at birth in the State was 66 years which increased 68.9 years in 2006-10. Infant Mortality Rate was reduced by 50% from 44 in 2002 to 21 in 2012. Maternal Mortality Rate also decreased from 111 in 2004-06 to 90 in 2010-12 (Economic Survey).

Energy Profile

Energy Profile Andhra Pradesh

The installed power generation capacity in the Andhra Pradesh as on 31st October 2016 stands at 27961.05 MW of which 16247.02 MW is from Andhra Pradesh and 11731.01 MW from current Telangana state.

Table 5: Source wise breakup of energy generation – Andhra Pradesh

		Coal	Gas	Diesel	Total Thermal	Nuclear	Hydro	RES	Total
		In MW	In MW	In MW	In MW	In MW	In MW	In MW	In MW
Andhra Pradesh	state	3085.91	235.4		3321.31		1758.87	89.5	5169.68
	private	2990	3074.11		6064.11			3395.79	9459.9
	central	1473.3			1473.3	127.16			1600.46
	sub total	7549.21	3309.51		10858.72	127.16	1758.87	3485.29	16230.04
		Coal	Gas	Diesel	Total	Nuclear	Hydro	RES	Total
		In MW	In MW	In MW	In MW	In MW	In MW	In MW	In MW
Telangana	state	4806.59			4806.59		2245.66	0	7052.25
	private	270	1570.89	19.83	1860.72			947.54	2808.26
	central	1721.88			1721.88	148.62			1870.5
	sub total	6798.47	1570.89	19.83	8389.19	148.62	2245.66	947.54	11731.01
Andhra Pradesh Total		14347.68	4880.4	19.83	19247.91	275.78	4004.53	4432.83	27961.05

Source: CEA 2016

Of the total installed capacity, 69% of the electricity produced is through thermal sources using coal, gas or diesel. Nuclear energy accounts for 1% of the total installed capacity, hydroelectric energy accounts for 14% and other renewable energy accounts for 16% (CEA 2016). The per capita energy consumption of the state is estimated at 1003 Kwh (Socio-economic survey of AP, 2015-16). As per the state economic survey data the number of consumers served 159.23 lakhs and peak energy demand in Andhra Pradesh is 6847MW.

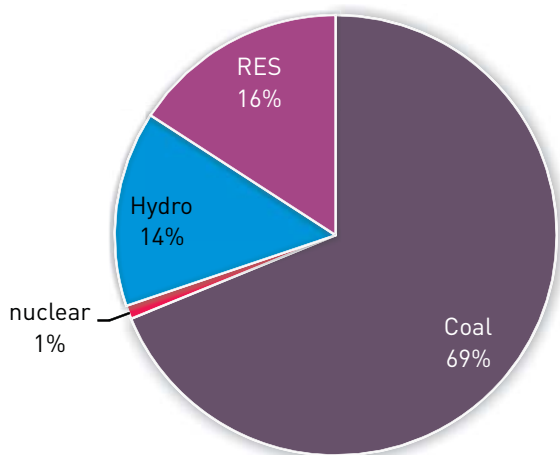


Table 6: Energy Statistics – Andhra Pradesh

Per capita energy consumption	1003 Kwh
Peak Energy Demand	6847MW
Number of Consumers	159.23 lakhs
Energy Deficit	6.9% (2013-2014)

Figure 2: Energy generation profile – Andhra Pradesh

Considering the growing demand for energy without increasing the burden on natural resources Andhra Pradesh state is taking initiatives for sustainable energy generation. The state is implementing Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) for the rural areas to increase energy access. It will also establish a 10MW Canal Top Solar PV Plant on Dharmavaram Canal at Ananthapuram. The Andhra Pradesh has also framed a new State Solar Policy-2015 and was the first state to adopt the Energy Conservation Building Code for all the new commercial buildings. The national UJALA scheme aims to promote efficient use of energy at the residential level by reducing costs and facilitating higher uptake of LED lights. The progress of the Ujala scheme, implemented in the state is shown in the map below.

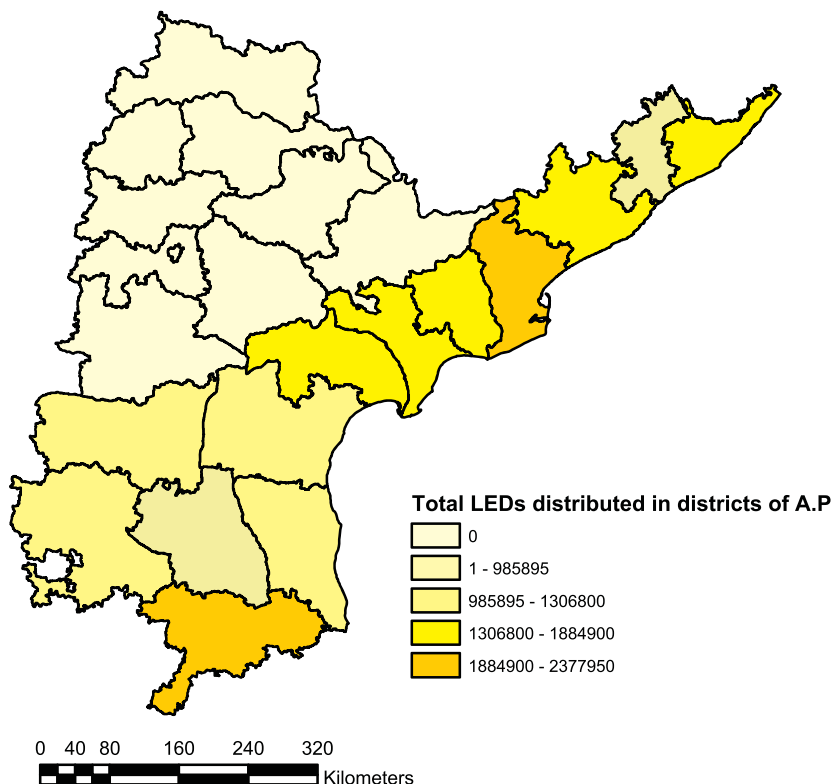


Table 7: UJALA Scheme Benefits – Andhra Pradesh

Energy Saved per year	24,70,836 MWh
Avoided peak demand	495 MW
CO ₂ Reduction per year	2001377 t of CO ₂

Source: <http://www.ujala.gov.in/state-dashboard/andhra-pradesh>

Map 1: Total LEDs distributed in Andhra Pradesh

Energy Profile Goa

Goa has no large power generating stations located in the state. The majority of power comes from coal-based central power generating stations, which contribute to 94% of the total power procured. The state has approximately 400 MW of power allocated from central generating stations. Power is also procured from privately owned cogeneration plants like the Goa Energy Private Ltd and Goa Sponge Private Ltd of capacity 30 MW and 12 MW respectively and power from Sesa Sterlite Ltd of ~3 MW which is expected from FY 2015-16¹¹.

Table 8: Source wise breakup of energy generation – Goa

		Coal	Gas	Diesel	Total	Nuclear	Hydro	RES	Grand Total
		In MW	In MW	In MW	In MW	In MW	In MW	In MW	In MW
Goa	state							0.05	0.05
	private		48		48				48
	central	338			338	25.28			363.28
	sub total	338	48		386	25.28		0.05	411.33

Goa has one of the highest electrification coverage in India with urban electrification of 98%¹². The per capita electricity consumption in Goa FY 2013-14 was registered at 2414 kWh. Peak Demand is for electricity of 540MW in the year 2013-14 is predicted to increase up to 940MW by 2018-19. The total number of electricity consumers is 10,52,657, of which 5,83,286 are commercial consumers and 4,69,371 are domestic consumers (FY 2013-14)¹³.

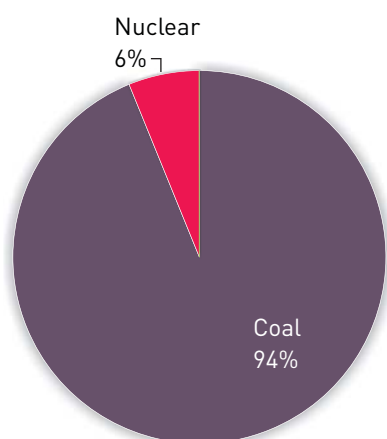


Table 9: Energy Statistics – Goa

Per capita energy consumption	2414 Kwh
Number of Consumers	105.26 lakhs
Peak Energy Demand	540 MW
Energy Deficit	154 MU (2013-2014)

Source: GOI and Goa joint Power for all initiative

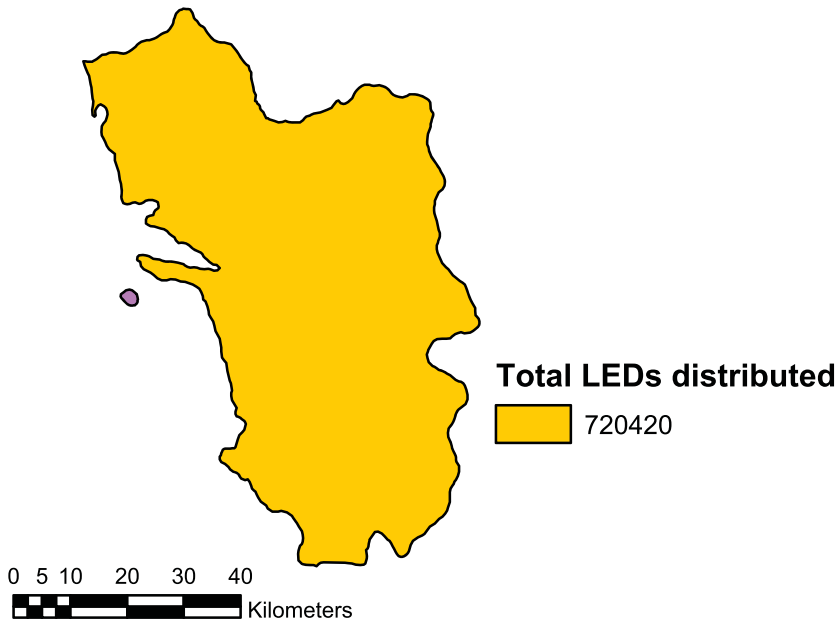
Figure 3: Energy generation profile – Goa

The state has no renewable energy source of power generation in the state. To meet the Renewable Energy Purchase Obligation, Government of Goa has signed Power Purchase Agreement with NTPC Vidyut Vyapar Nigam Limited (NVVNL) for the supply of solar power. Goa has received allocation of 25 MW solar power from Solar Energy Corporation of India (SECI) for a period of 25 years from FY 2015-16.

Other project in the pipeline is the retrofitting of conventional streetlights with LEDs, which has the potential to save about 50% of energy, amounting to approximately 4,300 MU annually. The current programme implemented for improving energy efficiency in residential sector is the national UJALA scheme. The status of implementation of the national Ujala Scheme and its energy savings are shown on the next page.

12- Census 2011

13- http://powermin.nic.in/sites/default/files/uploads/Goa_24x7-PFA_Final_Doc_14_Sep_15.pdf



Map 2: Total LEDs distributed in Goa

Table 10: UJALA Scheme Benefits – Goa

Energy Saved per year	93, 663 MWh
Avoided peak demand	19 MW
CO ₂ Reduction per year	75867 t of CO ₂

Source:
<http://www.ujala.gov.in/state-dashboard/goa>

Energy Profile Karnataka

Karnataka's total installed capacity as on 31st October 2016 is 17324.06 MW, of which 47% is produced through thermal sources utilizing coal, gas or diesel as fuel. Nuclear energy accounts for 0.8% of the total installed capacity, hydroelectric energy accounts for 20.8% and other renewable energy accounts for 32% (CEA 2016). The per capita energy consumption of the state is estimated at 925 Kwh as per FY 2013-14 (IEP power sector road map).

Table 11: Source wise breakup of energy generation – Karnataka

		Coal	Gas	Diesel	Total	Nuclear	Hydro	RES	Grand Total
		In MW	In MW	In MW	In MW	In MW	In MW	In MW	In MW
Karnataka	state	4220		127.92	4347.92		3599.8	153.33	8101.05
	private	2060		106.5	2166.5			5310.16	7476.66
	central	1628.46			1628.46	25.28			1653.74
	sub total	7908.46		234.42	8142.88	25.28	3599.8	5463.49	17231.45

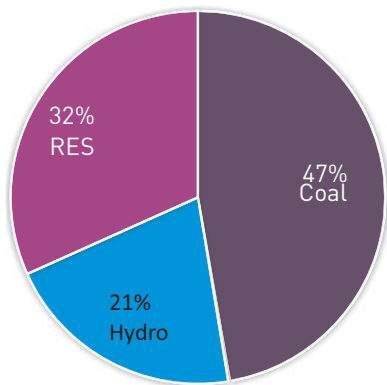


Figure 4: Energy generation profile – Karnataka

Table 12: Energy Statistics – Karnataka

Per capita consumption	925 Kwh (FY 2013-14)
Number of Consumers	Data Not Available
Peak Energy Demand	9549 MW 2015-16
Energy Deficit	1755 MW in 2014-15

Source: Economic Survey of Karnataka 2015-16

Karnataka recognizes that renewable energy deployment and energy conservation is crucial for sustainable economic development and growth. The state has programs for Solar Roof Top Grid Connected Systems, where government provides 30% subsidy for non-commercial and non-industrial categories for using domestic solar panels. Karnataka has also developed a Solar policy 2011-16 the objective of which is to promote solar power as part of the renewable energy generation. Energy efficiency initiatives taken by the state are, mandating the Energy conservation Building code, which has the potential to save 30% energy consumption in buildings. The government initiative to promote LED lights through National Ujala Scheme is also implemented in Karnataka. Status of implementation and the consequent benefits have been mentioned below.

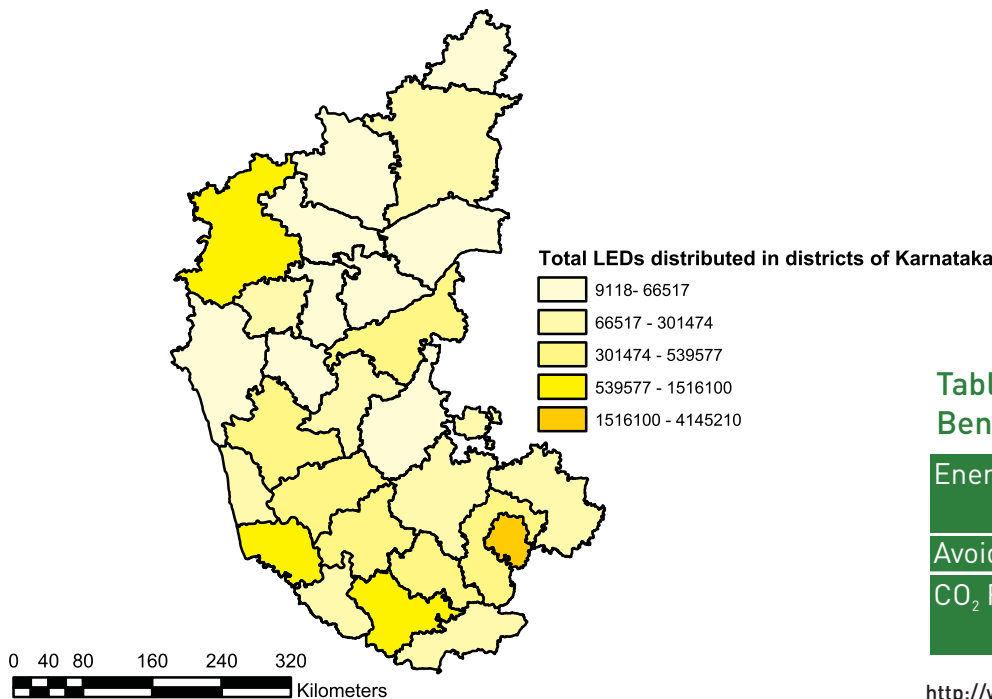


Table 13: UJALA Scheme Benefits – Karnataka

Energy Saved per year	1762781 MWh
Avoided peak demand	353 MW
CO ₂ Reduction per year	1427852 t of CO ₂

Source:

<http://www.ujala.gov.in/state-dashboard/karnataka>

Map 3: Total LEDs distributed in Karnataka

Energy Profile Tamil Nadu

Tamil Nadu state ranks third in Electricity generation capacity in the country. The total electricity capacity by the end of October 2016 was 26,660 MW with thermal power at about 13,313 MW. Nuclear 986.5 MW and hydro about 2,182 MW are the other conventional technology sources. The state is in the forefront of harnessing the new and renewable energy sources with installed capacity of 10117.9 MW, largely consisting of wind power.

Table 14: Source wise breakup of energy generation – Tamil Nadu

		Coal	Gas	Diesel	Total	Nuclear	Hydro	RES	Grand Total
		In MW	In MW	In MW	In MW	In MW	In MW	In MW	In MW
Tamil Nadu	state	4770	524.08		5294.08		2182.2	122.7	7598.98
	private	2950	503.1	411.66	3864.76			9995.2	13859.96
	central	4155.1			4155.1	986.5			5141.6
	sub total	11875.1	1027.18	411.66	13313.94	986.5	2182.2	10117.9	26600.54

The Tamil Nadu's per capita consumption has reached 1,232 kWh, which is higher than the national average. Approximately one-third of the total energy comes from renewable sources such as wind, solar and hydro.

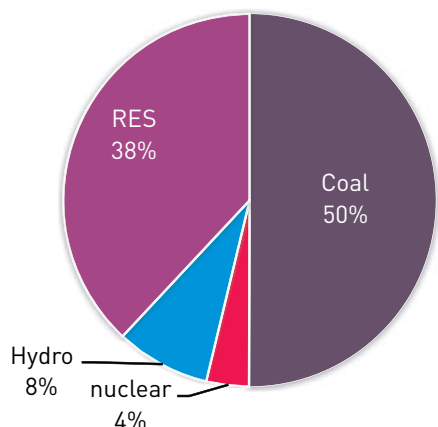


Table 15: Energy Statistics – Tamil Nadu

Per capita energy consumption	1232 Kwh
Number of Consumers	2.23 crores
Peak Energy Demand	18,994 MW
	2013-14
Energy Deficit	5.9% in 2013-14

Figure 5: Energy generation profile – Tamil Nadu

Tamil Nadu ranks highest in harnessing wind energy in the country. Joint Electricity Regulatory Commission (JERC)/State Electricity Regulatory Commissions (SERC) of Tamil Nadu has notified regulations/tariff order for grid connected solar rooftop projects. The state is also taking measures to improve energy efficiency. Although the National Ujala scheme has been launched in the state, it is currently not directly open to consumers. The scheme is currently being implemented by Indian Railways in Tamil Nadu.

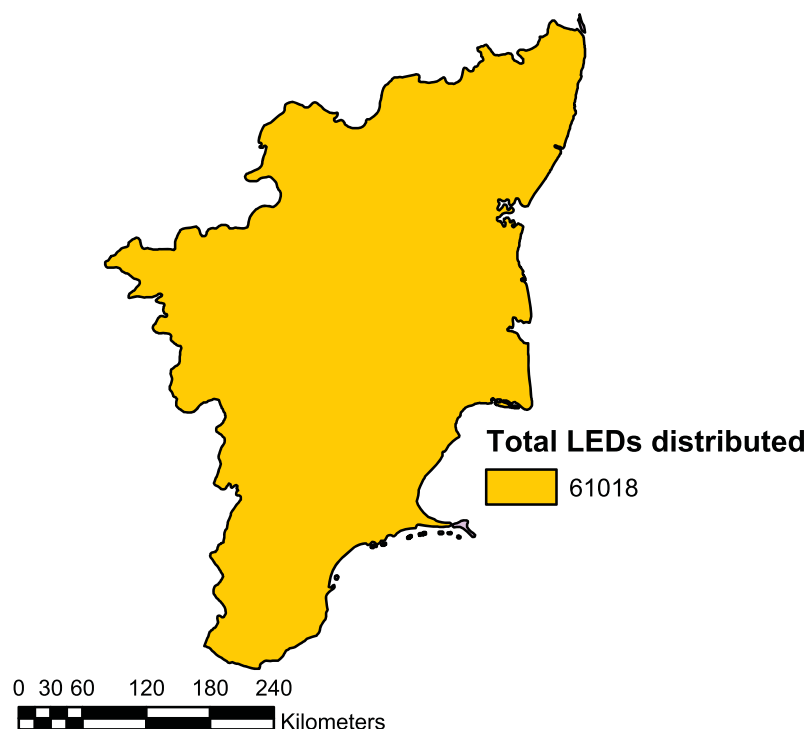


Table 16: UJALA Scheme Benefits – Tamil Nadu

Energy Saved per year	7924 MWh
Avoided peak demand	2 MW
CO ₂ Reduction per year	6419 t of CO ₂

Source:
<http://www.ujala.gov.in/state-dashboard/tamil-nadu>

Map 4: Total LEDs distributed in Tamil Nadu

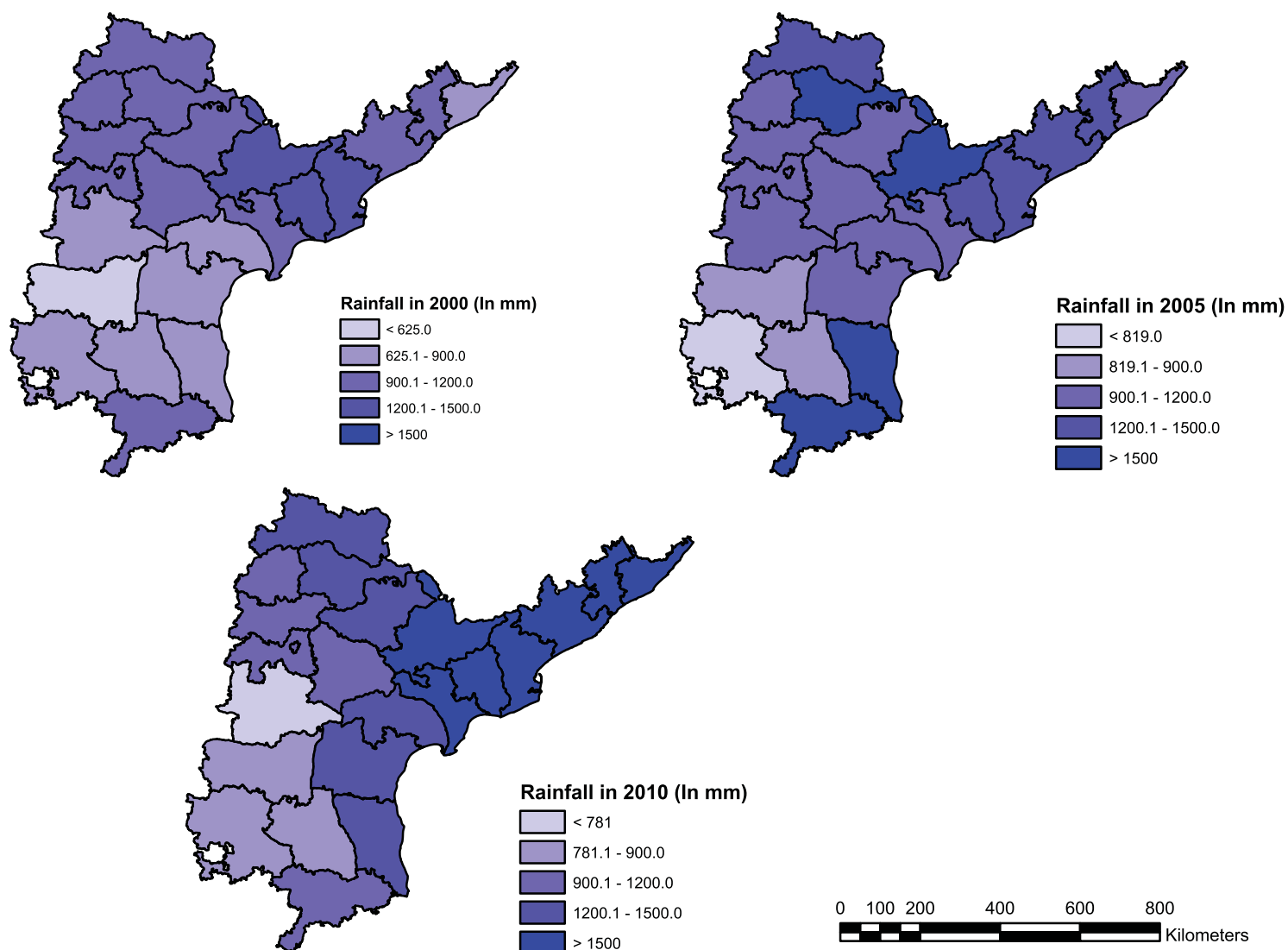
Vulnerability Profile

The vulnerability profile of the states being studied in this report looks more closely at the possible impacts of Climate Change on the state focusing on the rainfall patterns as well as variations from the mean precipitation levels. In addition, we also highlight other parameters such as occurrence of natural disasters like drought, cyclones etc. Ground water availability is also a key area of concern related to potential vulnerability for states due to inadequate groundwater replenishment and high extraction.

Andhra Pradesh Vulnerability Profile

Rainfall Pattern

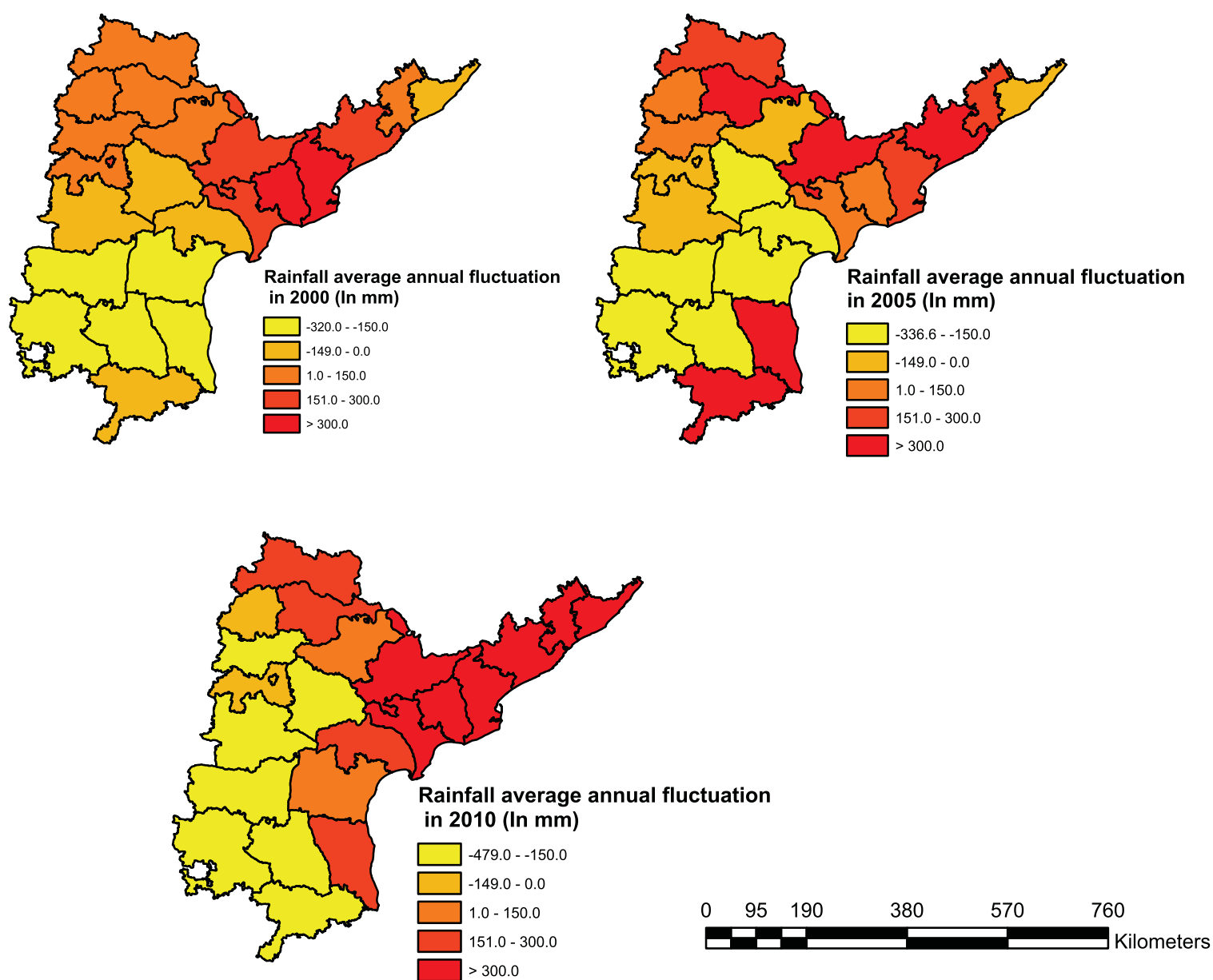
The rainfall pattern for Andhra Pradesh between 2000 to 2010 (see map below) shows that the coastal districts receive a relatively higher amount of precipitation, which has consistently been increasing over the years whereas for some southern districts the rainfall has been oscillating (high in 2005 but low in 2000 and 2010). The year 2005 marks a larger amount of rainfall in Northern part as well along with the Central Telangana region as opposed to rainfall received in 2000 and 2010. The northern coastal region especially has been consistently receiving increased rainfall over the 2000-10 decade.



Map 5: Rainfall Pattern of Andhra Pradesh

Rainfall Variation

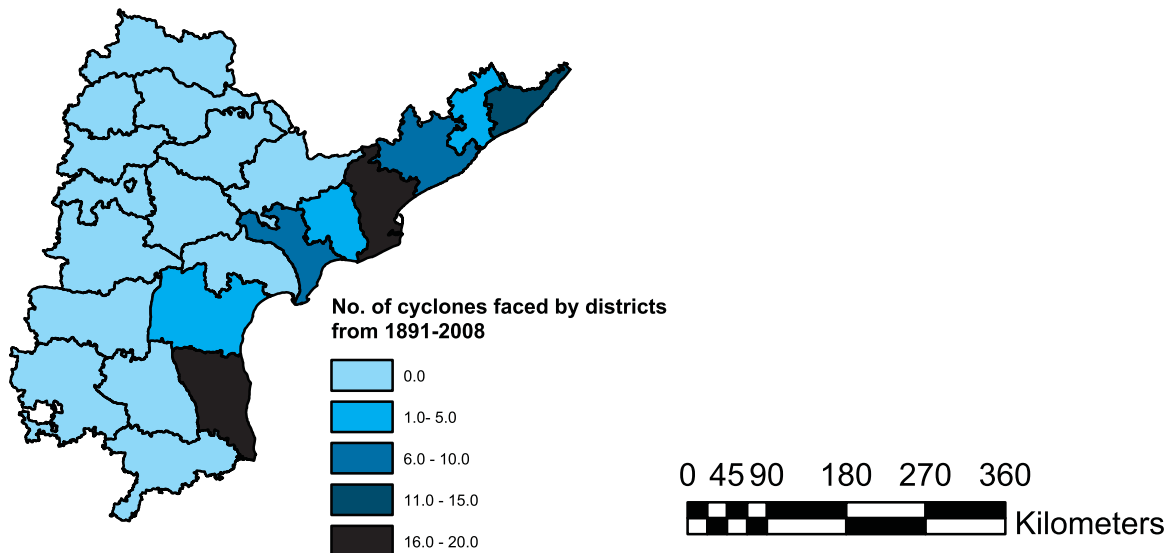
The fluctuation in rainfall, i.e., variation from the mean (see map below) shows a varied pattern of inconsistencies within districts. The high-altitude, inland, districts have received a considerable amount of rainfall above the mean in the year 2010 as opposed to 2000 and 2005 and thus, there is a high variation. Most of the southern districts have received lower precipitation than the mean except the two districts namely, Nellore and Chittoor that received a higher than the mean precipitation in the year 2005. Given the state average of 945.1 mm in the year 2000, 2 of the districts are above the state average and lie within the maximum deviation category (greater than 300 mm fluctuation), while 5 districts are well below the state average (higher than -150 mm fluctuation from the average). In the year 2005, the 6 districts were above the state average precipitation of 1156.3 mm and 6 districts were in the highest negative variation category. Data for the year 2010 depicts that 8 districts (including all coastal districts) received rainfall much higher than the state average of 1260.3 mm, while 7 districts received precipitation well below the state average. Over the 2000-10 decade 3 districts namely, Anantapur, Kuddapah and Kurnool have consistently been in the lowest rainfall category (higher than -150 mm variation from state average), thus, making their ecosystems vulnerable to negative impacts.



Map 6: Rainfall Variation in districts of Andhra Pradesh

Cyclone

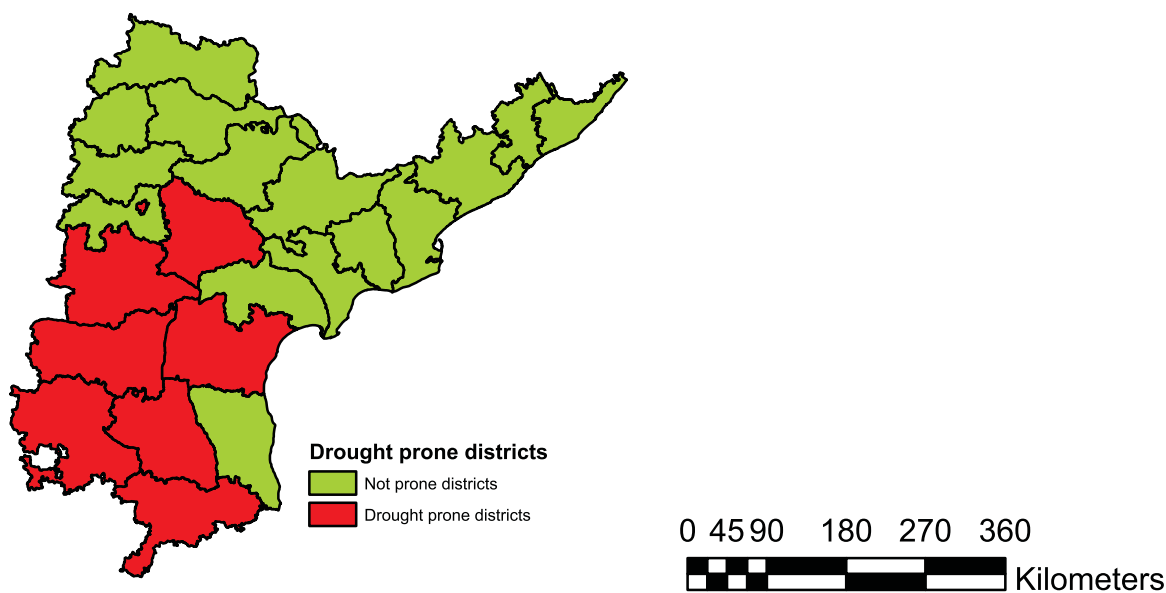
On account of the existing geology and climate of the state, it is exposed to a variety of disasters such as cyclones, storms, floods as well as droughts. In fact, the entire east coastline of Tamil Nadu, Andhra Pradesh, Odisha and West Bengal is prone to cyclone hazards. The cyclone prone districts have been identified and constructed through ArcGIS. Majority of the districts situated on the coast have faced cyclones in the past years, among which the two districts of East Godavari and Nellore have been affected by cyclones about 17-18 times. Severe cyclones have caused much value destruction in the state over the years, amounting to a maximum of Rs. 7,173 crores during Oct-Nov 2006 (NIDM).



Map 7: Cyclone affected districts of Andhra Pradesh

Drought

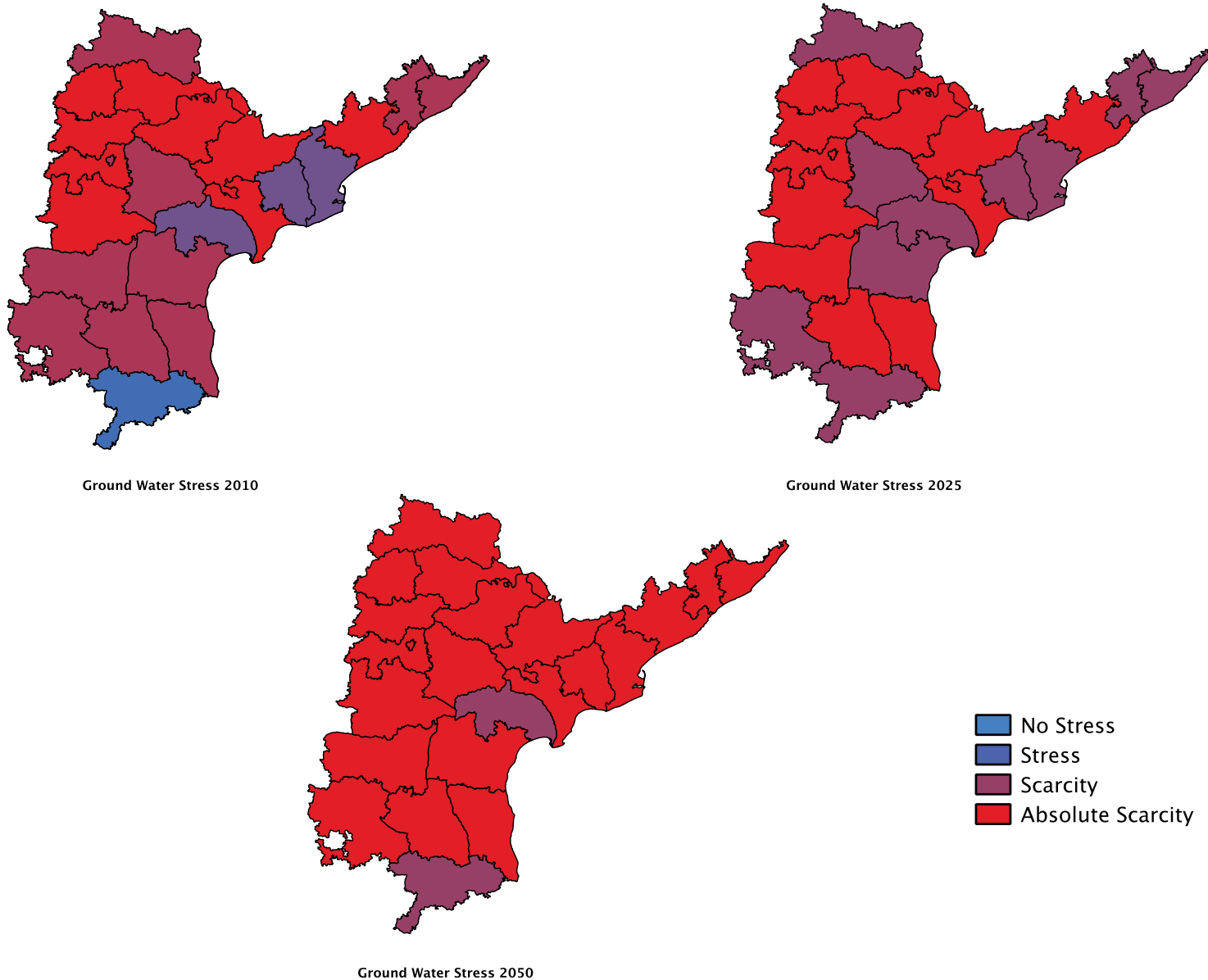
The drought prone areas have been identified and constructed through ArcGIS. Andhra Pradesh had about 35% of its districts that were prone to droughts and are situated towards the southern and central part of the state.



Map 8: Drought Prone districts in Andhra Pradesh

Groundwater

The groundwater stress has been depicted in the map below which indicates that even those districts that were categorized under “no stress” in 2010, could approach absolute water scarcity and hence, experience extreme groundwater stress levels, according to the 2050 projections by CGWB. In the year 2010, 9 districts out of a total of 23 were identified as absolutely scarce. However, according to the 2050 projections, almost all the districts except, Chittoor and Guntur, have been predicted to be under absolute groundwater stress, especially all the coastal districts of Andhra Pradesh.



Map 9: Groundwater Stress in Andhra Pradesh

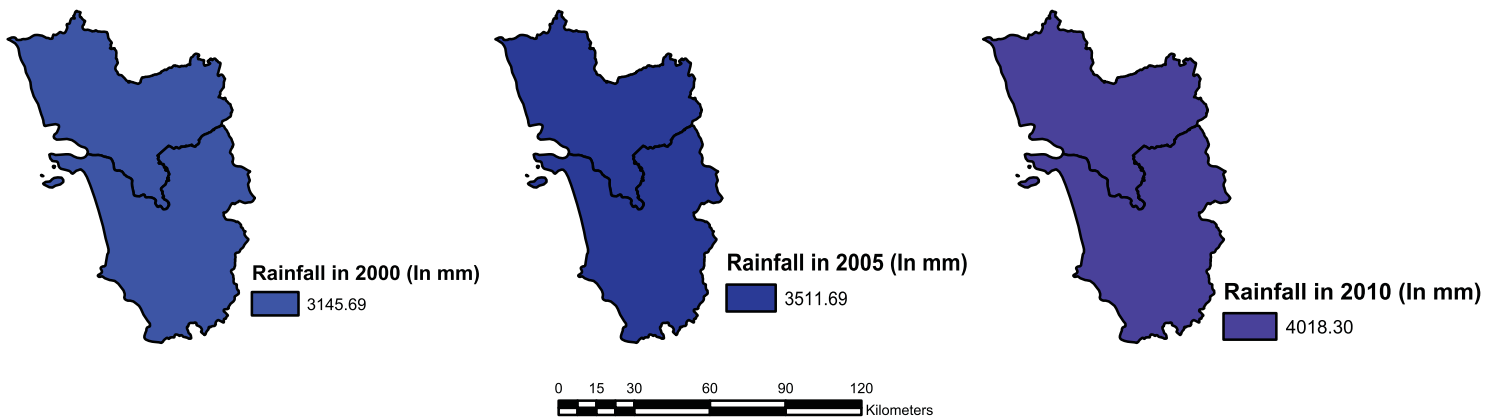
Impact and Vulnerabilities

Owing to the variable rainfall patterns, as well as vulnerability to natural disasters described above, Andhra Pradesh could be characterized as being a state that is highly vulnerable to climate change. Rainfall variability has serious implications for agriculture and water. Cyclones threaten the coastal zones given their sensitive ecosystem. Further, cyclones would also have a negative impact on the infrastructure of the state, along with the risk of loss of human life and damage to movable and immovable assets of the people. Droughts directly affect the agricultural production of a state, with a corresponding negative impact on the livelihoods of the bulk of the population, along with, a negative impact on general human development of the state and its people.

Goa Vulnerability Profile

Rainfall pattern

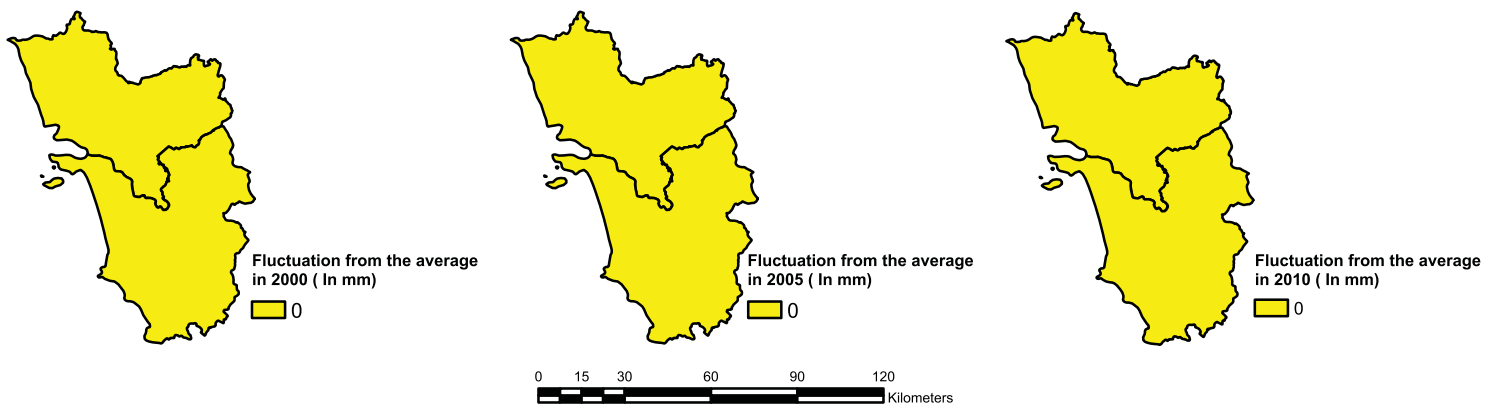
The State receives good rainfall on an average of 2500 mm annually during June to September. The map below shows that there has been a gradual increase in the annual average rainfall from the year 2000 to 2010.



Map 10: Rainfall Pattern of Goa

Rainfall Variation

Although there is no major variation between the average and actual rainfall received by the state, we can see a gradual increase in the rainfall pattern in both the districts.



Map 11: Rainfall Variation in districts of Goa

Cyclones

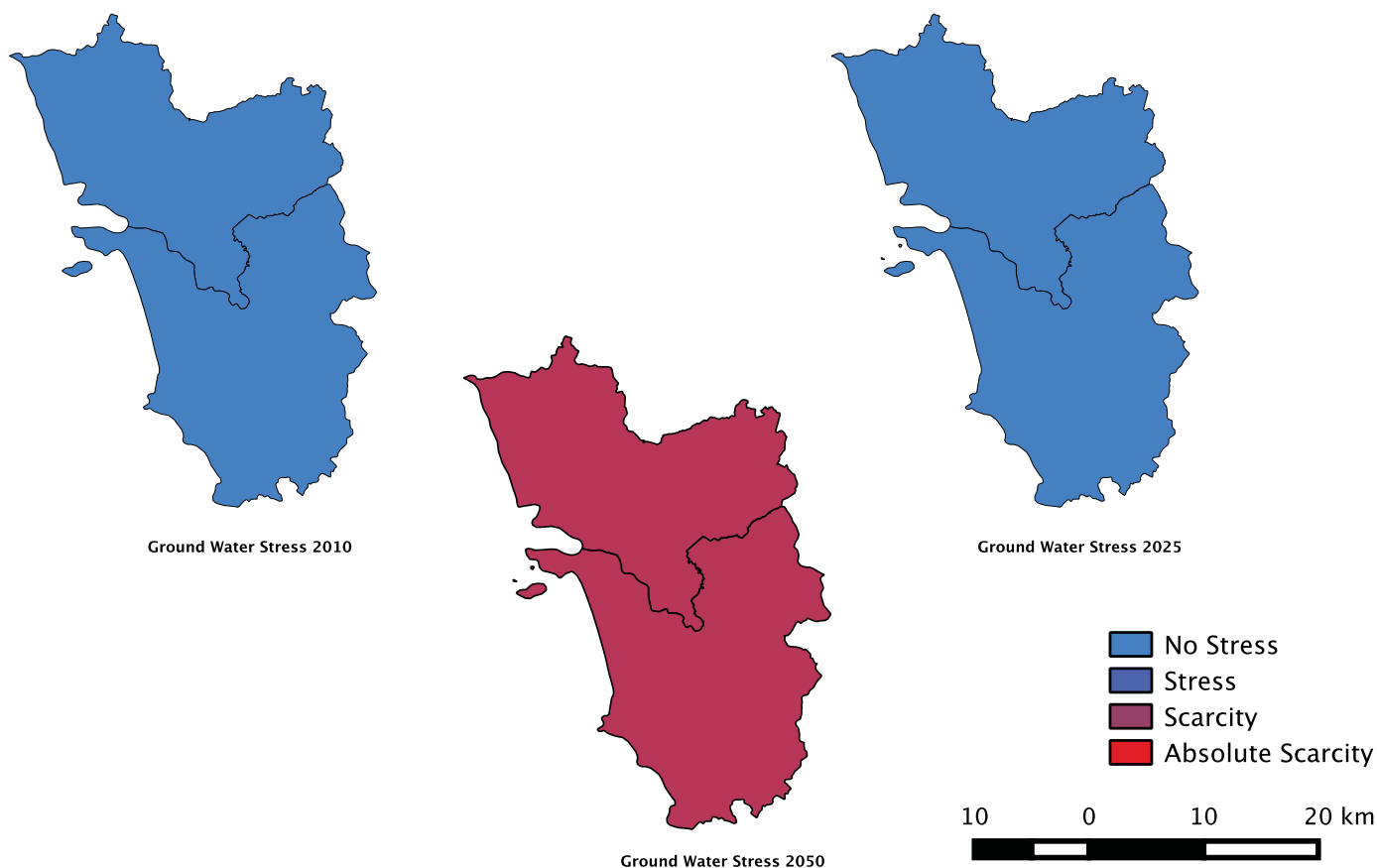
Goa is not categorized as a cyclone prone state. However, when Cyclone Phyllin hit the west coast of India and parts of Goa, approximately 10 people were killed and more than 50 were declared missing. The major loss recorded was to the crops and property during the Cyclone.

Droughts

Goa state has historically never faced drought and hence, is not categorized as vulnerable to impacts of Droughts.

Groundwater

The net ground water utilization in Goa is 33%. Based on the net annual ground water availability data, CGWB has categorized the districts for ground water stress as in the map below. The central ground water board predicts that both districts in Goa have no ground water scarcity in 2010 and 2025. However, the increasing climatic stressors and anthropogenic pressures on ground water will lead to water scarcity in Goa by 2050.



Map 12: Groundwater Stress in Goa

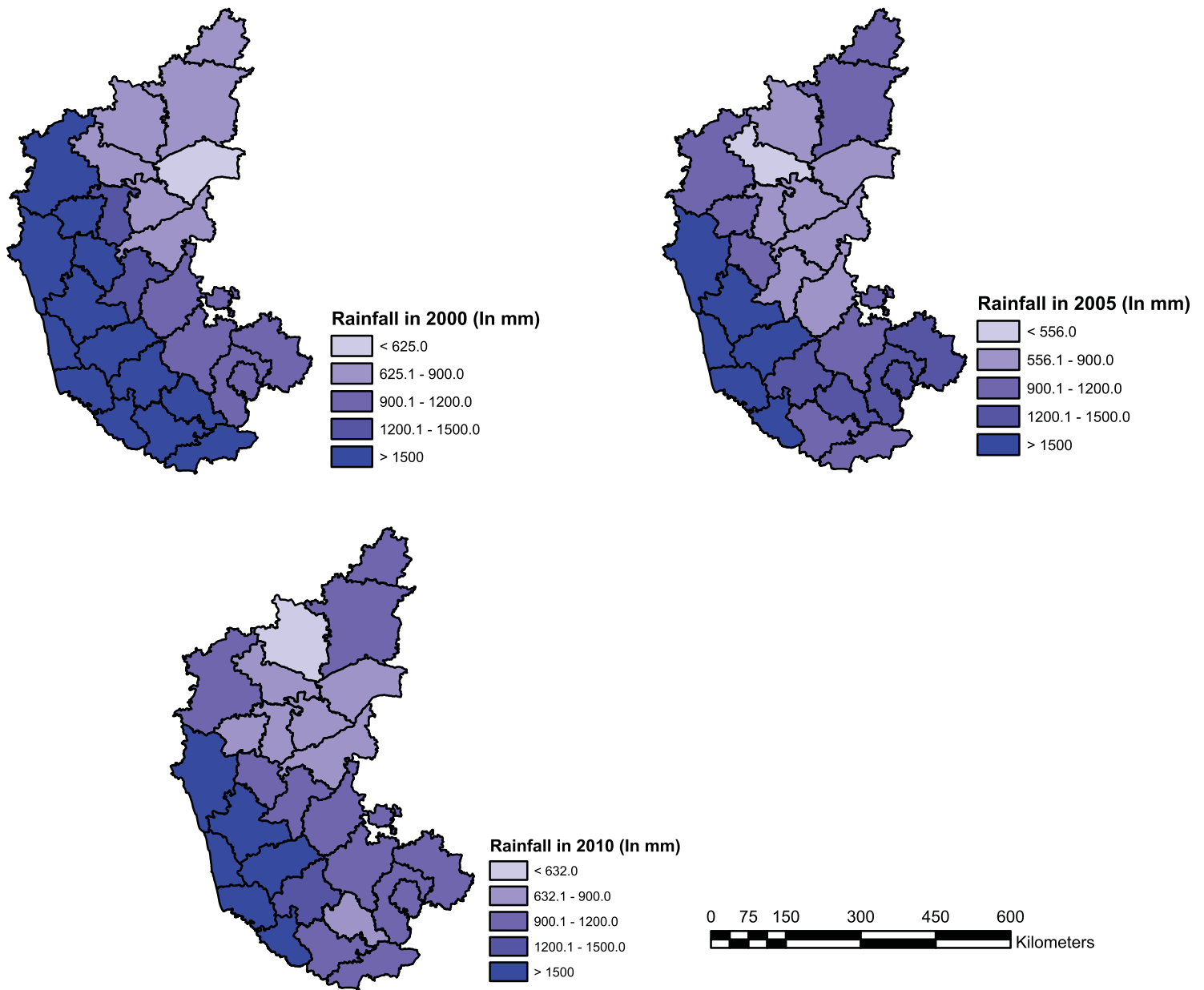
Impacts

The changing rainfall pattern has led to incidences of water logging in quite a few places. In recent years, some areas have become prone to such seasonal water logging, for example, in 2000 at Bicholim, in 2005 at Mala, Panaji and Bicholim and in 2007 also in Bicholim. These episodes caused damage to assets of the people. In general, however, owing to the comparatively smaller proportion of the people directly engaged in agriculture, as well as due to not being cyclone or flood prone or prone to rainfall variations, Goa is relatively less vulnerable to negative impacts of climate change

Karnataka Vulnerability Profile

Rainfall Pattern

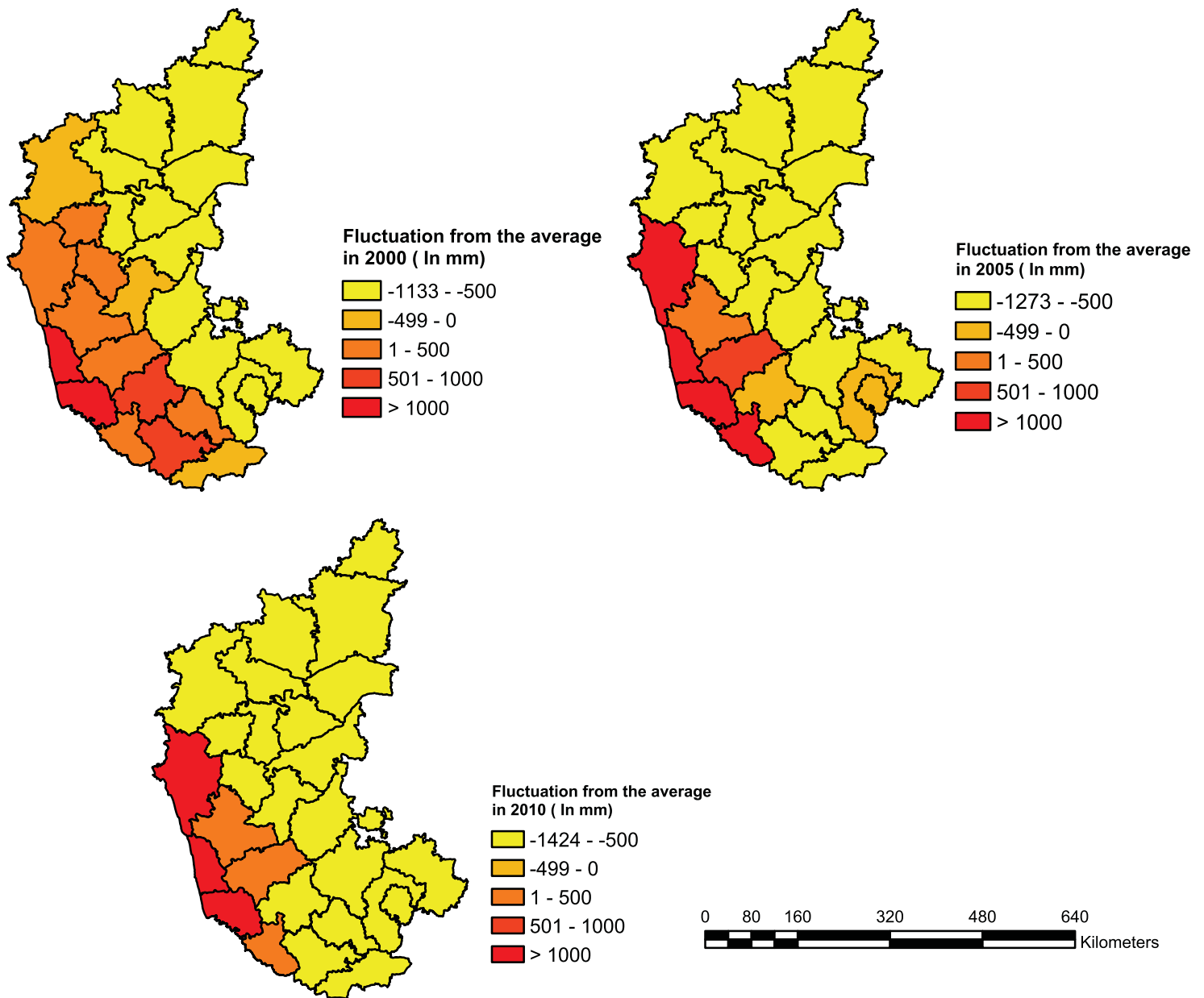
The annual rainfall in Karnataka varies from about 50 to 350 cm. The pattern over the 2000-2010 decade can be observed in the graph below. The rainfall pattern depicts lowering levels of precipitation for districts located on the northern and eastern part of the state. While some non-coastal districts have experienced significant fluctuations over the years, all three coastal districts receive plentiful precipitation, as is visible from the graph as well.



Map 13: Rainfall Pattern of Karnataka

Rainfall Variation

The fluctuation in rainfall, i.e., variation from the mean (see map below) shows a varied pattern of inconsistencies within districts. Some of the western districts, especially the coastal ones have received a considerable amount of rainfall above the mean in the decade 2000-2010. Overall, the coverage of high precipitation is falling as there is an increasing number of districts that experience rainfall much below the state average in 2010. Given the state average of 1759.1mm in the year 2000, 2 of the districts are above the state average and lie within the maximum deviation category (greater than 1000 mm fluctuation), while 13 districts are well below the state average (higher than -500 mm fluctuation from the average). In the year 2005, the 5 districts have been above state average of 1829.3 mm and 18 districts have been in the highest negative fluctuation category. Data for the year 2010 depicts that 3 districts (all coastal districts) have been receiving rainfall much higher than the state average of 2057.8 mm, while 21 districts lie well below the state average. Over the 2000-10 decade 4 districts namely, Bangalore, Bellary, Raichur and Gulbarga have consistently been in the lowest category (higher than -500 mm fluctuation from state average), thus making their ecosystem vulnerable to climate change impacts.



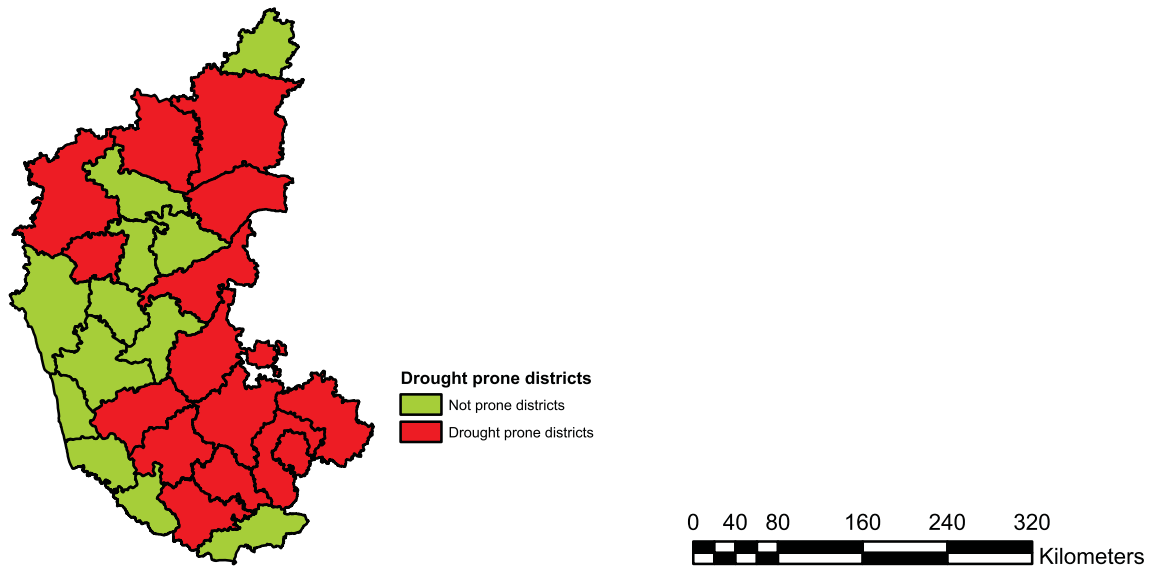
Map 14: Rainfall Variation in districts of Karnataka

Cyclone

In general Karnataka is not categorized as being vulnerable to cyclones. However, it was affected by Cyclone Phyllin, which had an impact on the western coast of India.

Drought

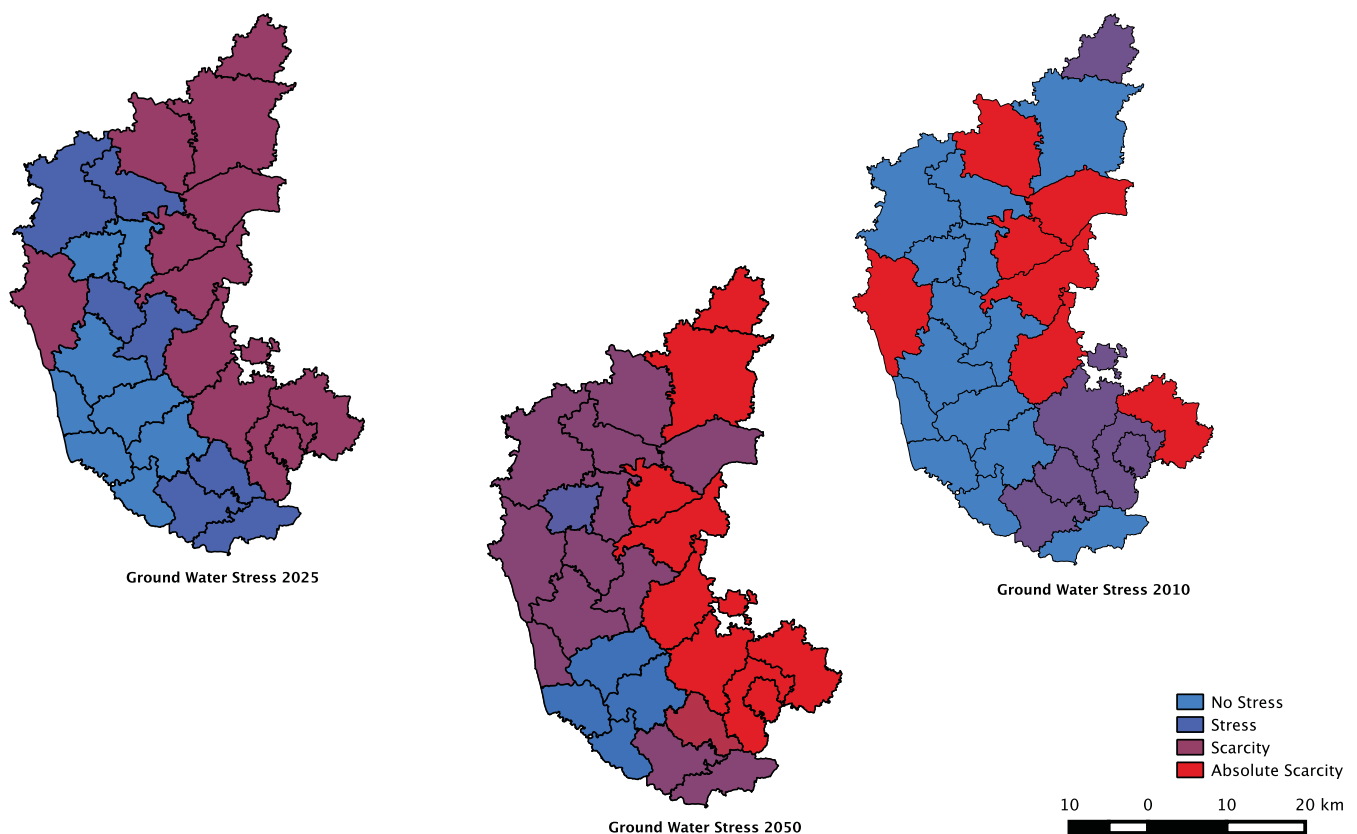
The drought prone areas have been identified and constructed through ArcGIS (see map below). The state is severely affected by droughts in almost 55.5% (15 out of a total of 27) of the districts as shown in the map below (NIDM). Given the potential risk to crop production, especially in the non-coastal districts, droughts are a serious climate change related risk to Karnataka.



Map 15: Drought Prone districts in Karnataka

Groundwater

Since water resources are an important source for irrigation for the agricultural sector in Karnataka, it is important to recognize various threats they face. In spite of the fact that net and gross area irrigated has increased overtime, the net annual groundwater availability has fallen between 2004 to 2009 due to lack of replenishment as well as increased anthropogenic pressure of resource extraction. The ground water stress level and its projections have been depicted in the map below. It clearly shows a rise in water scarcity and stress in almost all of the districts by the year 2050. In the year 2010, 7 districts out of a total of 27 were identified as absolutely scarce. However, according to the 2050 projections, almost all the districts have been predicted to be under at least scarcity in terms of groundwater, especially the coastal districts, whereas the eastern districts have been consistently identified under absolute stress in 2025 and 2050 projections.



Map 16: Groundwater Stress in Karnataka

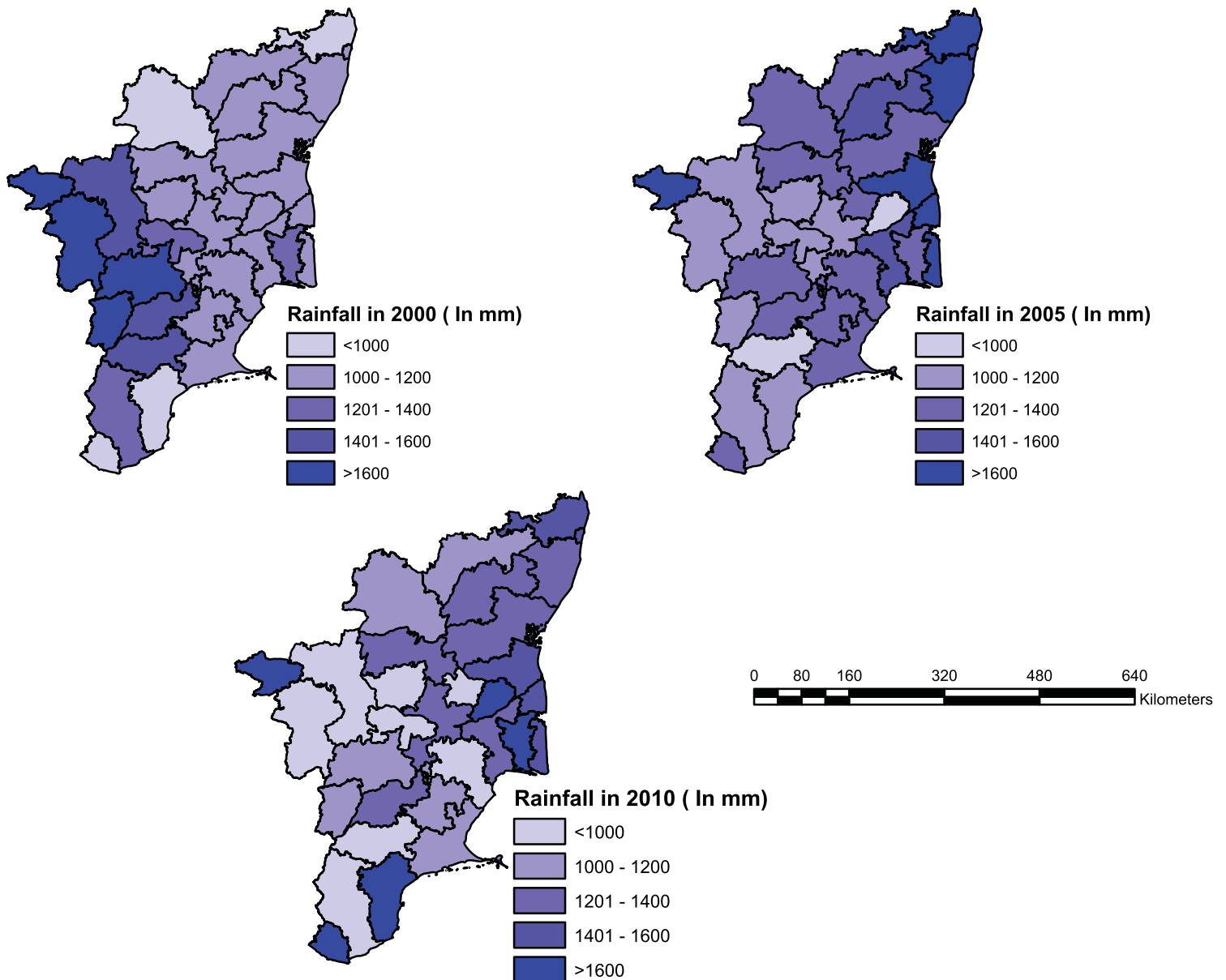
Impacts

Owing to the risk from the natural phenomenon described above, Karnataka could be categorized as being highly vulnerable to climate change. Negative rainfall variation poses implications for various sectors such as the agriculture and water. Further, changes in net annual groundwater availability impact the agricultural sector of the state as it derives 45% of the irrigation from groundwater resources (SAPCC). In addition, fresh water reserves including surface water as well as ground water aquifers are prone to alteration owing to fluctuation in rainfall, which could be further aggravated by droughts.

Tamil Nadu Vulnerability Profile

Rainfall pattern

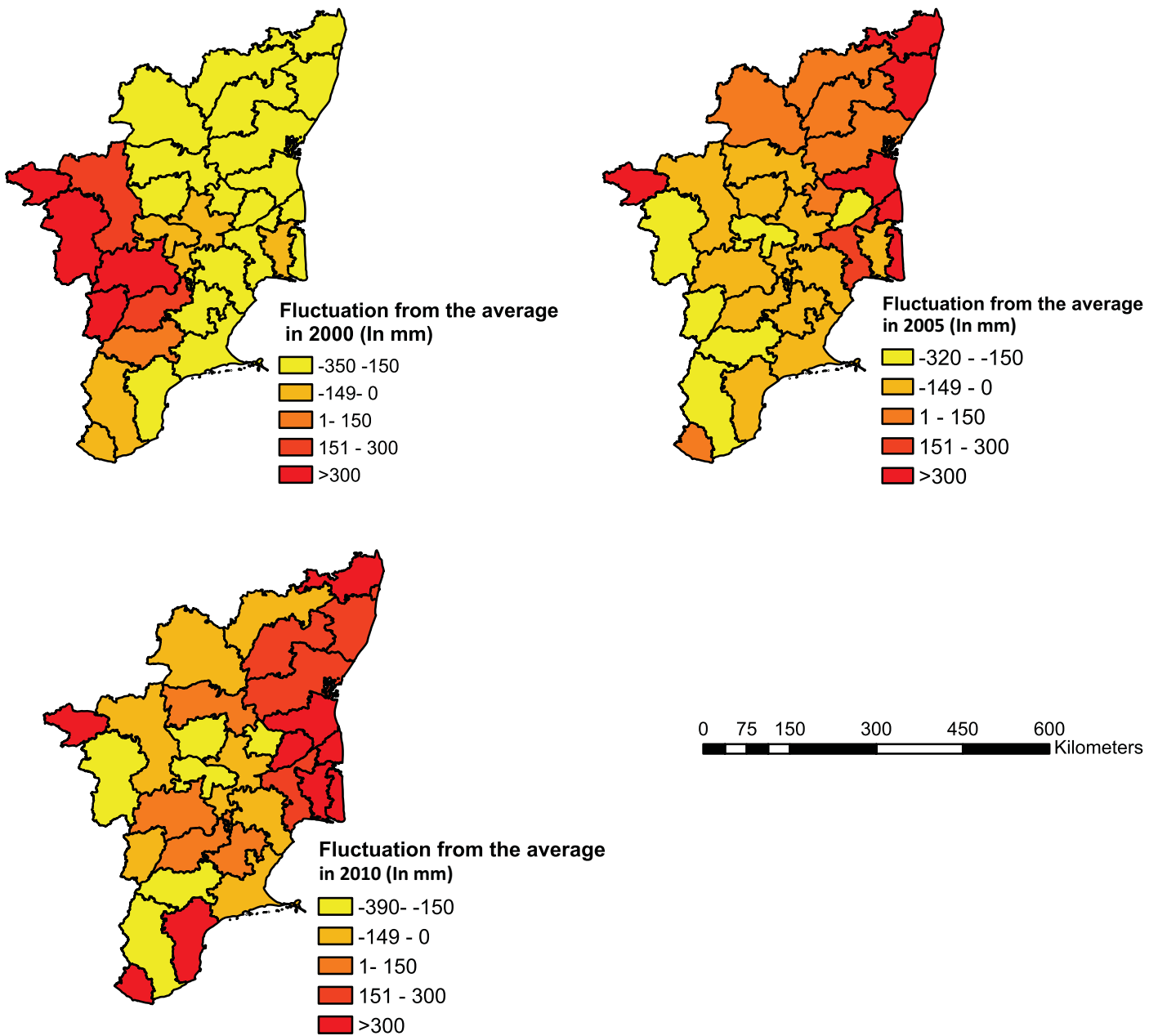
The average annual rainfall received by state is 1122 mm. 50 % of total annual average rainfall falling in state, is through northeast monsoon (SAPCC). The trend shows that there has been a decrease in rainfall over the period of 2000 to 2010.



Map 17: Rainfall Pattern of Tamil Nadu

Rainfall Variation

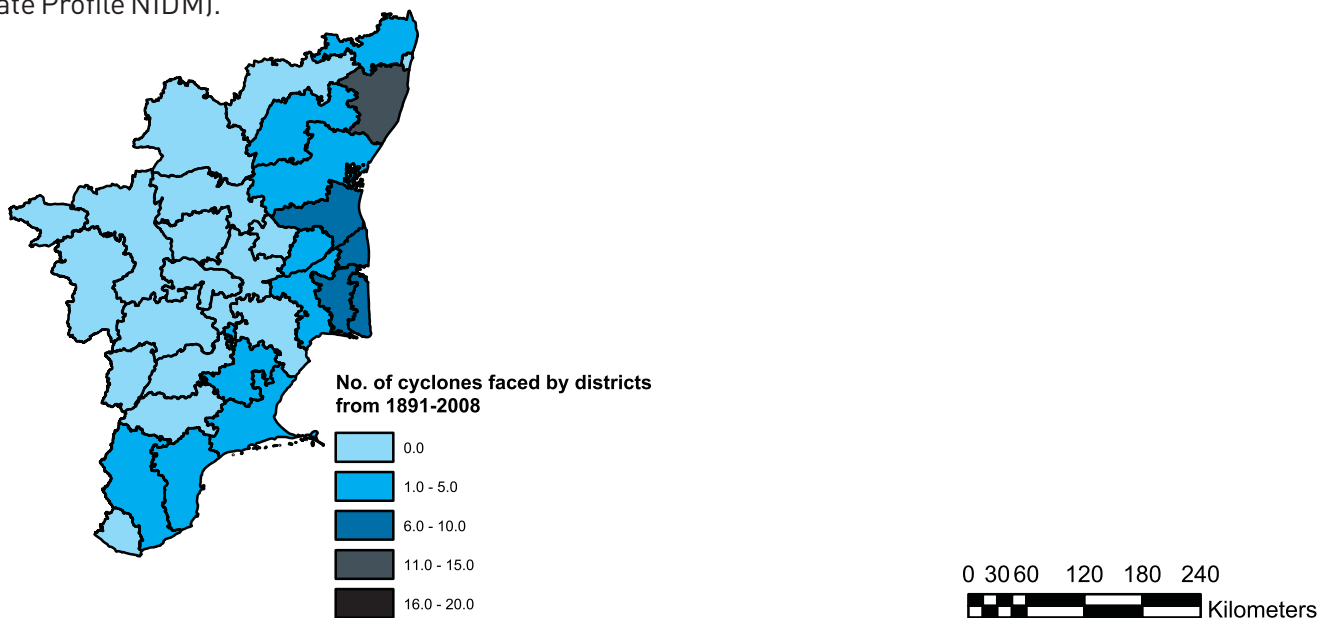
The map below shows fluctuation in rainfall from the state's mean precipitation levels. The overall trend shows a decreasing pattern with irregularities within districts. In the year 2000, five western districts had much higher rainfall than normal, falling within the maximum deviation (greater than 1000 mm fluctuation) category than the state average rainfall of 1282.4mm. In 2005, only four coastal districts had a higher precipitation from the state average of 1314mm. In 2010, the districts of Nilgiris, Cuddalore, Kanniya Kumari, Nagapattinam and Thiruvavarur received heavier rainfall as compared to state average of 1122 mm. Although the number of districts that experience rainfall higher than state average is increasing there is a decrease in the total annual rainfall in the state. From variation below state average in the year 2000 there is rainfall variation higher than state average in 2005 and 2010 along most of the coastal districts, such as Cuddalore, Kanniya Kumari, Nagapattinam and Thiruvavarur.



Map 18: Rainfall Variation in districts of Tamil Nadu

Cyclone

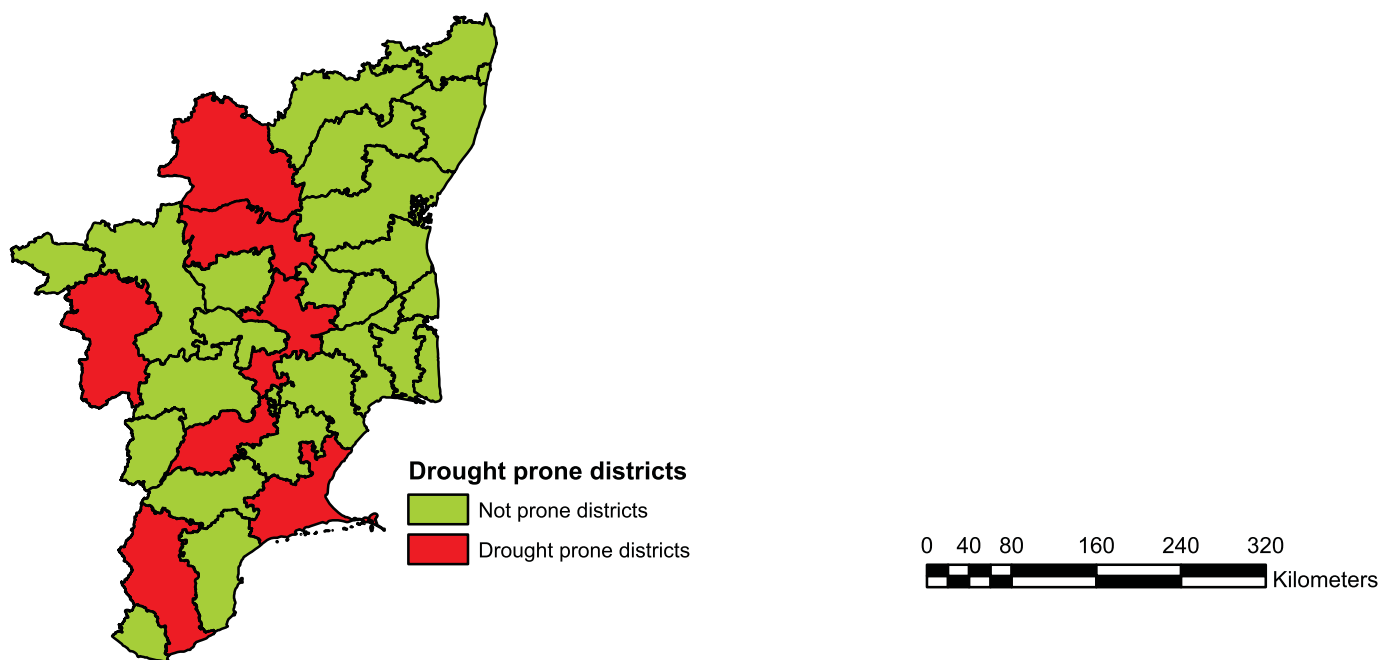
Coastal areas of Tamil Nadu are very prone to cyclones that originate in Bay of Bengal. These cyclones cause heavy rainfall and furious wind in coastal region of Tamil Nadu. Total 32 cyclonic storms hit the coast of Tamil Nadu from 1891 to 2006 of which 30 were severe cyclonic storms. Most of the cyclones in the state occurs during monsoon months from May to November. The frequency of cyclones faced by Kancheepuram and Nagapattinam districts is 13 and 10 times respectively from 1891-2008 and are most vulnerable to cyclones (State Profile NIDM).



Map 19: Cyclone affected districts of Tamil Nadu

Drought

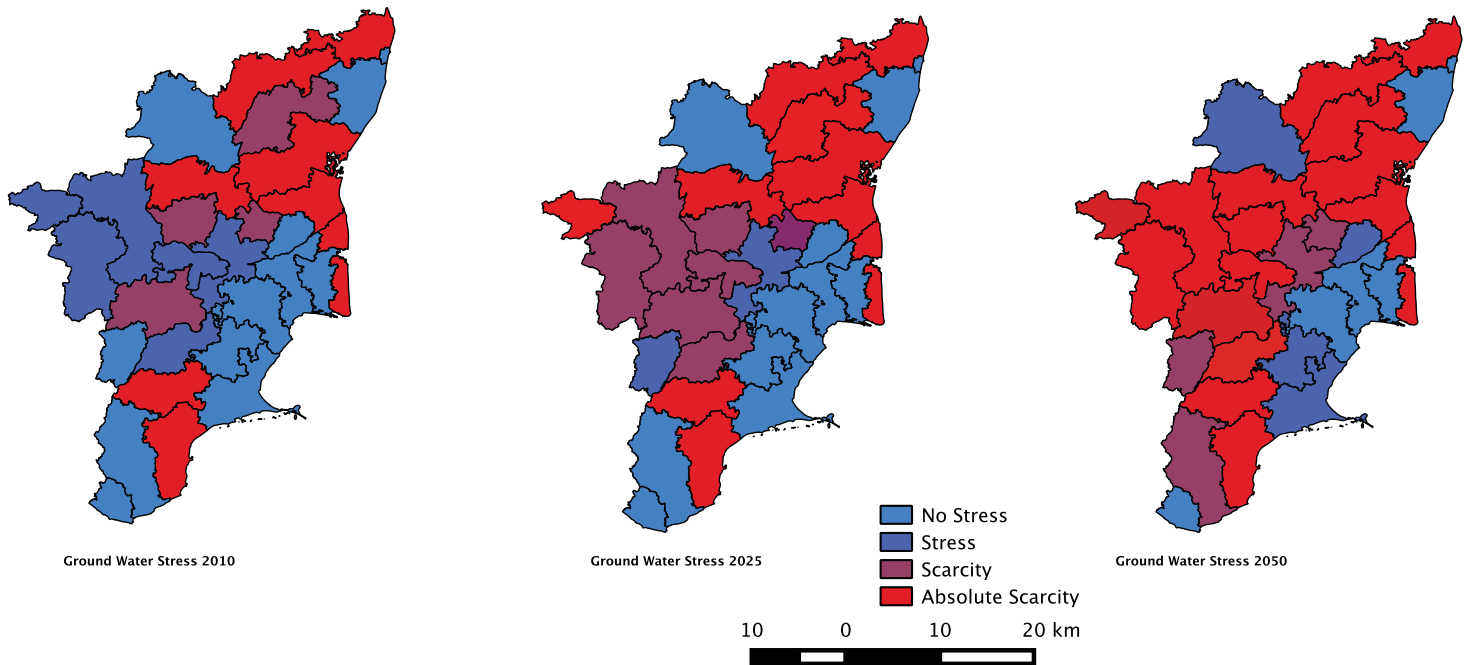
Seven districts of Tamil Nadu are severely drought prone. These seven districts are Dharmapuri, Salem, Tiruchirappalli, Madurai, Coimbatore, Tirunelveli and Ramanathapuram.



Map 20: Drought Prone districts in Tamil Nadu

Groundwater

Net annual ground water availability of Tamil Nadu is 20,649 MCM and annual ground water potential is 22,943 MCM (SAPCC). The map for ground water stress in districts of Tamil Nadu is placed below. In the year 2010, only nine districts were under “absolute scarcity” and 13 districts were classified under “not stress”. However, the 2050 predicted water availability shows, 16 districts will have “absolute scarcity” of ground water. In 2025, Tiruvannamalai, Namakkal, Perambalur and Dindigul districts are predicted to have water scarcity but by 2050 these districts may go dry with absolute water scarcity.



Map 21: Groundwater Stress in Tamil Nadu

Impacts

Tamil Nadu, too, is a state with heavy variations of rainfall as well as prone to droughts and cyclones. Further, most of these weather phenomenon will have a negative impact on the agriculture and water sectors, thus creating vulnerabilities in the vast majority of the population in the state.

Status of State Vulnerabilities

The vulnerability analysis of the 4 states that we have focused on shows that only Goa, among all the four states is relatively less vulnerable to impacts of climate change owing to the structure of its economy as well as its employment pattern as also the lack of any directly discernible impacts of climate change on its natural resources. The rest of the states, viz. Andhra Pradesh, Karnataka and Tamil Nadu are all highly vulnerable to the unfolding impacts of climate change.

Gap analysis and State of Preparedness

Based on the IPCC, NCE and SAPCC recommendations, in this section we highlight the state of preparedness of six major sectors which are Climate Resilient Agriculture, Climate resilient Ecosystem, Social adaptation, Climate Resilient Infrastructure, Energy and Sustainable smart cities that were identified as priority sectors in the state action plans of all four states.

Andhra Pradesh

Climate Resilient Agriculture

In agriculture sector 37% of the total recommendations are addressed with budgetary allocation; recommendations such as Efficient irrigation and water saving technologies, promoting energy efficiency in water pumps are addressed with state funding though governments initiative to replace one lakh agricultural pumps with energy efficient ones. Another 13% recommendation are taken cognizance of through various state and national policies measures but not supported through budgetary allocations. The larger governance issues in the sector such as regarding reallocating spending from low-yielding subsidies larger public support to farmers etc are not addressed by the state. Overall 50% of the recommendations are completely not addressed.

Figure 6: Recommendation addressed through Climate Resilient Agriculture in Andhra Pradesh

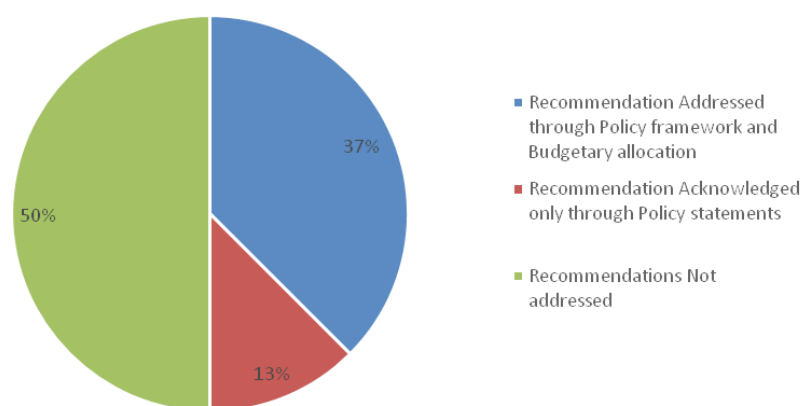


Table 17: Policy advice from IPCC and NCE for Climate resilient Agriculture addressed in Andhra Pradesh

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
Sustainable agriculture and forestry have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Agriculture and Ecosystem			Andhra Pradesh Community Forest Management Project		
			National Mission on Sustainable Agriculture under National Action Plan on Climate Change			

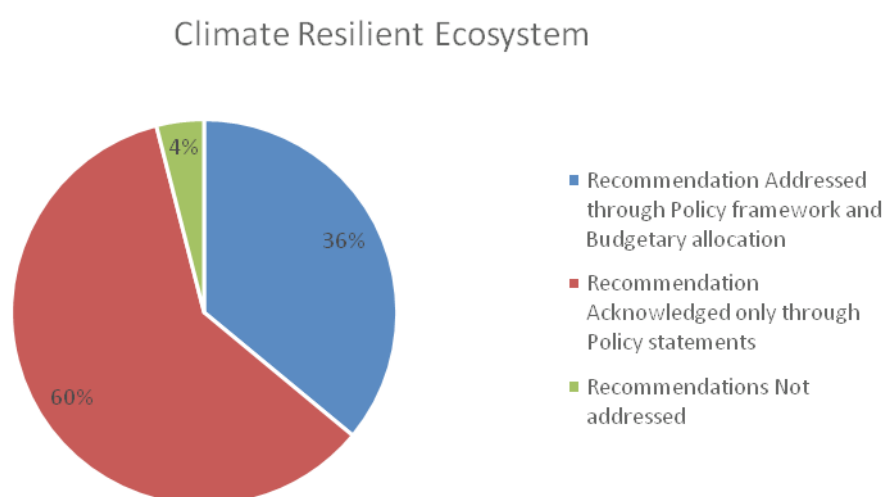
Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
<p>Changed cropping pattern, livestock and aquaculture practices are some adaptation options that can be used to conserve the ecosystem as well as better livelihood. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</p>	Climate Resilient Agriculture	Extension work for change of cropping timings and patterns, efficiency of water use, weather advisories to farmers, information on market prices etc. (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Agriculture Action Plan (2015-16)		Yes
			National Initiative on Climate Resilient Agriculture	Comprehensive drought proofing activities and measures for dry-spell mitigation in dry fed areas through programmes like <i>Panta Sanjeevani Rainguns</i>		
			Development of Inland Fisheries and Aquaculture Scheme	Registration of Fresh Water Aquaculture		
				Mechanization of Aquaculture		
			Registration of Coastal Aquaculture			
Using new crops and animal varieties as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Agriculture	Dissemination of resilient crop variety (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Agriculture Action Plan (2015-16)		Yes
Cropland management, grazing land management and restoration of organic soils are important mitigation options for the agriculture sector. (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR)	Climate Resilient Agriculture		National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Agriculture Action Plan (2015-16)		Yes
Adaptation strategies like changes in planting dates and crop varieties can offset some of the negative impacts of smaller temperature increases. (Para 1, Pg. 10, 2.1, NCE SYR India Chapter)	Climate Resilient Agriculture	Extension work for change of cropping timings and patterns, efficiency of water use, weather advisories to farmers, information on market prices etc. (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Initiative on Climate Resilient Agriculture	Agriculture Action Plan (2015-16)		Yes
Use of new methods of cultivation (e.g. System of Rice Intensification (SRI)) can help reduce water usage and methane emissions while improving resilience. (Para 7, Pg. 33, 4.4, NCE SYR India Chapter)	Climate Resilient Agriculture		National Initiative on Climate Resilient Agriculture	Agriculture Action Plan (2015-16)		Yes

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
<p>Promoting energy efficient water pumps for better water management. <i>(Para 8, Pg. 33, 4.4, NCE SYR India Chapter)</i></p>	Climate Resilient Agriculture	Retrofitting existing pump sets for higher energy efficiency. (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Planning to replace one lakh agricultural pumps with energy efficient ones (Budget allocation-whole Energy Sector)		
			National Water Mission under National Action Plan on Climate Change	Smart Village-Smart Ward Programme which aims to achieve better infrastructure and better services in the village		
			Solar Pumping Programme for Irrigation and Drinking Water under Off Grid and Decentralized Solar applications scheme			
<p>Using micro-irrigation methods such as drip and sprinkler irrigation for better water management. <i>(Para 8, Pg. 33, 4.4, NCE SYR India Chapter)</i></p>	Climate Resilient Agriculture	Minor irrigation works and other engineering solutions to recharge groundwater aquifers. (Pg. 102, Table 18, Andhra Pradesh SAPCC)	National Water Mission under National Action Plan on Climate Change	<i>Andhra Pradesh Community Based Tank Management Project</i>		Yes
			National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Agriculture Action Plan (2015-16)		Yes
<p>Reallocating spending from low-yielding subsidies towards high yielding agriculture R&D can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)</i> <i>(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i></p>	Climate Resilient Agriculture	Research on Agriculture in CC context. <i>(Pg. 101, Table 17, Andhra Pradesh SAPCC)</i>				
<p>Reallocating spending from low-yielding subsidies towards education can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)</i> <i>(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i></p>	Climate Resilient Agriculture					

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
Reallocating spending from low-yielding subsidies towards extension services and rural infrastructure can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)</i> <i>(Para 4, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture					
Policy reforms to use modern agricultural technologies and practices. <i>(Para 2, Pg. 27, 4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture					
Improved public policy support in agriculture sector. <i>(Para 2, Pg. 30, 4.1, NCE SYR India Chapter)</i>	Climate Resilient Agriculture					
Compensating farmers by credible and tangible improvements in public service delivery and better infrastructure could solve the problem of agriculture subsidy reform to some extent. <i>(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture					

Climate Resilient Ecosystem

Figure 7: Recommendation addressed through Climate Resilient Ecosystem in Andhra Pradesh



The state SAPCC has forest and biodiversity and coastal zone management as separate sectors that need attention to address impacts of Climate Change. As per the IPCC recommendations the Climate resilient Ecosystem sector focuses on concerns of Forest and Biodiversity as well as coastal zone management issues. It is also important to note that this sector has both adaptation and mitigation oriented benefits. 60% of the state recommendations have been acknowledged through policy statements such as the state Forest policy

for provision of protected areas Afforestation and eco-development through community based programmes (JFM), and A.P Forest department's initiative for forest management and Eucalyptus clone plantations. The Coastal Zone Management concerns related to the natural disasters such as cyclone etc. have been addressed by Andhra Pradesh Hazard Mitigation Project and Andhra Pradesh Disaster Recovery Project. 15% of recommendations have been addressed through budgetary allocations to support policy priorities, such as funding for soil and water conservation neeru chetu programme 640crores, Andhra Pradesh Community Based Tank Management Project which has been allocated funding by the state. The remaining 4% were left unaddressed such as recommendations for, strong regulatory governance and project selection mechanisms, Payment for ecosystem services etc.

Table 18: Policy advice from IPCC and NCE for Climate resilient Ecosystem addressed in Andhra Pradesh

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
Limiting warming over the 21 st century to below 2 ^o C relative to pre-industrial level requires larger reliance on Carbon Dioxide Removal (CDR) (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change			
Sustainable agriculture and forestry have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Agriculture and Ecosystem			Andhra Pradesh Community Forest Management Project		
			National Mission on Sustainable Agriculture under National Action Plan on Climate Change			
Protection of Ecosystem for carbon storage has synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change	Andhra Pradesh Community Forest Management Project		Yes
			State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA)			
			National Mission on Sustaining Himalayan Ecosystem under National Action Plan on Climate Change			
Ecosystem adaptation can be done effectively by coastal afforestation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Restoration of mangroves	National Afforestation Programme	Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the East Godavari River Estuarine Ecosystem, Andhra Pradesh		

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
Ecosystem management adaptation is enhanced by watershed and reservoir management . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Soil and Water Conservation in forest lands (Pg. 103, Table 20, Andhra Pradesh SAPCC)	National Environment Policy, 2006	<i>Andhra Pradesh Community Based Tank Management Project</i>		Yes
			Integrated Watershed Management Programme	Neeru Chettu Programme		Yes
Adaptation in ecosystem management can be conducted by reducing other stressors on ecosystems and habitat fragmentation . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change			
Maintenance of genetic diversity can enhance the adaptive capacity of ecosystem. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Documentation of biodiversity (genetic fingerprinting) (Pg. 103, Table 20, Andhra Pradesh SAPCC)	National Mission on Sustaining Himalayan Ecosystem under National Action Plan on Climate Change			
			National Biodiversity Action Plan			
			National Environment Policy, 2006			
Manipulation of disturbance regimes can lead to better ecosystem management (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem					
Provision of protected areas can improvise adaptation in land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Protection and conservation of forests including fire protection (Pg. 103, Table 20, Andhra Pradesh SAPCC)	National Environment Policy, 2006		Andhra Pradesh Forest Policy	
Mangrove Conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Restoration of mangroves	National Mission for Green India under National Action Plan on Climate Change	Mainstreaming Coastal and Marine Biodiversity Conservation into Production Sectors in the East Godavari River Estuarine Ecosystem, Andhra Pradesh		
			National Conservation Strategy and Policy Statement on Environment and Development			
			National Afforestation Programme			
			National Environment Policy, 2006			

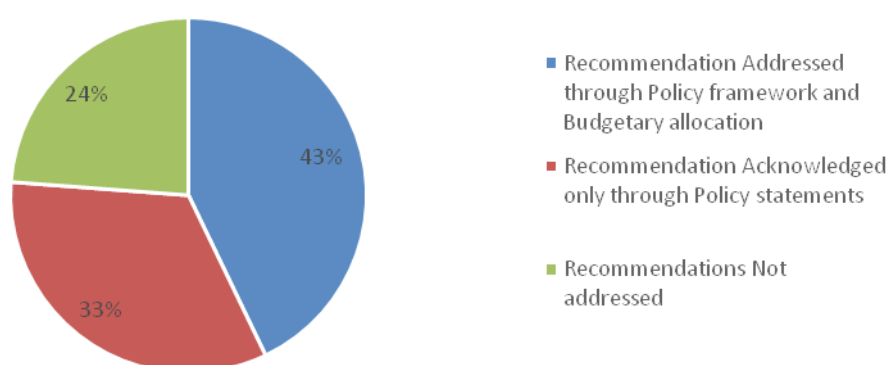
Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
Promoting Green infrastructure (e.g. shade trees and green roofs) as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission on Sustainable Habitat under National Action Plan on Climate Change			
			CPWD Guidelines on Sustainable Habitat			
Controlling overfishing, fisheries co-management as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		Comprehensive Marine Fishing Policy, 2004	Fisheries Development schemes Cage culture	Formulated a fisheries policy to provide various incentives for the development of the fisheries	Yes
				Promotion of alternative species		
				Relief to Marine fishermen during ban period to control overfishing		
Assisted species migration and dispersal as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change			
Creation of ecological corridors as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change			
			National Conservation Strategy and Policy Statement on Environment and Development			
Seed banks, gene banks and other ex-situ conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Documentation of biodiversity (genetic fingerprinting) (Pg. 103, Table 20, Andhra Pradesh SAPCC)	Development and Strengthening of Infrastructure Facilities for Production and Distribution of Quality Seeds (Subsumed under the Sub- mission on Seeds and Planting Material)	Development of Ex-Situ Conservation Biodiversity Park in Vishakhapatnam		Yes
			Creation of Gene Bank			
			National Biodiversity Action Plan			
Payments for ecosystem services as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem					

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
<p>Cost effective mitigation options in forestry are: Afforestation, sustainable forest management and reducing deforestation (with large differences in their relative importance across regions). (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR)</p>	Climate Resilient Ecosystem	Protection and conservation of forests including fire protection (Pg. 103, Table 20, Andhra Pradesh SAPCC)	National Mission for Green India under National Action Plan on Climate Change	The A.P. Forest Development Corporation is managing 48,637 Ha., of degraded forest area out of which 26,932 Ha., has been converted into high yielding Eucalyptus clone plantations.		
			State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA)	Andhra Pradesh Community Forest Management Project	Andhra Pradesh Forest Policy	Yes
			National Afforestation Programme			
			National Environment Policy, 2006			
			National Forest Policy, 1988			
<p>Scaling up of existing initiatives to expand the quality and quantity of forests under the 'Green India Mission'. (Para 6, Pg. 41, 6.2, NCE SYR India Chapter)</p>	Climate Resilient Ecosystem	Creation of forests in degraded/public lands. (Pg. 103, Table 20, Andhra Pradesh SAPCC)	Green India Mission			
<p>Ecological restoration as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</p>	Climate Resilient Ecosystem	Creation of new water bodies and restoration of existing water bodies. (Pg. 106, Table 25, Andhra Pradesh SAPCC)	Rainforest Restoration Programme	Andhra Pradesh Disaster Recovery Project		Yes
			National Mission for Green India under National Action Plan on Climate Change			
<p>National and Government Policy and Programs can include integrated coastal zone management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</p>	Climate Resilient Ecosystem		Integrated Coastal Zone Management Project	Andhra Pradesh Hazard Mitigation Project		Yes
<p>National and Government Policy and Programs can include ecosystem based management, community based adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</p>	Climate Resilient Ecosystem			AP Community Based Tank Management Project		Yes
<p>Policies that can help reduce excessive local pollution can benefit India improve the national welfare while still sustaining economic growth. (Para 1. Pg. 11, 2.3, NCE SYR India Chapter)</p>	Climate Resilient Ecosystem		Environment Research Programme	Addressed through sector specific guidelines for different industries		

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget Allocation
Policies that can help reduce inefficient natural resource use can benefit India improve the national welfare while still sustaining economic growth. (Para 1. Pg. 11, 2.3, NCE SYR India Chapter)	Climate Resilient Ecosystem		Natural Resource Management Programme			
Soil Conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Soil and Water Conservation in forest lands (Pg. 103, Table 20, Andhra Pradesh SAPCC)	National Water Mission under National Action Plan on Climate Change	Neeru Chettu Programme		Yes
			National Water Policy, 2012			
			National Mission on Sustainable Agriculture under National Action Plan on Climate Change			
Strong regulatory, governance and project selection mechanisms to reduce the risk that scarce public resources face because of government failures. (Para 8, Pg. 25, 3.4, NCE SYR India Chapter)	Climate Resilient Ecosystem					

Social Adaptation

Figure 8: Recommendation addressed through Social Adaptation in Andhra Pradesh



Social Adaptation sector in the states mainly covers the health sector however as per the IPCC recommendations issues for gender inequality, education and awareness and poverty alleviation are all covered in the social adaptation sector. 33% of the recommendations such as the Research on development of low cost vaccines, particularly those related to vector borne diseases through The National Vaccine Policy mandates low profit margins in order to produce low cost vaccines as well as Health Surveillance has been addressed through the Integrated Disease Surveillance Programme (IDSP) under the Ministry of Health & Family Welfare-Government of India are acknowledged through policy pronouncements but we are not aware of specific budgetary allocations to deal with these aspects. 43% are being addressed by the state with budgetary allocation for improvement of health, education and poverty reduction through Polampilusthondhi Scheme, AYUSH Grama Yojane, Providing quality education in Madarasas. Remaining 24% recommendations remain unaddressed.

Table 19: Policy advice from IPCC and NCE for Social Adaptation addressed in Andhra Pradesh

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	Budget allocation
Building adaptive capacity is important for better selection and implementation of adaptation options. (SPM 3.3, Pg. 19, Para 5, IPCC AR5 SYR)	Social Adaptation		National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change National Environment Policy, 2006 Capacity Building on Biosafety A CDM - Capacity Building Programme	State Action Plan on Climate Change (SAPCC) of Andhra Pradesh		
Adaptation options for poverty alleviation include improved access to and control of local resources. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation			Addressed through various sector specific schemes		
Increased decision making power can also help in livelihood enhancement. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Decentralized rural electrification using woody or agricultural reuse. (Pg. 104, Table 21, Andhra Pradesh SAPCC)	Rajiv Gandhi Panchayat Sashaktikaran Abhiyan The Constitution (seventy third amendment) Act, 1992			
Gender equity in education as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Sarva Siksha Abhiyan and Rashtriya Madhyamik Siksha Abhiyan	AP Open School Society		Yes
Extension services as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		National Mission on Agriculture Extension and Technology (NMAET) Support to State Extension Programmes for Extension Reforms	Polampilusthondhi Scheme		Yes
Sharing indigenous, traditional and local knowledge as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation					
Creating knowledge sharing and learning platforms available as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Setting up of Climate Change knowledge center at EPTRI. (Pg. 107, Table 26, Andhra Pradesh SAPCC)	National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change	Setting up of Climate Change Knowledge Center at EPTRI under SAPCC (AP)		Yes
Climate services as social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Climate Services Programme National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change			

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	Budget allocation
Use of indigenous climate observations as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation					
Better targeted and much more effective spending on poverty reduction. (Para 2, Pg. 40, 6, NCE SYR India Chapter)	Social Adaptation			Mission for Elimination of Poverty in Municipal Areas		Yes
National governments can coordinate adaptation efforts of local and subnational governments by protecting vulnerable groups (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Social Adaptation					
Some of the response adaptation options for human development can be improved access to education. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Operation Blackboard Scheme, 1987	Providing quality education in Madarasas		Yes
			District Primary Education Programme	Jawahar Knowledge Centres		Yes
			Sarva Shiksha Abhiyan	Knowledge Mission		
			Constitution Act, 2002			
			The Right of Children to Free and Compulsory Education Act, 2009			
			Early Child Care and Education Programme			
			Rashtriya Madhyamik Shiksha Abhiyan			
Better nutrition and health facilities can also help in effective human development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Health Surveillance. (Pg. 105, Table 24, Andhra Pradesh SAPCC)	Indira Gandhi Matritva Sahyog Yojana	AYUSH GramaYojane		Yes
			Rajiv Gandhi Scheme for Empowerment of Adolescent Girls (SABLA)	AYUSH PustiKaryakrama		
			National Action Plan on Children	Thayi Bhagya		
			National Action Plan on Nutrition			
			Integrated Child Development Services Scheme			
Reduced gender inequality and marginalization in other forms can be beneficial in enhancing adaptation in terms of human development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Beti Bachao Beti Padoo	AP Open school society		Yes

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	Budget allocation
Social safety nets along with social protection can help in effective poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		National Youth Policy, 2014	Tribal empowerment programme		Yes
			Saakshar Bharat Mission/ National literacy Mission, National Old Age Pension Scheme	ECONOMIC SUPPORT SCHEMES		Yes
			Vocationalisation of Secondary Education			
			Mid day Meal Programme			
			Public Distribution System			
			Early Child Care and Education Programme			
			Integrated Child Development Services Scheme			
			Food for Work Programme			
			National Social Assistance Programme			
Using services such as food banks and distribution of food surplus for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Public Distribution System			
Using services such as vaccination programs for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Research on development of low cost vaccines, particularly those related to vector borne diseases. (Pg. 105, Table 24, Andhra Pradesh SAPCC)	National Vaccine Policy, 2005			
			Universal Immunization Programme			
Using services such as essential public health services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Health Surveillance. (Pg. 105, Table 24, Andhra Pradesh SAPCC)	National Rural Health Mission			
			National Urban Health Mission			

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	Budget allocation
Using services such as enhanced emergency medical services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		National Rural Health Mission	RCH Programme -II-Rural emergency health transport Scheme-108 Services, FRUs strengthened with CEMONC services under NHRM, Rural Emergency Health Transport Scheme		Yes
Reliance on social networks as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation					
A modern nationwide system of social protection needs to be developed to address the adverse impacts of subsidy removal on the rural poor and also it helps in broadening the agenda for equitable development. (Para 5, Pg. 41, 6.2, NCE SYR India Chapter)	Social Adaptation					

Climate Resilient Infrastructure

Within this basket of recommendations, 24% of the recommendations for Upgrading urban infrastructure (scale and quantity), building for flood and cyclone shelters have been addressed with budgetary allocations, and 38% have been recognized through policies and schemes with no specific funding such as building codes and practices to reduce structural damages, with Andhra Pradesh Building Rules, 2012, AP Regulation of Buildings Act. Rest 38% recommendations for Better policies and planning to control land use etc were left unaddressed.

Figure 9: Recommendation addressed through Climate Resilient Infrastructure in Andhra Pradesh

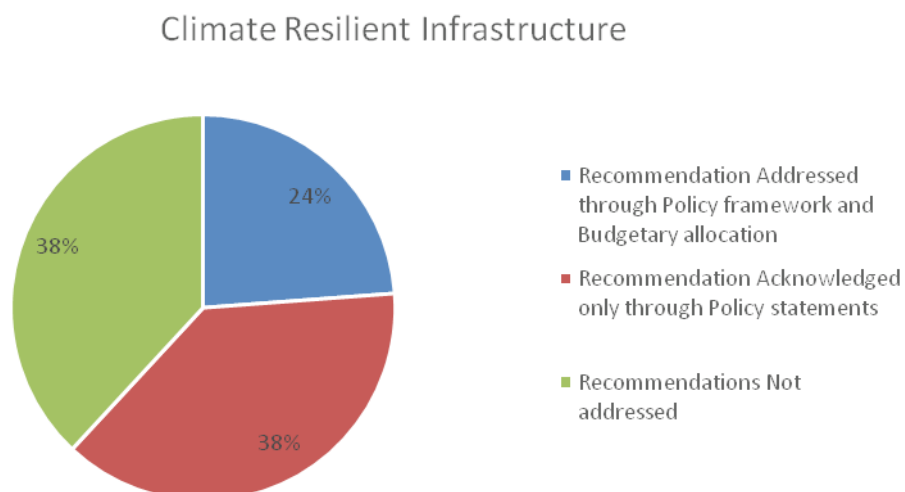


Table 20: Policy advice from IPCC and NCE for Climate Resilient Infrastructure addressed in Andhra Pradesh

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Energy, safe housing and settlement structures and social support structure are helpful as human development adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Protect both built and natural heritage against climate related damage. (Pg. 106, Table 25, Andhra Pradesh SAPCC)	National Urban Housing and Habitat Policy, 2007			
Disaster risk management can be addressed through flood and cyclone shelters. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Provision of cyclone shelters and all weather connectivity to all vulnerable habitations along the coast. (Pg. 102, Table 19, Andhra Pradesh SAPCC)	Flood Management Guidelines	National Cyclone Risk Mitigation (NCRMP) Project		Yes
Disaster risk management can be addressed through building codes and practices as they can save lives and reduce structural damages. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Strengthen disaster mitigation policies/ manuals/ drills for State and districts. (Pg. 103, Table 19, Andhra Pradesh SAPCC)	National Urban Housing and Habitat Policy, 2007	Andhra Pradesh Municipal Development Project (APMDP)	Andhra Pradesh Building Rules, 2012	
Better transport and road infrastructures can also help in reducing the vulnerability by natural disasters. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure/ Sustainable Transport	Interlink private and public transport modes so as to minimise the use of private transport. (Pg. 105, Table 23, Andhra Pradesh SAPCC)	National Urban Transport Policy	Atal Mission for Rejuvenation and Urban Transformation (AMRUT), the prime objectives of this scheme is to provide tap connection to each household, developing greenery and promoting public and non-motorized transport during the mission period from 2015-16 to 2019-20.		Yes
			National Mission on Sustainable Habitat under National Action Plan on Climate Change	Construction of CC Roads under Wada Wadalo Chandrannabata funded by MGNREGS		Yes
				Rural Development Fund		Yes

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Structural/Physical Adaptation Response Options include some Engineered and built-environment options such as sea walls and coastal protection structures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Protection works on rivers and seacoasts (flood banks, dykes etc.) (Pg. 102, Table 18, Andhra Pradesh SAPCC)				
Floating houses as a structural/physical adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure					
Using services such as municipal services including water and sanitation for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure			Andhra Pradesh rural Water Supply and Sanitation project	Solid Waste Management programme in Gram Panchayats	
Creating building standards and easements as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure		National Urban Housing and Habitat Policy, 2007	Andhra Pradesh Municipal Development Project (APMDP)	Andhra Pradesh Building Rules, 2012	Yes
Upgrading and expanding transmission network to allow tapping of power from new wind and solar sites. (Para 6, Pg. 25, 3.4, NCE SYR India Chapter)	Climate Resilient Infrastructure	Incentives for rooftop solar power generation and provision of grid connectivity. (Pg. 106, Table 25, Andhra Pradesh SAPCC)	Jawaharlal Nehru National Solar Mission under National Action Plan on Climate Change			
Upgrading urban infrastructure (scale and quantity) is required for better growth. (Para 7, Pg. 37, 5.1, NCE SYR India Chapter)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Protect both built and natural heritage against climate related damage. (Pg. 106, Table 25, Andhra Pradesh SAPCC)	National Urban Housing and Habitat Policy	AP Municipal Development Project		Yes
				Urban Infrastructure Mission		Yes
Broad reforms of land regulation are required for infrastructure development/up-gradation. (Para 7, Pg. 37, 5.1, NCE SYR India Chapter)	Climate Resilient Infrastructure			Swatcha Andhra Pradesh funded by MGNREGS	AP Regulation of Buildings Act	
					Land Reforms - Record of Rights	Yes

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
					AP Land Reforms Act	
Coordination of land regulation reforms with development of infrastructure initiatives is a key opportunity for clean urbanisation in India. <i>(Para 6 and 7, Pg. 38, 5.2, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure					
A well-developed housing finance system is required. <i>(Para 1, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Climate resilient infrastructure			Weaker Section Housing Program		Yes
Local government's revenue (through reforms of property taxes) needs to be encouraged. <i>(Para 3, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Climate resilient infrastructure		Reform of the Property Tax under Jawaharlal Nehru Urban Renewal Mission			
Institutional approaches involves multiple actors and include economic options such as insurance, public private partnership, laws and regulations such land zoning laws and national and government policies and programs such as economic diversification play a key role in promoting the transition from planning to effective implementation of adaptation. <i>(SPM 4.4, Pg. 29, Para 11, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure/ Climate Resilient Livelihood			Addressed through sector specific programmes		Yes
Land tenure can be another soft adaptation measure for poverty alleviation. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Legal and institutional reforms for low carbon development (adaptation)/ Climate Resilient Infrastructure		National Land Records Modernisation Programme	AP Land Reforms		
Land zoning laws can lead to better land-use and spatial planning. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Legal and institutional reforms for low carbon development (adaptation)/ Climate Resilient Infrastructure					

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Laws to encourage insurance purchasing as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure					
Defining property rights and land tenure security as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure					
Property tax reforms that focus on taxing land values rather than building space can be effective in promoting development. (Para 4, Pg. 39, 5.2, NCE SYR India Chapter)	Climate Resilient Infrastructure					
Better policies and planning to control land use and energy demand for urbanization. (Para 4, Pg. 40, 6, NCE SYR India Chapter)	Climate Resilient Infrastructure					

Sustainable water Management

64% of the recommendations in the water sector regarding integrated water resource management, Better water storage, Soil and water conservation have been addressed through the Neeru Chettu Programme, Andhra Pradesh Water Sector Improvement Project etc with funding through the budget. 18 % of the recommendations have been acknowledged through other state and national policy measures which do not have funding allocation, while 18% of the recommendations such as diversifying water resources etc have not been addressed.

Figure 10: Recommendation addressed through Sustainable Water Management in Andhra Pradesh

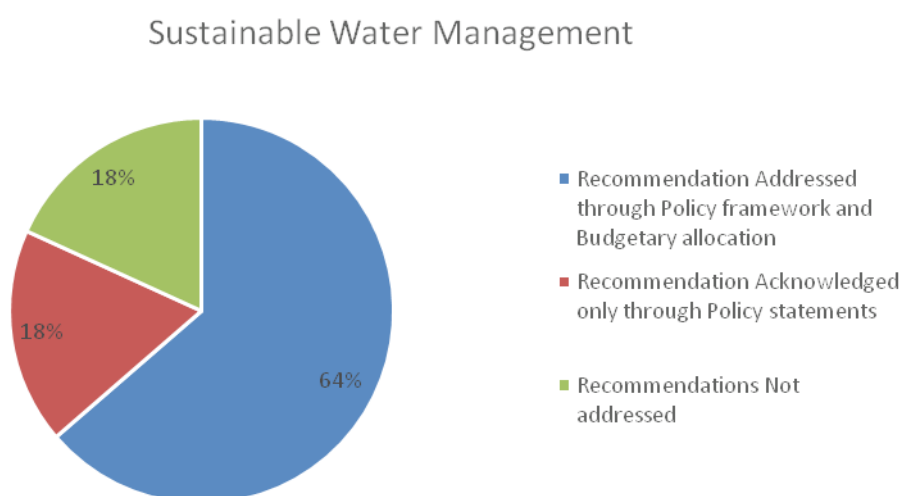


Table 21: Policy advice from IPCC and NCE for Sustainable Water Management addressed in Andhra Pradesh

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
National and Government Policy and Programs can include municipal water management programs. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management			Andhra Pradesh Water Sector Improvement Project AP Community Based Tank Management Project		Yes
National and Government Policy and Programs can include integrated water resource management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		National Water Mission under National Action Plan on Climate Change	Andhra Pradesh Water Sector Improvement Project		Yes
				AP Community Based Tank Management Project		Yes
Recycling of water have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Sustainable Water Management	Reuse of domestic wastewater for horticulture crops and crops with minimum risk of contamination. (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Water Mission under National Action Plan on Climate Change			
			National Rural Drinking Water Program (NRDWP)			
			National Water Policy, 2012			
Disaster risk management can be addressed through diversifying water resources. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management					
Disaster risk management can be addressed through improved drainage. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Restoring efficiency of drainage network of all municipalities to enable quick evacuation of water and to avoid flooding (Pg. 105, Table 24, Andhra Pradesh SAPCC)	National Water Mission under National Action Plan on Climate Change			
			National Water Policy, 2012			
			National Mission on Sustainable Habitat under National Action Plan on Climate Change			
			National Urban Sanitation Policy			

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Better water storage is also a structural/ physical adaptation response. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Safe Water Supply as per norms to the entire rural population and entire coverage of sewerage and sanitation for the rural population. (Pg. 106, Table 25, Andhra Pradesh SAPCC)	National Water Mission under National Action Plan on Climate Change	NTR Sujala Pathakam- it provides drinking water at the cost of Rs.2 for 20 litres.		Yes
			National Water Policy, 2012		Solid Waste Management programme in Gram Panchayats	
Use of desalinization as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		National Water Mission under National Action Plan on Climate Change	Andhra Pradesh Municipal Development Project (APMDP)		Yes
			National Water Policy, 2012			
Pricing water to encourage universal provision and careful use as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Safe water supply as per norms to the entire urban population. (Pg. 105, Table 24, Andhra Pradesh SAPCC)	National Rural Drinking Water Program (NRDWP)	NTR Sujala Pathakam- it provides drinking water at the cost of Rs.2 for 20 litres.		Yes
			National Water Mission under National Action Plan on Climate Change National Water Policy, 2012			
Water regulations and agreements as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Strict regulation of ground water abstraction. (Pg. 102, Table 18, Andhra Pradesh SAPCC)	National Water Policy, 2012	schemes under Krishna Water Disputes Tribunal		Yes
			National Water Mission under National Action Plan on Climate Change			
Soil and water conservation as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Increase the efficiency of water use by micro-water shed development, catchment area systems and water management practices. (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Water Mission under National Action Plan on Climate Change	Neeru Chettu Programme		Yes
				Andhra Pradesh Community Based Tank Management Project		Yes
			National Water Policy, 2012	Polampilusthondi & Chandranna Rythu Kshetralu (PCRK)		Yes
			National Mission on Sustainable Agriculture under National Action Plan on Climate Change			

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Storm drain clearance as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Restoring efficiency of drainage network of all municipalities to enable quick evacuation of water and to avoid flooding (Pg. 105, Table 24, Andhra Pradesh SAPCC)	National Water Mission under National Action Plan on Climate Change, Urban Infrastructure Governance	storm water drainage scheme, Underground Drainage scheme for Tirupati, Storm Water Drainage System for TMC, Improvement of Storm Water drains for Zone VIII of Greater Vishakapatnam city (Gangulhedda and Yerrigada branch canals), Visakhapatnam, Vijayawada, Tirupathi, Rajahmundry, Kadapa, Pulivendula, Puttaparthi & Tadipathri Underground Drainage Schemes		Yes

Energy

Recommendations for the energy sector consider both Energy Efficiency and promotion of Renewable Energy. 34% of the recommendations have been addressed through policies and schemes as well as budgetary support such as recommendation for improved energy efficiency or reducing the proportion of coal in the country's fuel mix is addressed by adding two Solar Parks of 1,000 MW each in Anantapuram and Kurnool, Promotion of affordable alternative energy sources (solar home systems, solar street lights etc.) through National Ujala Scheme etc. Of the remaining recommendations, 33% are taken cognizance of through policy provisions, while an equal number remain unaddressed.

Figure 11: Recommendation addressed through Energy in Andhra Pradesh

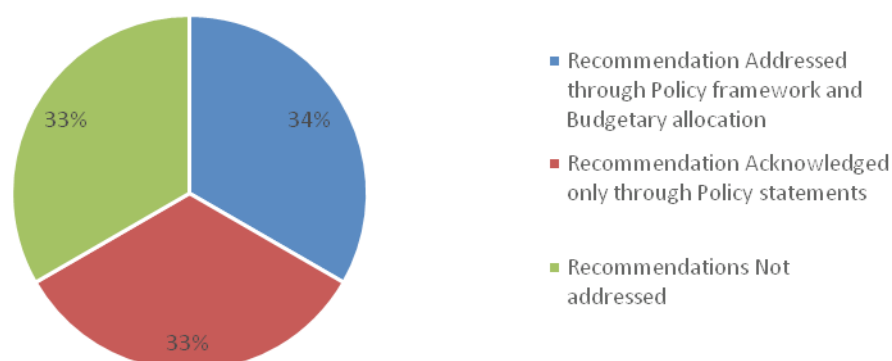


Table 22: Policy advice from IPCC and NCE for Energy addressed in Andhra Pradesh

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Behavior, lifestyle and culture influence energy use and associated emissions and have high mitigation potential in some sectors specially when complementing technological and structural change. (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Energy Efficiency	Decentralized rural electrification using woody or agricultural reuse. (Pg. 104, Table 21, Andhra Pradesh SAPCC)				

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Expanded information initiatives along with mandatory minimum energy efficiency standards can play an important role in reducing GHG emissions. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency					
Decarbonizing (reducing the carbon intensity) electricity generation as well as efficiency enhancement and behavioural changes without compromising development are important mitigation measures to limit global warming to 2°C. <i>(SPM 4.3, Pg. 28, Para 3, IPCC AR5 SYR)</i>	Energy Efficiency	Electricity generation through renewable sources. <i>(Pg. 104, Table 21, Andhra Pradesh SAPCC)</i>		Distributed 1.87 crore LED bulbs to 93.5 lakh households and intend to cover all households by March 2016. Also replaced 3 lakh streetlights in 110 ULBs and intend to complete the replacement by June 2016.	Under the solar power policy, two Solar Parks of 1,000 MW each in Anantapuram and Kurnool, which will be commissioned during 2016-17. Further, we are going to add an additional capacity of 619 MW of solar power to the grid.	Yes
Near-term reductions in energy demand are very important in cost-effective mitigation strategies. <i>(SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR).</i>	Energy Efficiency			Distributed 1.87 crore LED bulbs to 93.5 lakh households and intend to cover all households by March 2016. Also replaced 3 lakh streetlights in 110 ULBs and intend to complete the replacement by June 2016.		Yes
Behaviour, lifestyle and culture influence energy use and associated emissions and have high mitigation potential in some sectors specially... <i>(SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)</i>	Energy Efficiency					
Regulatory approaches such as energy efficiency standards and information measures such as labelling programs are environmentally effective and can help consumers make better-informed decisions. <i>(SPM 4.4, Pg. 30, Para 3, IPCC AR5 SYR)</i>	Energy Efficiency	Improve the efficiency of electrical equipment (water pumps also). <i>(Pg. 104, Table 21, Andhra Pradesh SAPCC)</i>	National Energy Labelling Programme and PAT Scheme			
Adopting methods such as improved energy efficiency or reducing the proportion of coal in the country's fuel mix will be necessary to reduce GHG emissions. <i>(Para 2, Pg. 14, 2.3, NCE SYR India Chapter)</i>	Energy Efficiency	Improve the efficiency of thermal power generation. <i>(Pg. 104, Table 21, Andhra Pradesh SAPCC)</i>				

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Mandatory minimum energy efficiency standards can be an effective tool.	Energy Efficiency		Energy Conservation Building Codes(ECBC)			
Fuel efficiency standards for new cars can be an important step towards better management of energy demand in the transport sector. <i>(Para 1, Pg. 21, 3.2, NCE SYR India Chapter)</i>	Energy Efficiency	Enhance the share of low emission/fuel-efficient vehicles and vehicles that run on alternate fuels. <i>(Pg. 105, Table 23, Andhra Pradesh SAPCC)</i>	Standards and Labelling			
Improving agglomeration productivity to upgrade growth and economic efficiency. <i>(Para 4, Pg. 40, 6, NCE SYR India Chapter)</i>	Energy Efficiency					
Introduction/tightening up of mandatory minimum energy efficiency standards for appliances, vehicles and buildings can play an important role in reducing GHG emissions. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency	Retrofitting existing pump sets for higher energy efficiency. <i>(Pg. 101, Table 17, Andhra Pradesh SAPCC)</i>	Standards and Labelling	Smart Village-Smart Ward Programme which aims to acvhive btter infrastructure and better services in the village		Yes
Careful monitoring and impact evaluation to ensure vigorous enforcement of minimum energy efficiency standards. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency	Improve the efficiency of transmission (elimination of pilferage). <i>(Pg. 104, Table 21, Andhra Pradesh SAPCC)</i>	Standards and Labelling			
Increasing the flow of concessional domestic debt to renewable projects through creation or strengthening of development banking institutions can help with the high financing costs in renewable energy projects in India. <i>(Para 8, Pg. 25, 3.4, NCE SYR India Chapter)</i>	Renewable Energy	Minimize environmental damage including GHG emissions, caused by industrial and mining activities. <i>(Pg. (x), Executive Summary, Industries, Andhra Pradesh SAPCC)</i>	NCEF Refinance Scheme			Yes
Government initiatives to reduce the high cost of renewable projects can stimulate private investments in renewables. <i>(Para 4, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Renewable Energy		National Solar Mission under National Action Plan on Climate Change	Solar Energy Programme		Yes
GHG Emissions can be reduced substantially through changes in consumption patterns and adoption of energy saving measures. <i>(SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)</i>	Energy Efficiency					

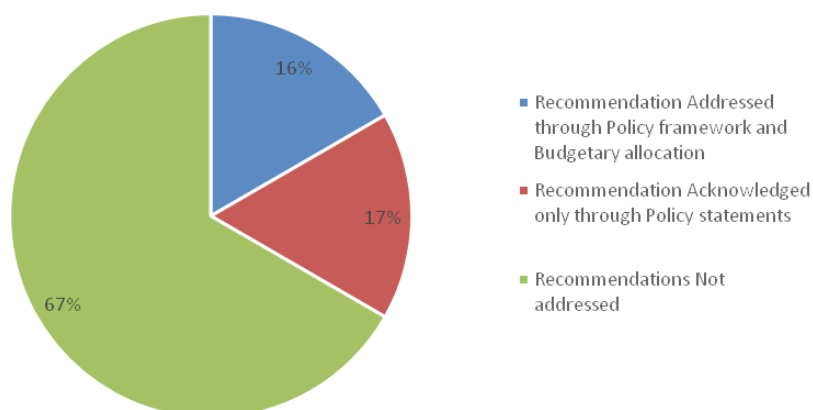
Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Financial incentives (e.g. consumer rebates) can be complemented along with minimum energy efficiency standards to encourage energy demand management and appliance efficiency. <i>(Para 7, Pg. 20, 3.2, NCE SYR India Chapter)</i>	Energy Efficiency			Distributed 1.87 crore LED bulbs to 93.5 lakh households and intend to cover all households by March 2016. Also replaced 3 lakh streetlights in 110 ULBs and intend to complete the replacement by June 2016.		
Using public sector approach e.g. creation of a National Renewable Power Corporation to undertake major renewable investments with world class levels of management and technological dynamism. <i>(Para 8, Pg. 25, 3.4, NCE SYR India Chapter)</i> <i>(Para 4, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Renewable Energy		Indian Renewable Energy Development Agency	New & Renewable Energy Development Corporation of Andhra Pradesh		Yes
			National Renewable Energy Act 2015			
			Solar Energy Corporation of India			
Strengthening government administrative capacity to ensure vigorous enforcement of minimum energy efficiency standards. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency					
Use of cleaner energy sources have synergies and between adaptation and mitigation measures can co-benefit both the sectors. <i>(SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)</i>	Renewable Energy		National Renewable Energy Act 2015	Under the solar power policy, two Solar Parks of 1,000 MW each in Anantapuram and Kurnool, which will be commissioned during 2016-17. Further, we are going to add an additional capacity of 619 MW of solar power to the grid.		
			Alternate Energy			
Substitution of renewable energy for imported coal at the margin can have vital economic and social benefits such as greater energy security and a cleaner environment. <i>(Para 3, Pg. 24, 3.4, NCE SYR India Chapter)</i>	Renewable Energy			Under the solar power policy, two Solar Parks of 1,000 MW each in Anantapuram and Kurnool, which will be commissioned during 2016-17. Further, we are going to add an additional capacity of 619 MW of solar power to the grid.		

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Voluntary codes along with mandatory minimum energy efficiency standards can play an important role in reducing GHG emissions. (Para 2, Pg. 41, 6.1, NCE SYR India Chapter)(Para 7, Pg. 20, 3.2, NCE SYR India Chapter)	Energy Efficiency		Standards and Labelling Scheme			

Smart and Sustainable Cities

67% of the recommendations in this sector have not been addressed. Examples include Reforms to achieve more compact, productive and green cities, rent control laws (reform), better systems of appraise land values and determine property rights have not been recognized by the states. 17 % of the recommendation have been taken cognizance of through policy measures such as the National Urban Housing and Habitat Policy, 2007, Revised Building Rules 2006. 16% of the recommendations have been addressed through policy and budgetary support.

Figure 12: Recommendation addressed through Smart and Sustainable Cities in Andhra Pradesh



Recommendations from the other Cross Cutting themes, including those for International cooperation and enhanced capacity building have been mainly addressed through National schemes and policies.

Table 23: Policy advice from IPCC and NCE for Smart and sustainable Cities addressed in Andhra Pradesh

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Urban planning and upgrading programs can be one of the adaptation options for land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Smart and Sustainable Cities	all addressed under urban/ rural development in the SAPCC	National Mission on Sustainable Habitat under National Action Plan on Climate Change National Urban Housing and Habitat Policy, 2007	AP Municipal Development Project		Yes
High restriction on floor space indexes (FSI) needs to be relaxed. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities		National Urban Housing and Habitat Policy, 2007	Revised Building Rules 2006		

Policy Advice from IPCC and NCE	Thematic Focus	Identified Solutions from SAPCC	National Schemes	State Schemes	State Policies	State Budget allocation
Reforms to achieve more compact, productive and green cities need to move simultaneously and in coordination. <i>(Para 1, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Smart and Sustainable Cities					
Need of rent control laws (reform). <i>(Para 1, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Smart and Sustainable Cities					
Need of better systems of appraise land values and determine property rights. <i>(Para 1, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Smart and Sustainable Cities					
A comprehensive impact evaluation of Jawaharlal Nehru Urban Renewal Mission is needed to learn and improve effectiveness for a renewed and better urban investment and reform agenda. <i>(Para 8, Pg. 39, 5.2, NCE SYR India Chapter) (Para 2, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Smart and Sustainable Cities					

Status of implementation of Recommendations not identified as priorities under SAPCC

Of the recommendations for Power sector Reforms as per the IPCC and NCE, 11.76% have been addressed with policy framework and budgetary support. These include regulating policies along with fuel taxes through the Motor Vehicle Tax scheme. 5.8% have been taken cognizance of through only policy statements such as Adoption of complimentary policies such as income tax rebates or other benefit transfer mechanisms through the Nation Electric Mobility Mission Plan. However, 82.3% of the recommendations for this sector have not been addressed.

Improved Livestock management sector recommendations have all been (100%) addressed with budgetary support. These include adequately resourced public initiatives in the livestock sector, animal feeds by providing better quality of animal diets, Better animal health and reproduction management, Mobile Veterinary Clinics, Feed & Fodder Development Programme, Livestock Development Programmes etc.

In the Adaptation oriented recommendations Disaster preparedness was quite well addressed with more than 72% of the recommendations being supported through budgetary allocations. Specifically, these recommendations have been addressed through initiatives such as AP Hazard Mitigation Project , State Disaster Response Fund under National Cyclone Mitigation Project etc. The rest 18% of the recommendations remain unaddressed.

Climate Resilient Agriculture

50% of the recommendations such as dissemination of resilient crop variety, Adaptation strategies like changes in planting dates and crop varieties etc. have been addressed through various schemes backed through budgetary outlays such as enhanced outlay for Cashew Rejuvenation scheme, Rashtriya Krishi Vikas Yojana, enhancing agro- biodiversity being promoted through The Kamdhenu Scheme to allow purchase of certain indigenous breeds of cattle such as Sahiwal, Gir, Red Sindhi by the farmers with budgetary allocations. Manures required for coconut cultivation with total value of Rs. 15,000 per hectare to cover 500-hectare area is provided as an incentive to the farmer. Further, assistance is also being provided under Government of India schemes like National Horticulture Mission (NHM), use of new methods of cultivation, improved varieties of high yielding groundnut seeds are made available to farmers to increase Seed Replacement Rate (SRR). Further, quality seeds required for Kharif and Rabi season are procured from National Seeds Corporation Ltd. (NSC). Cropland management, grazing land management and restoration of organic soils through Khazan Land Development Project is initiated by the Department of Agriculture and is approved by the State Level Sanctioning Committee (SLSC) under Rashtriya Krishi Vikas Yojana (RKVY) for its implementation during 2015-16. Policies such as the State Agriculture policy without necessarily being backed by budgetary support take cognizance of 6% of the recommendations. However, 44% of the recommendation are still unaddressed by the state as very little is being done by the state to for example, increase awareness and knowledge about impacts of Climate Change on Agriculture and its allied sectors.

Figure 13: Recommendation addressed through Climate Resilient Agriculture in Goa

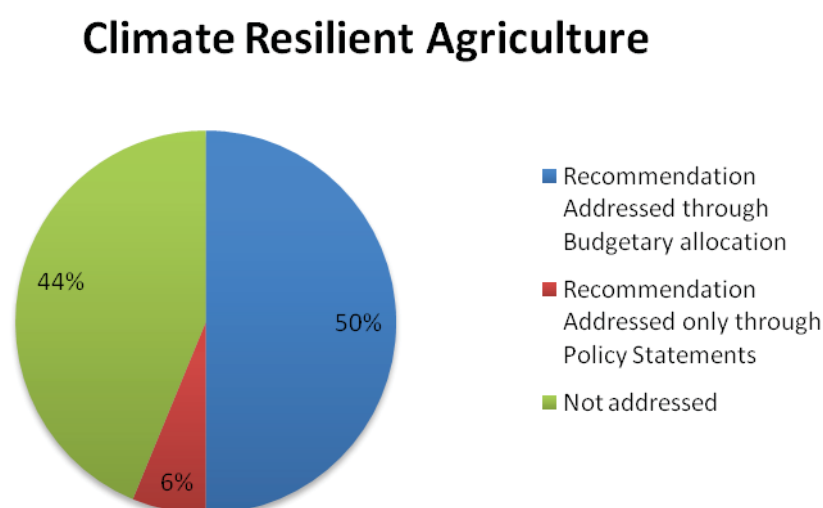


Table 24: Policy advice from IPCC and NCE for Climate resilient Agriculture addressed in Goa

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Sustainable agriculture and forestry have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Agriculture and Ecosystem	National Mission on Sustainable Agriculture under National Action Plan on Climate Change		State Agriculture Policy (Proposed)	
			crop insurance scheme		
			The Kamdhenu Scheme to allow purchase of certain indigenous breeds of cattle such as Sahiwal, Gir, Red Sindhi by the farmers		Yes

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Changed cropping pattern, livestock and aquaculture practices are some adaptation options that can be used to conserve the ecosystem as well as better livelihood. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Agriculture	National Mission on Sustainable Agriculture under National Action Plan on Climate Change			
		National Initiative on Climate Resilient Agriculture			
		Development of Inland Fisheries and Aquaculture Scheme			
Using new crops and animal varieties as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Agriculture	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	The financial allocation of Agriculture, Animal Husbandry and Fisheries		Yes
			provided enhanced outlay for Cashew Rejuvenation		Yes
Cropland management, grazing land management and restoration of organic soils are important mitigation options for the agriculture sector. (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR)	Climate Resilient Agriculture	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Special Programme for organic farming (50% subsidy for Organic farming)		Yes
Adaptation strategies like changes in planting dates and crop varieties can offset some of the negative impacts of smaller temperature increases. (Para 1, Pg. 10, 2.1, NCE SYR India Chapter)	Climate Resilient Agriculture	National Initiative on Climate Resilient Agriculture	Horticulture development		Yes
Use of new methods of cultivation (e.g. System of Rice Intensification (SRI)) can help reduce water usage and methane emissions while improving resilience. (Para 7, Pg. 33, 4.4, NCE SYR India Chapter)	Climate Resilient Agriculture	National Initiative on Climate Resilient Agriculture			
Promoting energy efficient water pumps for better water management. (Para 8, Pg. 33, 4.4, NCE SYR India Chapter)	Climate Resilient Agriculture	National Mission on Sustainable Agriculture under National Action Plan on Climate Change			
		Solar Pumping Programme for Irrigation and Drinking Water under Off Grid and Decentralised Solar applications scheme			
Using micro-irrigation methods such as drip and sprinkler irrigation for better water management. (Para 8, Pg. 33, 4.4, NCE SYR India Chapter)	Climate Resilient Agriculture		Micro Irrigation Scheme		Yes
		National Mission on Sustainable Agriculture under National Action Plan on Climate Change			

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Reallocating spending from low-yielding subsidies towards high yielding agriculture R&D can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)</i> <i>(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture				
Reallocating spending from low-yielding subsidies towards education can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)</i> <i>(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture				
Reallocating spending from low-yielding subsidies towards extension services and rural infrastructure can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)</i> <i>(Para 4, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture				
Policy reforms to use modern agricultural technologies and practices. <i>(Para 2, Pg. 27, 4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture	Atal Gram Yojana	Crop Subsidy		Yes
Improved public policy support in agriculture sector. <i>(Para 2, Pg. 30, 4.1, NCE SYR India Chapter)</i>	Climate Resilient Agriculture	Rashtriya Krishi Vikas Yojana	Special Programme for organic farming (50% subsidy for Organic farming)		Yes
Compensating farmers by credible and tangible improvements in public service delivery and better infrastructure could solve the problem of agriculture subsidy reform to some extent. <i>(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture		Krishi Card Scheme and Integrated Farming System		Yes

Climate Resilient Ecosystem

Due to the increasing impacts of climate change and increased human activities such as mining and construction the forests of Goa areas are at a high risk of degradation. These are extremely sensitive ecosystems; Climate change exacerbates the risk to these ecosystems. As shown in the pie chart below, 30% of the recommendations are addressed through policy initiatives coupled with budgetary allocations. The state is investing in preparation of new coastal zone management plan, protective measures such as aids for conservation of mangrove areas which in turn is an effective coastal afforestation measure and Galjibaga turtle conservation area is part of ecological restoration measure. Another 59% of the recommendations are being taken cognizance of through measures such as the Air and Water monitoring act, State Forest conservation Policy, the Forest Restoration programme, Western Ghats conservation programme etc. 11% of the recommendation have not been addressed by the state, like the recommendation for strong regulatory, governance and project selection mechanism to reduce risks.

Figure 14: Recommendation addressed through Climate Resilient Ecosystem in Goa

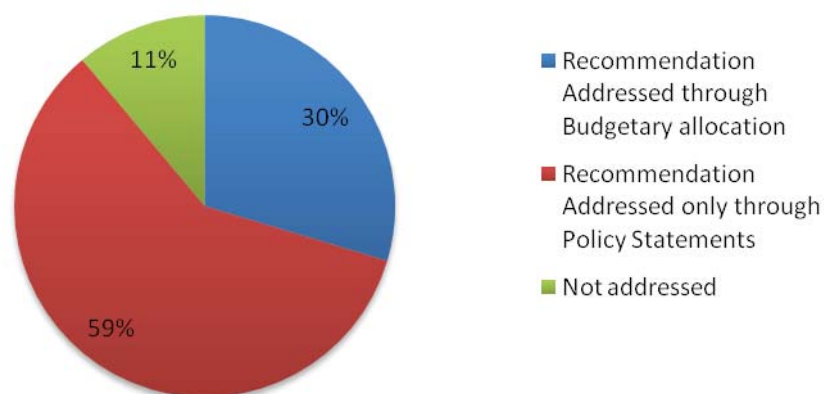


Table 25: Policy advice from IPCC and NCE for Climate resilient Ecosystem addressed in Goa

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires larger reliance on Carbon Dioxide Removal (CDR) (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Mission for Green India under National Action Plan on Climate Change			
Sustainable agriculture and forestry have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Agriculture and Ecosystem	National Mission on Sustainable Agriculture under National Action Plan on Climate Change		State Agriculture Policy (Proposed)	
			crop insurance scheme		
Protection of Ecosystem for carbon storage has synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Mission for Green India under National Action Plan on Climate Change	The Kamdhenu Scheme to allow purchase of certain indigenous breeds of cattle such as Sahiwal, Gir, Red Sindhi by the farmers		Yes
			Galgibag Turtle Conservation Reserve		Yes
		State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA)	provided enhanced outlay for Cashew Rejuvenation		

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Ecosystem adaptation can be done effectively by coastal afforestation . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Afforestation Programme	Cashew Rejuvenation		Yes
Ecosystem management adaptation is enhanced by watershed and reservoir management . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Environment Policy, 2006		Forest Conservation Policy	
		Integrated Watershed Management Programme			
Adaptation in ecosystem management can be conducted by reducing other stressors on ecosystems and habitat fragmentation . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Mission for Green India under National Action Plan on Climate Change			
Maintenance of genetic diversity can enhance the adaptive capacity of ecosystem. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem				
		National Biodiversity Action Plan			
		National Environment Policy, 2006			
Manipulation of disturbance regimes can lead to better ecosystem management (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem			Forest Conservation Policy	
Provision of protected areas can improve adaptation in land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Environment Policy, 2006	Coastal zone management Plan	Forest Conservation Policy	Yes
		State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA)			
		National Afforestation Programme			
		National Environment Policy, 2006			
		National Forest Policy, 1988			

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Mangrove Conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Mission for Green India under National Action Plan on Climate Change	Coastal zone management Plan	Forest Conservation Policy	Yes
		National Conservation Strategy and Policy Statement on Environment and Development	Mangrove management Plan		
		National Afforestation Programme			
		National Environment Policy, 2006			
Promoting Green infrastructure (e.g. shade trees and green roofs) as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		DEENDAYAL PANCHAYATI RAJ INFRASTRUCTURE DEVELOPMENT SCHEME		Yes
		CPWD Guidelines on Sustainable Habitat	Solar and Green Cities program		
Controlling overfishing, fisheries co-management as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Comprehensive Marine Fishing Policy, 2004			
Assisted species migration and dispersal as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Mission for Green India under National Action Plan on Climate Change			
Creation of ecological corridors as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Mission for Green India under National Action Plan on Climate Change			
		National Conservation Strategy and Policy Statement on Environment and Development			
Seed banks, gene banks and other ex-situ conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Development and Strengthening of Infrastructure Facilities for Production and Distribution of Quality Seeds (Subsumed under the Sub- mission on Seeds and Planting Material)			
		Creation of Gene Bank			
		National Biodiversity Action Plan			

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Payments for ecosystem services as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem				
Cost effective mitigation options in forestry are: Afforestation, sustainable forest management and reducing deforestation (with large differences in their relative importance across regions). (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR)	Climate Resilient Ecosystem	National Mission for Green India under National Action Plan on Climate Change		Forest Conservation Policy	
		State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA)			
		National Afforestation Programme			
		National Environment Policy, 2006			
		National Forest Policy, 1988			
Scaling up of existing initiatives to expand the quality and quantity of forests under the 'Green India Mission'. (Para 6, Pg. 41, 6.2, NCE SYR India Chapter)	Climate Resilient Ecosystem				
Ecological restoration as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Rainforest Restoration Programme	Coastal zone management Plan		Yes
		National Mission for Green India under National Action Plan on Climate Change	Salaulim botanical Garden		Yes
National and Government Policy and Programs can include integrated coastal zone management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Integrated Coastal Zone Management Project	Coastal zone management Plan		Yes
National and Government Policy and Programs can include ecosystem based management, community based adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		Coastal zone management Plan		Yes
Policies that can help reduce excessive local pollution can benefit India improve the national welfare while still sustaining economic growth. (Para 1. Pg. 11, 2.3, NCE SYR India Chapter)	Climate Resilient Ecosystem	Environment Research Programme		Air and Water Acts monitored by GSPCB	
Policies that can help reduce inefficient natural resource use can benefit India improve the national welfare while still sustaining economic growth. (Para 1. Pg. 11, 2.3, NCE SYR India Chapter)	Climate Resilient Ecosystem	Ecosystem Research Programme			

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Strong regulatory, governance and project selection mechanisms to reduce the risk that scarce public resources face because of government failures. <i>(Para 8, Pg. 25, 3.4, NCE SYR India Chapter)</i>	Climate Resilient Ecosystem				
Soil Conservation as an ecosystem adaptation strategy. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Ecosystem	National Water Mission under National Action Plan on Climate Change			
		National Water Policy, 2012			
		National Mission on Sustainable Agriculture under National Action Plan on Climate Change			

Social Adaptation

Social Adaptation sector in the states mainly covers the health sector however as per the IPCC recommendations issues for gender inequality, education and awareness and poverty alleviation are all covered in the social adaptation sector. 38% of the recommendations such as vaccination programs for better adaptation, The National Vaccine Policy mandates low profit margins in order to produce low cost vaccines, Essential public health services for better adaptation, Health Surveillance (addressed through the Integrated Disease Surveillance Programme (IDSP) under the Ministry of Health & Family Welfare-Government of India) etc are being taken cognizance of various existing through policy measures. 24% of the recommendations are being addressed by the state with budgetary allocation for improvement of health , education and poverty reduction through Deen Dayal Swasthya Seva scheme that provides a health cover through an insurance policy scheme and medical infrastructure is allotted funding of 400 lakhs, MAMTA scheme is aid for pregnant women , for education the Beti Padhao Beti Bachao scheme, Ladli Lakhmi Scheme etc. Remaining 38% recommendation remain unaddressed. These recommendations are especially relevant due to seasonal increase in vector borne diseases and infections, which reportedly is seen to be rising in the state. With rise in high intensity of rainfall, flooding and water logging, risk of such diseases is predicted to further increase. Further, recommendations for improved nutrition mainly for women and children, creation of food banks etc. have not been addressed.

Figure 15: Recommendation addressed through Social Adaptation in Goa

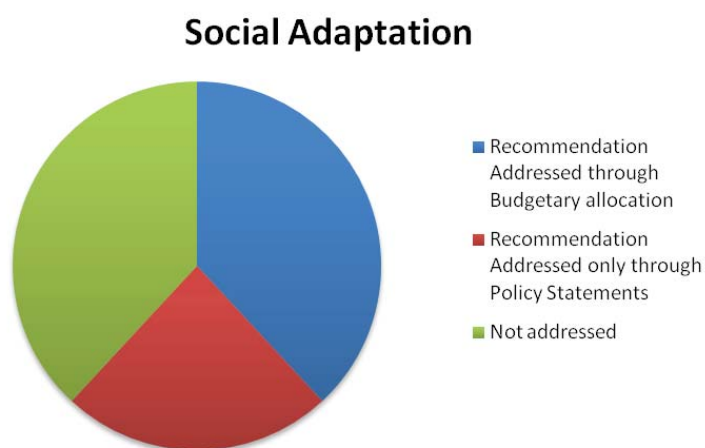


Table 26: Policy advice from IPCC and NCE for Social Adaptation addressed in Goa

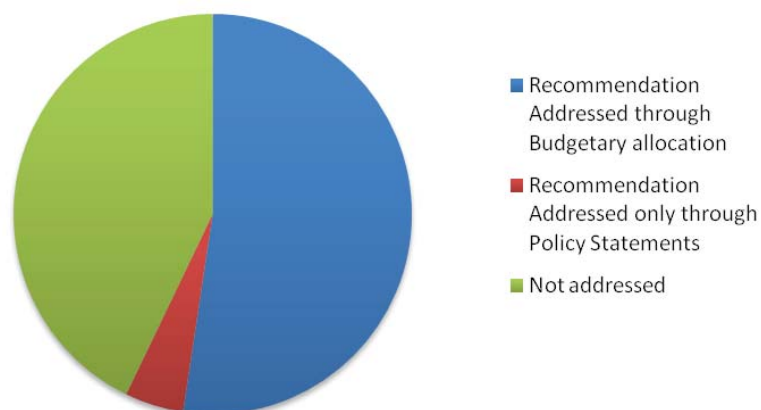
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Building adaptive capacity is important for better selection and implementation of adaptation options. (SPM 3.3, Pg. 19, Para 5, IPCC AR5 SYR)	Social Adaptation	National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change			
		National Environment Policy, 2006			
Adaptation options for poverty alleviation include improved access to and control of local resources. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				
Increased decision making power can also help in livelihood enhancement. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Rajiv Gandhi Panchayat Sashaktikaran Abhiyan			Yes
		The Constitution (seventy third ammendment) Act, 1992			
Gender equity in education as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Beti Bachao Beti Padoo	Ladli Lakhmi Scheme		Yes
Extension services as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				
Sharing indigenous, traditional and local knowledge as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				
Creating knowledge sharing and learning platforms available as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change			
Climate services as social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				
Use of indigenous climate observations as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				
National governments can coordinate adaptation efforts of local and subnational governments by protecting vulnerable groups (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Social Adaptation				

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Some of the response adaptation options for human development can be improved access to education . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Sarva Shiksha Abhiyan	Goa Scholarship Scheme		Yes
		District Primary Education Programme			
		The Right of Children to Free and Compulsory Education Act, 2009			
		Constitution Act, 2002			
		Rashtriya Madhyamik Shiksha Abhiyan			
		Early Child Care and Education Programme			
Better nutrition and health facilities can also help in effective human development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Indira Gandhi Matritva Sahyog Yojana	DIET Programme		Yes
		Rajiv Gandhi Scheme for Empowerment of Adolescent Girls (SABLA)	Deen Dayal Swasthya Seva scheme		
		National Health Mission			
		Janani Shishu Suraksha Program			
		Integrated Child Development Services Scheme			
Reduced gender inequality and marginalization in other forms can be beneficial in enhancing adaptation in terms of human development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Beti Bachao Beti Padoo	MAMTA scheme		Yes
Social safety nets along with social protection can help in effective poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	National Youth Policy, 2014			
		Saakshar Bharat Mission/ National literacy Mission			
		Vocationalisation of Secondary Education			
		Mid day Meal Programme			
		Public Distribution System			
		Early Child Care and Education Programme			
		Integrated Child Development Services Scheme			
		Janani Suraksha yojna			
Using services such as food banks and distribution of food surplus for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	National Food security act 2013			
Using services such as vaccination programs for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	National Vaccine Policy, 2005			
		Universal Immunization Programme			

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Using services such as essential public health services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	National Rural Health Mission	Deen Dayal Swasthya Seva		Yes
		National Urban Health Mission			
Using services such as enhanced emergency medical services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	National Rural Health Mission	Deen Dayal Swasthya Seva		Yes
Reliance on social networks as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				
A modern nationwide system of social protection needs to be developed to address the adverse impacts of subsidy removal on the rural poor and also it helps in broadening the agenda for equitable development. (Para 5, Pg. 41, 6.2, NCE SYR India Chapter)	Social Adaptation				
Better targeted and much more effective spending on poverty reduction. (Para 2, Pg. 40, 6, NCE SYR India Chapter)	Social Adaptation				

Climate Resilient Infrastructure

Figure 16: Recommendation addressed through Climate Resilient Infrastructure in Goa



52% of the recommendations falling under this sector have been addressed through various state and national schemes such as upgradation of urban infrastructure through national AMRUT scheme, MNREGA Goa Gram Samrudhi scheme and Rajiv Awas yojana all of which are accompanied with budgetary allocations. addressing the recommendations for Upgrading urban infrastructure (scale and quantity) and Better transport and road infrastructures. Another 43% of the recommendations to improve disaster risk building codes and Disaster Management through multi purpose shelters, Disaster Management Legislation and Relief and Rehabilitation Policy are taken cognizance of through policy statements. Only 5% of the recommendations in this sector are not addressed.

Table 27: Policy advice from IPCC and NCE for Climate Resilient Infrastructure addressed in Goa

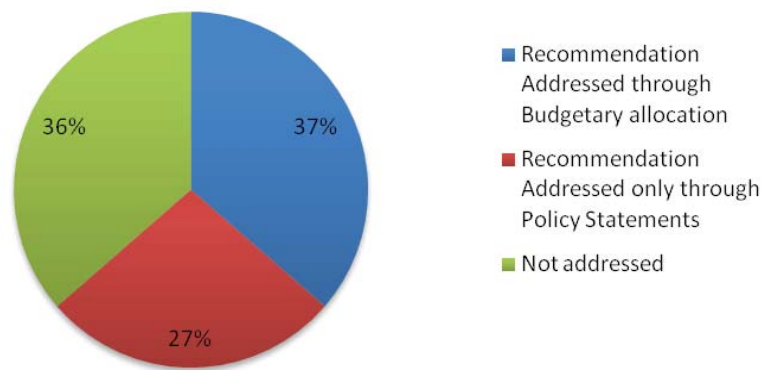
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Energy, safe housing and settlement structures and social support structure are helpful as human development adaptation measures. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure	National Urban Housing and Habitat Policy, 2007	DEENDAYAL PANCHAYATI RAJ INFRASTRUCTURE DEVELOPMENT SCHEME		
Disaster risk management can be addressed through flood and cyclone shelters . <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure	Flood Management Guidelines	DISASTER MANAGEMENT SCHEME AT PANCHAYAT LEVEL	Disaster Management Legislation and Relief and Rehabilitation Policy	Yes
Disaster risk management can be addressed through building codes and practices as they can save lives and reduce structural damages. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure	National Urban Housing and Habitat Policy, 2007	DISASTER MANAGEMENT SCHEME AT PANCHAYAT LEVEL	Disaster Management Legislation and Relief and Rehabilitation Policy	Yes
Better transport and road infrastructures can also help in reducing the vulnerability by natural disasters. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure	National Urban Transport Policy	IDMT Integrated development of Major Towns Scheme		Yes
		National Mission on Sustainable Habitat under National Action Plan on Climate Change	DEENDAYAL PANCHAYATI RAJ INFRASTRUCTURE DEVELOPMENT SCHEME		
Structural/Physical Adaptation Response Options include some Engineered and built-environment options such as sea walls and coastal protection structures . <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure			Disaster Management Legislation and Relief and Rehabilitation Policy	
Floating houses as a structural/physical adaptation measure. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure				
Using services such as municipal services including water and sanitation for better adaptation. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure		AMRUT scheme		Yes
			DEENDAYAL PANCHAYATI RAJ INFRASTRUCTURE DEVELOPMENT SCHEME		
Creating building standards and easements as regulatory institutional adaptation measure. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure	National Urban Housing and Habitat Policy, 2007	Goa Gram Samrudhi Scheme		Yes

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Upgrading and expanding transmission network to allow tapping of power from new wind and solar sites. <i>(Para 6, Pg. 25, 3.4, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure	Jawaharlal Nehru National Solar Mission under National Action Plan on Climate Change	DEENDAYAL PANCHAYATI RAJ INFRASTRUCTURE DEVELOPMENT SCHEME		Yes
			Goa Gram Samrudhi Scheme		
			DEENDAYAL PANCHAYATI RAJ INFRASTRUCTURE DEVELOPMENT SCHEME		
Upgrading urban infrastructure (scale and quantity) is required for better growth. <i>(Para 7, Pg. 37, 5.1, NCE SYR India Chapter)</i> <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure	National Urban Housing and Habitat Policy	IDMT Integrated development of Major Towns Scheme		Yes
Broad reforms of land regulation are required for infrastructure development/up-gradation. <i>(Para 7, Pg. 37, 5.1, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure				
Coordination of land regulation reforms with development of infrastructure initiatives is a key opportunity for clean urbanisation in India. <i>(Para 6 and 7, Pg. 38, 5.2, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure				
A well-developed housing finance system is required. <i>(Para 1, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure				
Local government's revenue (through reforms of property taxes) needs to be encouraged. <i>(Para 3, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure	Reform of the Property Tax under Jawaharlal Nehru Urban Renewal Mission			
Laws to encourage insurance purchasing as regulatory institutional adaptation measure. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure				
Defining property rights and land tenure security as regulatory institutional adaptation measure. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure				
Property tax reforms that focus on taxing land values rather than building space can be effective in promoting development. <i>(Para 4, Pg. 39, 5.2, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure	Reform of the Property Tax under Jawaharlal Nehru Urban Renewal Mission			
Better policies and planning to control land use and energy demand for urbanization. <i>(Para 4, Pg. 40, 6, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure				

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Institutional approaches involves multiple actors and include economic options such as insurance, public private partnership, laws and regulations such land zoning laws and national and government policies and programs such as economic diversification play a key role in promoting the transition from planning to effective implementation of adaptation. (SPM 4.4, Pg. 29, Para 11, IPCC AR5 SYR)	Climate Resilient Infrastructure/ Climate Resilient Livelihoods	Addressed through various sectors			
Land zoning laws can lead to better land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional adaptation/ Urban infrastructure	Coastal Regulation Zone			
Land tenure can be another soft adaptation measure for poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional adaptation/ Urban infrastructure	National Land Records Modernisation Programme			yes

Sustainable Water Management

Figure 17: Recommendation addressed through Sustainable Water Management in Goa



37% of the recommendations in the water sector regarding integrated water resource management and municipal water management programs are addressed through Rural water supply programme and the panchayat level disaster management scheme are addressed through policy initiatives coupled with budgetary allocations. 27 % of the recommendations have been taken cognizance of through other state and national policy measures without any corresponding budgetary support such as the state Water Policy, 2014 and the Goa Ground Water Policy. 36 % of the recommendations such as diversifying water resources etc have not been addressed.

Table 28: Policy advice from IPCC and NCE for Sustainable Water Management addressed in Goa

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
National and Government Policy and Programs can include municipal water management programs . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		DISASTER MANAGEMENT SCHEME AT PANCHAYAT LEVEL		Yes
National and Government Policy and Programs can include integrated water resource management . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	National Water Mission under National Action Plan on Climate Change		Draft State Water Policy	
Recycling of water have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Sustainable Water Management	National Water Policy, 2012	Goa Gram Samrudhi Scheme		
Disaster risk management can be addressed through diversifying water resources . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		DISASTER MANAGEMENT SCHEME AT PANCHAYAT LEVEL	Disaster Management Legislation and Relief and Rehabilitation Policy	Yes
Disaster risk management can be addressed through improved drainage . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	National Water Policy, 2012	DISASTER MANAGEMENT SCHEME AT PANCHAYAT LEVEL		Yes
Better water storage is also a structural/physical adaptation response. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management			Draft State Water Policy	
Use of desalinization as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		Rural Water Supply Programme		Yes
Pricing water to encourage universal provision and careful use as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management				
Water regulations and agreements as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management			Goa Ground Water Policy	
Soil and water conservation as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management			Goa Ground Water Policy	
Storm drain clearance as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management				

Energy

38% of the recommendations have been addressed through policy initiatives coupled with budgetary allocations. Especially notable in this regard is that Goa has signed a Power Purchase Agreement with NTPC Vidyut Vyapar Nigam Limited (NVVNL) for the supply of solar power. Goa has received allocation of 25 MW solar power from Solar Energy Corporation of India (SECI) for a period of 25 years. 33% recommendations have been taken cognizance of through various policy measures such as mandating energy efficiency standards by adopting the energy conservation norms for buildings, National Energy Labeling Programme etc for the state. The rest 34% recommendations are not addressed by the state.

Figure 18: Recommendation addressed through Energy in Goa

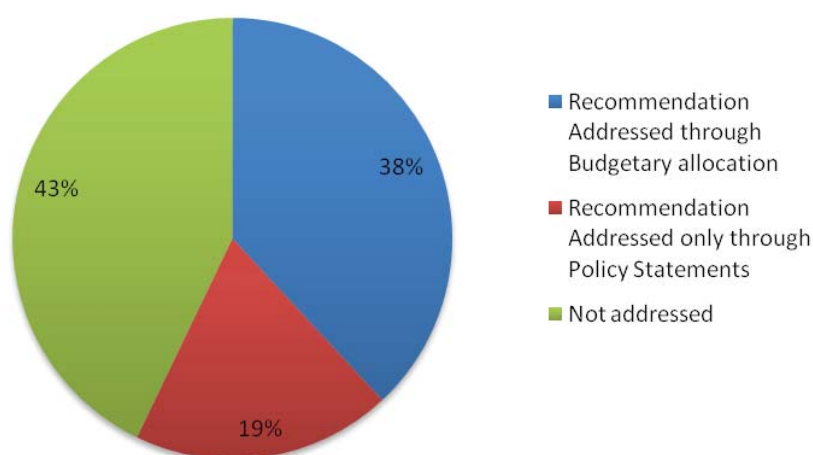


Table 29: Policy advice from IPCC and NCE for Energy addressed in Goa

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Behaviour, lifestyle and culture influence energy use and associated emissions and have high mitigation potential in some sectors specially when complementing technological and structural change. (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Energy Efficiency		DEENDAYAL PANCHAYATI RAJ INFRASTRUCTURE DEVELOPMENT SCHEME		Yes
			Goa Gram Samrudhi Scheme		
Voluntary codes along with mandatory minimum energy efficiency standards can play an important role in reducing GHG emissions. (Para 2, Pg. 41, 6.1, NCE SYR India Chapter)(Para 7, Pg. 20, 3.2, NCE SYR India Chapter)	Energy Efficiency	Standards and Labelling Scheme			
Expanded information initiatives along with mandatory minimum energy efficiency standards can play an important role in reducing GHG emissions. (Para 2, Pg. 41, 6.1, NCE SYR India Chapter)	Energy Efficiency	Standards and Labelling Scheme			
Decarbonizing (reducing the carbon intensity) electricity generation as well as efficiency enhancement and behavioural changes without compromising development are important mitigation measures to limit global warming to 2°C. (SPM 4.3, Pg. 28, Para 3, IPCC AR5 SYR)	Energy Efficiency		UJALA (UnnatJyoti by Affordable LEDs for All) scheme		Yes

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Near-term reductions in energy demand are very important in cost-effective mitigation strategies. <i>(SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR).</i>	Energy Efficiency		UJALA (UnnatJyoti by Affordable LEDs for All) scheme		Yes
Behaviour, lifestyle and culture influence energy use and associated emissions and have high mitigation potential in some sectors specially... <i>(SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)</i>	Energy Efficiency				
Regulatory approaches such as energy efficiency standards and information measures such as labelling programs are environmentally effective and can help consumers make better-informed decisions. <i>(SPM 4.4, Pg. 30, Para 3, IPCC AR5 SYR)</i>	Energy Efficiency	National Energy Labelling Programme			
Adopting methods such as improved energy efficiency or reducing the proportion of coal in the country's fuel mix will be necessary to reduce GHG emissions. <i>(Para 2, Pg. 14, 2.3, NCE SYR India Chapter)</i>	Energy Efficiency				
Mandatory minimum energy efficiency standards can be an effective tool.	Energy Efficiency	Energy Conservation Building Codes(ECBC)	UJALA (UnnatJyoti by Affordable LEDs for All) scheme		Yes
Fuel efficiency standards for new cars can be an important step towards better management of energy demand in the transport sector. <i>(Para 1, Pg. 21, 3.2, NCE SYR India Chapter)</i>	Energy Efficiency	Standards and Labelling			
Improving agglomeration productivity to upgrade growth and economic efficiency. <i>(Para 4, Pg. 40, 6, NCE SYR India Chapter)</i>	Energy Efficiency				
Introduction/tightening up of mandatory minimum energy efficiency standards for appliances, vehicles and buildings can play an important role in reducing GHG emissions. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency	Standards and Labelling	UJALA (UnnatJyoti by Affordable LEDs for All) scheme		Yes
Careful monitoring and impact evaluation to ensure vigorous enforcement of minimum energy efficiency standards. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency	Standards and Labelling			
Increasing the flow of concessional domestic debt to renewable projects through creation or strengthening of development banking institutions can help with the high financing costs in renewable energy projects in India. <i>(Para 8, Pg. 25, 3.4, NCE SYR India Chapter)</i>	Renewable Energy				

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Government initiatives to reduce the high cost of renewable projects can stimulate private investments in renewables. <i>(Para 4, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Renewable Energy	National Solar Mission under National Action Plan on Climate Change	24X7 Power for All Scheme		Yes
GHG Emissions can be reduced substantially through changes in consumption patterns and adoption of energy saving measures. <i>(SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)</i>	Energy Efficiency				
Financial incentives (e.g. consumer rebates) can be complemented along with minimum energy efficiency standards to encourage energy demand management and appliance efficiency. <i>(Para 7, Pg. 20, 3.2, NCE SYR India Chapter)</i>	Energy Efficiency				
Using public sector approach e.g. creation of a National Renewable Power Corporation to undertake major renewable investments with world class levels of management and technological dynamism. <i>(Para 8, Pg. 25, 3.4, NCE SYR India Chapter)(Para 4, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Renewable Energy				
		National Renewable Energy Act 2015			
Strengthening government administrative capacity to ensure vigorous enforcement of minimum energy efficiency standards. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency				
Use of cleaner energy sources have synergies and between adaptation and mitigation measures can co-benefit both the sectors. <i>(SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)</i>	Renewable Energy		project for development of grid connected solar PV plants		Yes
		Alternate Energy			
Substitution of renewable energy for imported coal at the margin can have vital economic and social benefits such as greater energy security and a cleaner environment. <i>(Para 3, Pg. 24, 3.4, NCE SYR India Chapter)</i>	Renewable Energy		project for development of grid connected solar PV plants		Yes

Smart and Sustainable Cities

67% of the recommendations in this sector have not been addressed. These include suggestions such as reforms of rent control laws, better systems to appraise land values and determine property rights etc. The rest, i.e. 33 % of the recommendations that include reforms to achieve more compact, productive and green cities and better urban planning are being addressed through the State's participation in the Smart Cities Mission.

Figure 19: Recommendation addressed through Smart and Sustainable Cities in Goa

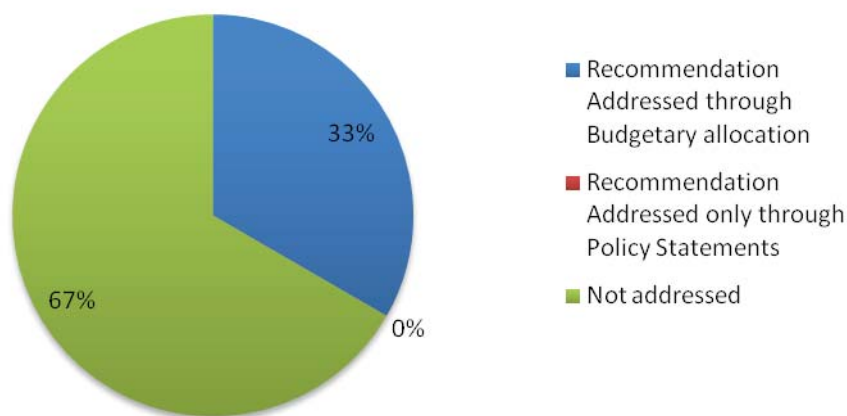


Table 30: Policy advice from IPCC and NCE for Smart and sustainable Cities addressed in Goa

Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation
Urban planning and upgrading programs can be one of the adaptation options for land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Smart Cities	National Mission on Sustainable Habitat under National Action Plan on Climate Change	Solar and Green Cities program and Smart city mission		Yes
		National Urban Housing and Habitat Policy, 2007	Smart City Mission		
High restriction on floor space indexes (FSI) needs to be relaxed. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Sustainable Smart Cities				
Reforms to achieve more compact, productive and green cities need to move simultaneously and in coordination. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Sustainable Smart Cities		Smart Cities Mission		Yes
Need of rent control laws (reform). (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Sustainable Smart Cities				
Need of better systems of appraise land values and determine property rights. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Sustainable Smart Cities				
A comprehensive impact evaluation of Jawaharlal Nehru Urban Renewal Mission is needed to learn and improve effectiveness for a renewed and better urban investment and reform agenda. (Para 8, Pg. 39, 5.2, NCE SYR India Chapter) (Para 2, Pg. 42, 6.3, NCE SYR India Chapter)	Sustainable Smart Cities				

Status of implementation of Recommendations not identified as priorities under SAPCC

Of the recommendations made for Power sector Reforms as per the IPCC and NCE, 94.12% recommendation have not been addressed. However 33% of the recommendations for this sector have been addressed with budgetary allocations.

Improved Livestock management sector recommendations have all been (100%) addressed with budgetary support. These include recommendations such as Adequately resourced public initiatives in the livestock sector, improved feeds by providing better quality of animal diets, Better animal health and reproduction management etc., that addressed with Stray Cattle management Scheme and Community Dairy Farming, Green Fodder Initiative, as well as Pashupalan scheme in the state.

As far as the adaptation oriented recommendations are concerned, disaster preparedness is an important aspect. The status here is that 36% of the recommendation have been addressed with policy initiatives coupled with budgetary allocations. These recommendations include storm and wastewater management and the development of flood prone and high risk areas. These have been addressed through Cyclone Shelters cum coastal fire stations proposed to be built under National Cyclone Risk Mitigation Project, as well as the disaster management scheme at the panchayat level. 36.36% of the recommendations have been taken cognizance of through policy statements such as the Disaster Management Legislation and Relief and Rehabilitation Policy, as well as the National Disaster Management Policy. The rest of the 27% recommendations have not been addressed.

Recommendations from the other Cross Cutting themes, and IPCC recommendations for International cooperation and enhanced capacity building have been mainly addressed through National schemes and policies and not at the level of the state government.

Karnataka

Climate Resilient Agriculture

25% of the recommendations under this category are addressed through policy initiatives coupled with budgetary support. Some of these recommendations include Cropland management, Development and planting of climate-hardy indigenous cultivars etc., which have been addressed in the Bhoo Chetna (17000 crores) initiative, recommendations such as better animal health, reproduction and management research etc. are being addressed by the Disease Research Unit at KVAFSU, Shimoga and Livestock Health Research and IEC center at Mulabagilu (2 crores). Crop insurance is being provided in the state through Provision of Crop insurance under the National Agricultural Insurance Scheme (NAIS) and Water Based Crop Insurance Scheme. Mitigation oriented initiatives_for carbon sequestration are addressed through the Afforestation schemes in Karnataka as well as the Agro Forestry development scheme. 31% of the recommendations are taken cognizance of through only policy statements and initiatives without any corresponding budgetary support. 44% of the recommendations under this category have not been addressed.

Figure 20: Recommendation addressed through Climate Resilient Agriculture in Karnataka

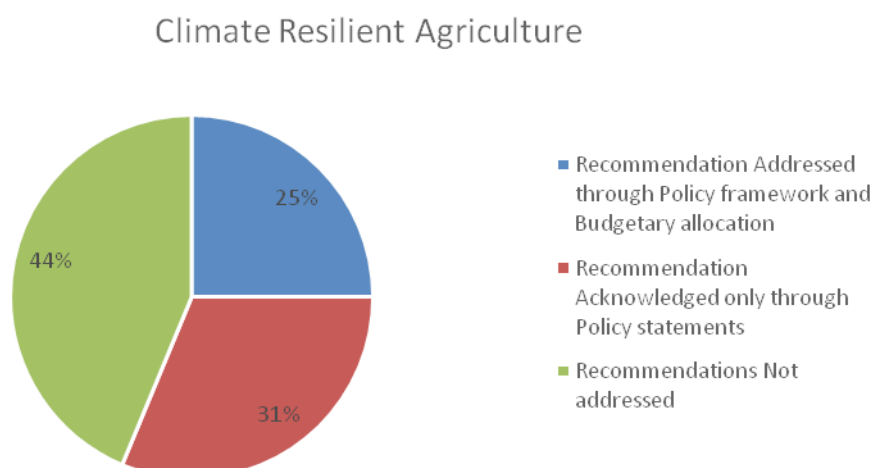


Table 31: Policy advice from IPCC and NCE for Climate resilient Agriculture addressed in Karnataka

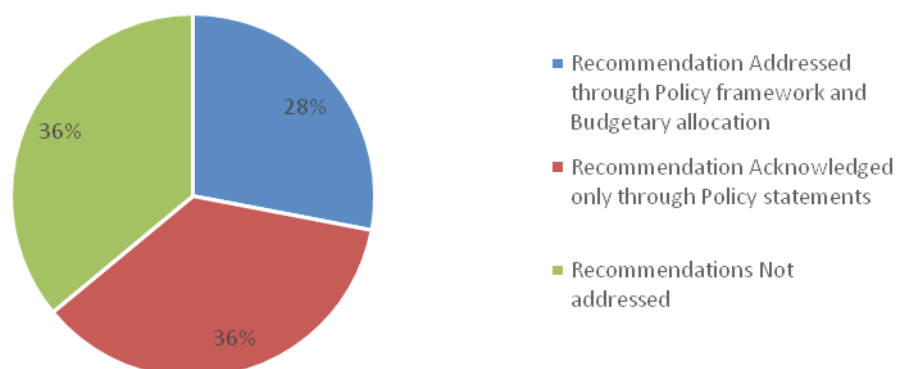
Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Sustainable agriculture and forestry have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Agriculture and Ecosystem	Promotion of agro-forestry (Pg. 52, Karnataka SAPCC) Promoting benefits of multifunctional agro forestry (Pg. 52, Karnataka SAPCC)	Initiate conservation and development programmes for indigenous breeds of sheep are facing extinction.				Yes
Changed cropping pattern, livestock and aquaculture practices are some adaptation options that can be used to conserve the ecosystem as well as better livelihood. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Agriculture			Karnataka Agricultural Policy 2006; Karnataka Land Policy			Yes
Using new crops and animal varieties as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Agriculture	Development and planting of climate-hardy indigenous cultivars (Pg. 52, Karnataka SAPCC)	Bhoo Chetana (Land Improvement) programme (Pg. 139, Karnataka SAPCC)		Provision of Crop insurance under the National Agricultural Insurance Scheme (NAIS) and Water Based Crop Insurance Scheme (WBCIS) (Pg. 139, Karnataka SAPCC)		Yes
		Development of Agro-biodiversity using indigenous varieties (Pg. 52, Karnataka SAPCC)	KARNATAKA STATE BIODIVERSITY STRATEGY AND ACTION PLAN (KBSAP)				Yes
Cropland management, grazing land management and restoration of organic soils are important mitigation options for the agriculture sector. (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR)	Climate Resilient Agriculture	Conversion of wastelands to pasturelands in a phased manner (Pg. 52, Karnataka SAPCC)	establishment of Silk Testing Centre				Yes
Adaptation strategies like changes in planting dates and crop varieties can offset some of the negative impacts of smaller temperature increases. (Para 1, Pg. 10, 2.1, NCE SYR India Chapter)	Climate Resilient Agriculture	Development and planting of climate-hardy indigenous cultivars (Pg. 52, Karnataka SAPCC)	Bhoo Chetana (Land Improvement) programme (Pg. 139, Karnataka SAPCC)		Provision of Crop insurance under the National Agricultural Insurance Scheme (NAIS) and Water Based Crop Insurance Scheme (WBCIS) (Pg. 139, Karnataka SAPCC)		Yes

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Use of new methods of cultivation (e.g. System of Rice Intensification (SRI)) can help reduce water usage and methane emissions while improving resilience. <i>(Para 7, Pg. 33, 4.4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture				System of Rice Intensification in India		
Promoting energy efficient water pumps for better water management. <i>(Para 8, Pg. 33, 4.4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture	measurement of flows in the irrigation canals for accounting losses and improving efficiency (Pg. 72, Karnataka SAPCC)					
Using micro-irrigation methods such as drip and sprinkler irrigation for better water management. <i>(Para 8, Pg. 33, 4.4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture	study of efficient crop water utilisation methods (Pg. 72, Karnataka SAPCC)					
Reallocating spending from low-yielding subsidies towards high yielding agriculture R&D can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture						Yes
Reallocating spending from low-yielding subsidies towards education can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Reallocating spending from low-yielding subsidies towards extension services and rural infrastructure can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)(Para 4, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture						
Policy reforms to use modern agricultural technologies and practices. <i>(Para 2, Pg. 27, 4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture						
Improved public policy support in agriculture sector. <i>(Para 2, Pg. 30, 4.1, NCE SYR India Chapter)</i>	Climate Resilient Agriculture						
Compensating farmers by credible and tangible improvements in public service delivery and better infrastructure could solve the problem of agriculture subsidy reform to some extent. <i>(Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture	Establishment of a state level policy body to develop suitable mechanisms for encouraging cropping shifts through re-distribution of existing subsidies (Table 11.3.2, Pg. 166, Karnataka SAPCC)	It is proposed to waive off the outstanding loans along with interest amounting to Rs.473.05 lakhs availed by Fisheries Co-operative Societies under 1st and 2nd Stage of NCDC Scheme for inland fisheries				Yes

Climate Resilient Ecosystem

Figure 21: Recommendation addressed through Climate Resilient Ecosystem in Karnataka



For the Climate resilient ecosystem sector, 36% of the recommendations such as **Protection of Ecosystem, Ecosystem management, Provision of protected area, Initiating Conservation and development programs etc.** are taken cognizance of by National Forest Restoration Programme. 28% of the recommendations are addressed through a policy focus coupled with budgetary support. Some of these initiatives include the **Integrated Coastal Zone Management programme, beach protection and coast management plan, and National Disaster Mitigation Project, Agro Forestry Development Scheme etc.** The rest (36%) of the recommendations, are not being addressed.

Table 32: Policy advice from IPCC and NCE for Climate resilient Ecosystem addressed in Karnataka

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Limiting warming over the 21 st century to below 2 ^o C relative to pre-industrial level requires larger reliance on Carbon Dioxide Removal (CDR) (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Climate Resilient Ecosystem				National Mission for Green India under National Action Plan on Climate Change		Yes
Sustainable agriculture and forestry have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Agriculture and Ecosystem	Promotion of agro-forestry (Pg. 52, Karnataka SAPCC) Promoting benefits of multifunctional agro forestry (Pg. 52, Karnataka SAPCC)	Initiate conservation and development programmes for indigenous breeds of sheep are facing extinction.				Yes
Protection of Ecosystem for carbon storage has synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Ecosystem						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Ecosystem adaptation can be done effectively by coastal afforestation . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Formulate an action plan for replanting of mangrove in the area where they have disappeared (Table 11.3.19, Pg. 98, Karnataka SAPCC)				CRZ Notification Government of India	
		Promoting best practices for conservation and sustainable utilisation of coastal resources (Pg. 98, Karnataka SAPCC)				CRZ Notification Government of India	Yes
Ecosystem management adaptation is enhanced by watershed and reservoir management . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	GIS based aquifer studies for assessing research possibilities (Pg. 72, Karnataka SAPCC)		watershed development and construction of ground water recharge structures			Yes
Adaptation in ecosystem management can be conducted by reducing other stressors on ecosystems and habitat fragmentation . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						
Maintenance of genetic diversity can enhance the adaptive capacity of ecosystem. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Development of tissue culture labs to enhance the germ plasm	Implementation of the Suvarna Gramodhya (Village development) scheme implemented (Pg. 139, Karnataka SAPCC)				Yes
Manipulation of disturbance regimes can lead to better ecosystem management (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						

Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Provision of protected areas can improvise adaptation in land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem			Establishment of Western Ghat Task force			Yes
Mangrove Conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Formulate an action plan for replanting of mangrove in the area where they have disappeared (Table 11.3.19, Pg. 98, Karnataka SAPCC)				CRZ Notification Government of India	Yes
Promoting Green infrastructure (e.g. shade trees and green roofs) as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						
Controlling overfishing, fisheries co-management as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Promoting best practices for conservation and sustainable utilisation of coastal resources (Pg. 98, Karnataka SAPCC)				CRZ Notification Government of India	
Assisted species migration and dispersal as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						
Creation of ecological corridors as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						

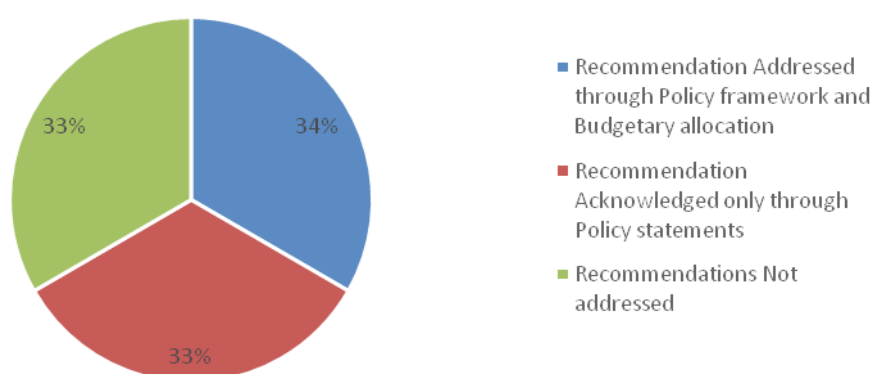
Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Seed banks, gene banks and other ex-situ conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						
Payments for ecosystem services as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						
Cost effective mitigation options in forestry are: Afforestation, sustainable forest management and reducing deforestation (with large differences in their relative importance across regions). (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR)	Climate Resilient Ecosystem	increase tree cover in the state to 33% of the geographical area		Establishment of Western Ghat Task force (Pg. 140, Karnataka SAPCC)		Forest Conservation Act	Yes
Scaling up of existing initiatives to expand the quality and quantity of forests under the 'Green India Mission'. (Para 6, Pg. 41, 6.2, NCE SYR India Chapter)	Climate Resilient Ecosystem	Development and implementation of GIS based forest land management system		Protection of forests, enhancement of resources productivity and growing of medicinal plan (Pg. 140, Karnataka SAPCC)		Forest Conservation Act	Yes
Ecological restoration as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem			Lake Conservation and Development by Karnataka Lake Conservation and Development			

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
National and Government Policy and Programs can include integrated coastal zone management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Beach protection through bio-shielding (Pg. 98, Karnataka SAPCC)		Under Coastal Protection Scheme Phase-2, DPR for 8 sub-projects have been prepared and submitted to Central Water Commission for approval. Works will be commenced after approval.		CRZ Notification Government of India	Yes
National and Government Policy and Programs can include ecosystem based management, community based adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem				Addressed through various sector specific schemes		
Policies that can help reduce excessive local pollution can benefit India improve the national welfare while still sustaining economic growth. (Para 1. Pg. 11, 2.3, NCE SYR India Chapter)	Climate Resilient Ecosystem		14 point programme on reduction of pollution				
Policies that can help reduce inefficient natural resource use can benefit India improve the national welfare while still sustaining economic growth. (Para 1. Pg. 11, 2.3, NCE SYR India Chapter)	Climate Resilient Ecosystem		Karnataka Natural Resources Data Management System (NRDMS) program 1992				

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Soil Conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	To ensure the minimization of GHG emissions a standard code of operations should be developed by and for KFD for activities such as planting, soil and water conservation, use of fertilizers and machinery (Pg. 86, Karnataka SAPCC)		Approximately 80,000 ha of plantation by Karnataka Forest Department in 2010-11 (Pg. 140, Karnataka SAPCC)			Yes
Strong regulatory, governance and project selection mechanisms to reduce the risk that scarce public resources face because of government failures. (Para 8, Pg. 25, 3.4, NCE SYR India Chapter)	Climate Resilient Ecosystem						

Social Adaptation

Figure 22: Recommendation addressed through Social Adaptation in Karnataka



34% of the recommendations in this category have been addressed through a policy focus backed by budgetary allocations. Some of these initiatives include Karnataka Nutrition mission, Karnataka Health System Development & Reform Project, Implementation of the Janani Suraksha Yojana (Maternal care scheme) and Prasuthi Ariake Yojana (Pregnant woman care) schemes under the umbrella of the Thaiy Bhagya (Maternal health care) programme, etc. 33% of the recommendations suggesting better nutrition and health have been taken cognizance of through a number of policy frameworks put in place such as the Pradhan Mantri Gramin Awaas Yojana, Support to Training & Employment Programme for Women (STEP), The Karnataka State Integrated Health Policy and the Karnataka Nutrition Mission and other social safety nets. However, 33% of the recommendations remain unaddressed by the state. These include climate services as social (informational) adaptation measures and reliance on social networks as behavioral adaptation.

Table 33: Policy advice from IPCC and NCE for Social Adaptation addressed in Karnataka

Policy Advice from IPCC and NCE	Thematic Focus	Identified solution /intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Building adaptive capacity is important for better selection and implementation of adaptation options. (SPM 3.3, Pg. 19, Para 5, IPCC AR5 SYR)	Social Adaptation			Includes all sector specific adaptive capacity measures			
Adaptation options for poverty alleviation include improved access to and control of local resources. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				Pradhan Mantri Gramin Awaas Yojana		Yes
Increased decision making power can also help in livelihood enhancement. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation						Yes
Gender equity in education as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Support to Training & Employment Programme for Women (STEP)				Yes
Extension services as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation						
Sharing indigenous, traditional and local knowledge as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Promote knowledge sharing (Pg. 52, Karnataka SAPCC)	Implementation of the Suvarna Bhoomi (Land prosperity) scheme				
Creating knowledge sharing and learning platforms available as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Promote knowledge sharing (Pg. 52, Karnataka SAPCC)	Implementation of the Suvarna Bhoomi (Land prosperity) scheme				Yes
Climate services as social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution /intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Use of indigenous climate observations as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation						
Better targeted and much more effective spending on poverty reduction. (Para 2, Pg. 40, 6, NCE SYR India Chapter)	Social Adaptation				Integrated Rural Development Programme; National Fund for Rural Development		Yes
National governments can coordinate adaptation efforts of local and subnational governments by protecting vulnerable groups (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Social Adaptation	Assess regional vulnerability (spatially and temporally) with respect to changes in the climate (Pg. 138, Karnataka SAPCC)	Implementation of the Karnataka Health System Development & Reform Project		Implementation of the National Vector-Borne Disease Control Programme (NVBDCP) (Pg. 141, Karnataka SAPCC)		Yes
Some of the response adaptation options for human development can be improved access to education. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		RASHTRIYA MADHYAMIK SHIKSHA ABHIYAN				Yes
Better nutrition and health facilities can also help in effective human development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Karnataka Nutrition Mission	The Karnataka State Integrated Health Policy			Yes
Reduced gender inequality and marginalization in other forms can be beneficial in enhancing adaptation in terms of human development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Support to Training & Employment Programme for Women (STEP)				

Policy Advice from IPCC and NCE	Thematic Focus	identified solution /intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Social safety nets along with social protection can help in effective poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Social safety net Bengaluru		Nutrition and Social Safety Net, Planning Commission		
Using services such as food banks and distribution of food surplus for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation						
Using services such as vaccination programs for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation					National Vaccine Policy, 2005	
Using services such as essential public health services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				National Rural Health Mission, National Urban Health Mission		
Using services such as enhanced emergency medical services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation	Study the regional pattern of climate sensitive diseases and disease outbreaks (Pg. 137, Karnataka SAPCC)	Free emergency care services to the rural people under the Arogya Kavacha		Implementation of the Janani Suraksha Yojana (Maternal care scheme) and Prasuthi Ariake Yojana (Pregnant woman care) schemes under the umbrella of the Thaiy Bhagya (Maternal health care) programme		Yes
		Identify trigger events (climatic and non-climatic) that influence infection transmission spread of climate sensitive diseases (Pg. 138, Karnataka SAPCC)					
Reliance on social networks as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution /intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
A modern nationwide system of social protection needs to be developed to address the adverse impacts of subsidy removal on the rural poor and also it helps in broadening the agenda for equitable development. (Para 5, Pg. 41, 6.2, NCE SYR India Chapter)	Social Adaptation						

Climate Resilient Infrastructure

57% of the recommendations in this sector are unaddressed. 10% of the recommendations have been addressed through policy statements supported by budgetary measures. These include, upgrading and expanding the transmission network or upgrading urban infrastructure. In addition, there are many recommendations (33%) that have been taken cognizance of through a policy focus. Examples of such recommendations include building codes and practices, reforms of land regulations, Better policies and planning to control land use and energy demand etc.

Figure 23: Recommendation addressed through Climate Resilient Infrastructure in Karnataka

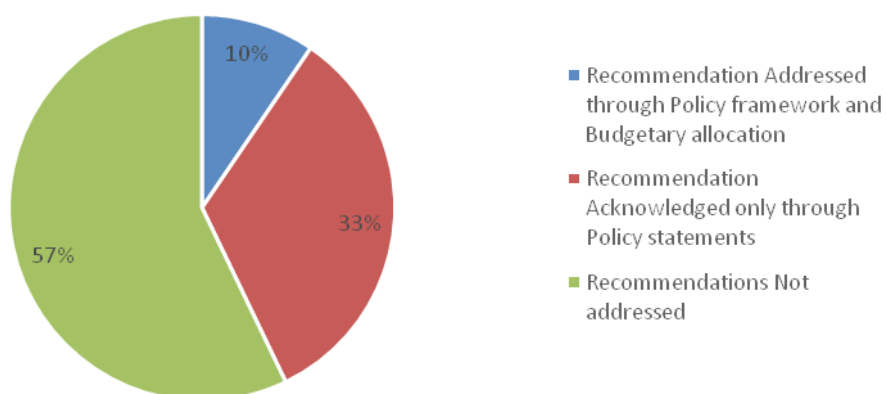


Table 34: Policy advice from IPCC and NCE for Climate Resilient Infrastructure addressed in Karnataka

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Energy, safe housing and settlement structures and social support structure are helpful as human development adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Disaster risk management can be addressed through flood and cyclone shelters . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure				National Cyclone Risk Mitigation Project to be implemented		Yes
Disaster risk management can be addressed through building codes and practices as they can save lives and reduce structural damages. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure					National Building Code of India 2005	
Better transport and road infrastructures can also help in reducing the vulnerability by natural disasters. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure/ Sustainable Transport	improve public transport dependability (Pg. 132, Karnataka SAPCC)		Proposal of high speed rail connecting Bangalore International Airport			
Structural/Physical Adaptation Response Options include some Engineered and built-environment options such as sea walls and coastal protection structures . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Beach protection through bio-shielding (Pg. 98, Karnataka SAPCC)	Under Coastal Protection Scheme Phase-2, DPR for 8 sub-projects have been prepared and submitted to Central Water Commission for approval. Works will be commenced after approval.			CRZ Notification Government of India	Yes
		Beach management to strengthen local economy (Pg. 98, Karnataka SAPCC)				CRZ Notification Government of India	
Floating houses as a structural/physical adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure						
Using services such as municipal services including water and sanitation for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure			Karnataka urban drinking water and sanitation policy 2002			Yes

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Creating building standards and easements as regulatory institutional adaptation measure. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Climate Resilient Infrastructure						
Upgrading and expanding transmission network to allow tapping of power from new wind and solar sites. <i>(Para 6, Pg. 25, 3.4, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure	Development of indigenous and cost effective solar technology (Pg. 117, Karnataka SAPCC)	Solar Karnataka Programme for 25,000 solar rooftops of 5 to 10 kW with net metering	Incentivisation of installation of solar water heater by BESCO through tariff discounts			Yes
Upgrading urban infrastructure (scale and quantity) is required for better growth. <i>(Para 7, Pg. 37, 5.1, NCE SYR India Chapter)[SPM Table 4.2, Pg. 27, IPCC AR5 SYR]</i>	Climate Resilient Infrastructure			NA			
Broad reforms of land regulation are required for infrastructure development/up-gradation. <i>(Para 7, Pg. 37, 5.1, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure			Karnataka Land Reforms Act 1961			
Coordination of land regulation reforms with development of infrastructure initiatives is a key opportunity for clean urbanisation in India. <i>(Para 6 and 7, Pg. 38, 5.2, NCE SYR India Chapter)</i>	Climate Resilient Infrastructure						
A well-developed housing finance system is required. <i>(Para 1, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Climate resilient infrastructure						
Local government's revenue (through reforms of property taxes) needs to be encouraged. <i>(Para 3, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Climate resilient infrastructure						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Institutional approaches involves multiple actors and include economic options such as insurance, public private partnership, laws and regulations such land zoning laws and national and government policies and programs such as economic diversification play a key role in promoting the transition from planning to effective implementation of adaptation. (SPM 4.4, Pg. 29, Para 11, IPCC AR5 SYR)	Climate Resilient Infrastructure/ Climate Resilient Livelihood					Addressed through various sector specific schemes	
Land tenure can be another soft adaptation measure for poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal and institutional reforms for low carbon development (adaptation)/ Climate Resilient Infrastructure			Land Resources and Policy of Karnataka			
Land zoning laws can lead to better land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal and institutional reforms for low carbon development (adaptation)/ Climate Resilient Infrastructure					CRZ Notification and Special Economic Zones	
Laws to encourage insurance purchasing as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure						
Defining property rights and land tenure security as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Remove encroachments within a timeframe of 5 years (Table 11.3.17, Pg.181, Karnataka SAPCC)		Land Resources and Policy of Karnataka			
Property tax reforms that focus on taxing land values rather than building space can be effective in promoting development. (Para 4, Pg. 39, 5.2, NCE SYR India Chapter)	Climate Resilient Infrastructure						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Better policies and planning to control land use and energy demand for urbanization. (Para 4, Pg. 40, 6, NCE SYR India Chapter)	Climate Resilient Infrastructure						

Sustainable Water Management

Of the total recommendations for the vulnerabilities identified in this sector, 73% have been loosely addressed through cognizance within policy statements. Examples include urban drinking water and sanitation policy, industrial policy mandating rain water harvesting, soil and water conservation etc. However, recommendations that have been fully addressed through a policy focus coupled with budgetary support are a mere 9% of the total number of recommendations. 18% of the recommendations have not been addressed at all. These include aspects such as research and study on efficient water utilization methods, diversifying water resources etc.

Figure 24: Recommendation addressed through Sustainable Water Management in Karnataka

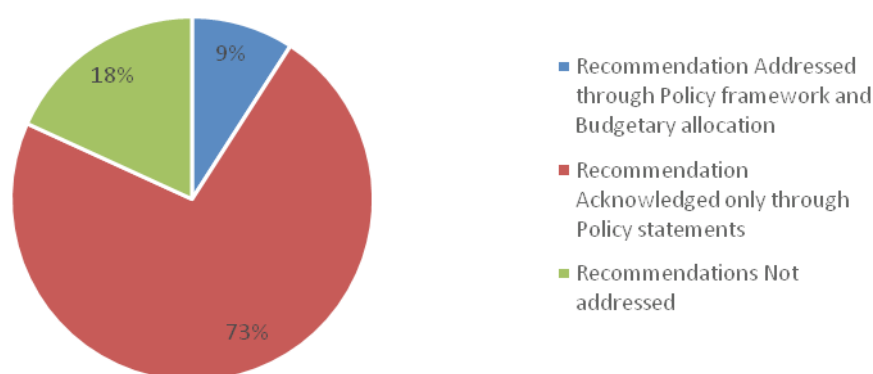


Table 35: Policy advice from IPCC and NCE for Sustainable Water Management addressed in Karnataka

Policy Advice from IPCC and NCE	Thematic Focus	identified solution /intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
National and Government Policy and Programs can include municipal water management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		<u>Karnataka Municipal Water Energy Efficiency Project</u>				

Policy Advice from IPCC and NCE	Thematic Focus	identified solution /intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
National and Government Policy and Programs can include integrated water resource management . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Advanced computing systems for making predictions for water resources (Pg. 72, Karnataka SAPCC) Formulating a legal provision in by-laws of local bodies for water conservation (Pg. 72, Karnataka SAPCC)	Installation of a permanent water storage scheme of 7.5 million litre ground level reservoir at Ramamurthi nagar (construction ongoing)	Enactment of the Karnataka Groundwater (Regulation and Control of Development and Management) Bill, 2011 for better protection of groundwater resources		National lake and river conservation (Pg. 140, Karnataka SAPCC)	
	Sustainable Water Management	Conducting a detailed water resources inventory (Pg. 71, Karnataka SAPCC)	Karnataka Integrated and Sustainable Water Resources Management Investment Program				
Recycling of water have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Sustainable Water Management	Promoting of treatment plants at point source/ CETPs for small industries (Table 11.3.18, Pg. 98, Karnataka SAPCC)		<u>Karnataka Industrial Policy 2014-19</u>			Yes
Disaster risk management can be addressed through diversifying water resources . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management						
Disaster risk management can be addressed through improved drainage . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management			Karnataka Industrial Policy 2014-19			
Better water storage is also a structural/ physical adaptation response. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	assessment for reducing evaporation losses within water storage structures (Pg. 72, Karnataka SAPCC)		mandatory dual piping in new layouts for use of treated water			
Use of desalinization as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution /intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Pricing water to encourage universal provision and careful use as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Consider a policy on water metering for bulk consumers of groundwater (Pg. 72, Karnataka SAPCC)		Karnataka Urban Drinking Water and Sanitation Policy, 2003			
Water regulations and agreements as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Consider a policy on water metering for bulk consumers of groundwater (Pg. 72, Karnataka SAPCC)		Karnataka Urban Drinking Water and Sanitation Policy, 2003			
Soil and water conservation as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Conducting spatial and temporal assessments of water availability for micro-watersheds and analyse trends using models such as Surface Water Assessment Tool (SWAT) (Pg. 72, Karnataka SAPCC)	Launch of the Jalasiri (Water recharge) programme	Mandatory use of rainwater harvesting in residential and commercial buildings in certain areas		Bharat Nirman Policy (Pg. 139, Karnataka SAPCC)	
		Regulate use of Bore wells (Pg. 72, Karnataka SAPCC)					Yes
		Formulating a legal provision in by-laws of local bodies for water conservation (Pg. 72, Karnataka SAPCC)					
		To ensure the minimization of GHG emissions a standard code of operations should be developed by and for KFD for activities such as planting, soil and water conservation, use of fertilizers and machinery (Pg. 86, Karnataka SAPCC)			Approximately 80,000 ha of plantation by Karnataka Forest Department		
Storm drain clearance as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management				National Water Mission under National Action Plan on Climate Change		

Energy

52% of the recommendations have been taken cognizance of through policy initiatives. These include initiatives such as the national labeling and standards scheme. 29% of the recommendations have been addressed through a policy focus coupled with budgetary allocations. Examples of such initiatives include the National UJALA scheme to distribute energy efficient LED lamps and incentivisation of roof top solar heaters etc. Only around 19% of the recommendations remain unaddressed under this category.

Figure 25: Recommendation addressed through Energy in Karnataka

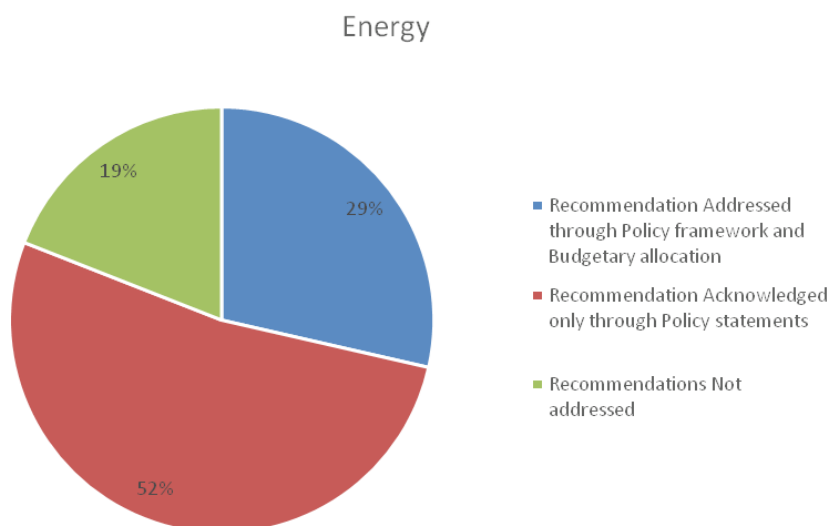


Table 36: Policy advice from IPCC and NCE for Energy addressed in Karnataka

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Behaviour, lifestyle and culture influence energy use and associated emissions and have high mitigation potential in some sectors specially when complementing technological and structural change. (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Energy Efficiency						
Voluntary codes along with mandatory minimum energy efficiency standards can play an important role in reducing GHG emissions. (Para 2, Pg. 41, 6.1, NCE SYR India Chapter)(Para 7, Pg. 20, 3.2, NCE SYR India Chapter)	Energy Efficiency				Standards and Labelling Scheme		

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Expanded information initiatives along with mandatory minimum energy efficiency standards can play an important role in reducing GHG emissions. (Para 2, Pg. 41, 6.1, NCE SYR India Chapter)	Energy Efficiency	Capacity building of local bodies for planning and implementation energy efficiency means (Pg. 116, Karnataka SAPCC)	Belaku (Light) scheme to replace up to four incandescent bulbs with CFLs at a subsidised rates per household (Pg. 140, Karnataka SAPCC)	Mandatory use of solar water heaters, CFLs, ISI marked motor pump sets and integration of energy efficiency and renewable energy in new buildings (Pg. 140, Karnataka SAPCC)			
Decarbonizing (reducing the carbon intensity) electricity generation as well as efficiency enhancement and behavioural changes without compromising development are important mitigation measures to limit global warming to 2°C. (SPM 4.3, Pg. 28, Para 3, IPCC AR5 SYR)	Energy Efficiency			KARNATAKA RENEWABLE ENERGY POLICY 2009-14			Yes
Near-term reductions in energy demand are very important in cost-effective mitigation strategies. (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR).	Energy Efficiency			KARNATAKA RENEWABLE ENERGY POLICY 2009-14			
Behaviour, lifestyle and culture influence energy use and associated emissions and have high mitigation potential in some sectors specially... (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Energy Efficiency			KARNATAKA RENEWABLE ENERGY POLICY 2009-14			
Regulatory approaches such as energy efficiency standards and information measures such as labelling programs are environmentally effective and can help consumers make better-informed decisions. (SPM 4.4, Pg. 30, Para 3, IPCC AR5 SYR)	Energy Efficiency			KARNATAKA RENEWABLE ENERGY POLICY 2009-14	Star Labelled Appliances BEE Programme		Yes
Adopting methods such as improved energy efficiency or reducing the proportion of coal in the country's fuel mix will be necessary to reduce GHG emissions. (Para 2, Pg. 14, 2.3, NCE SYR India Chapter)	Energy Efficiency				PAT		Yes

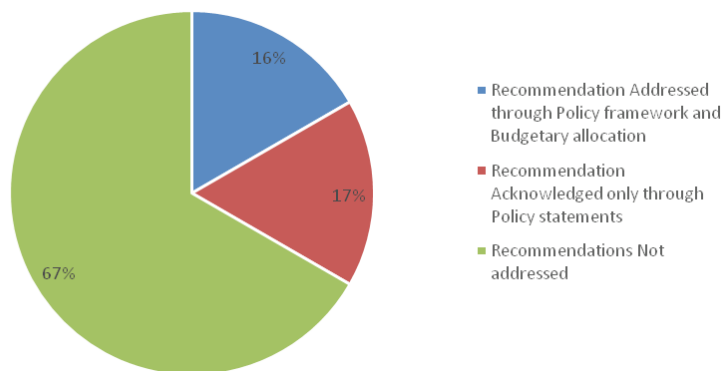
Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Mandatory minimum energy efficiency standards can be an effective tool.	Energy Efficiency			24 X 7 POWER FOR ALL	PAT		Yes
Improving agglomeration productivity to upgrade growth and economic efficiency. <i>(Para 4, Pg. 40, 6, NCE SYR India Chapter)</i>	Energy Efficiency			24 X 7 POWER FOR ALL	PAT		Yes
Introduction/tightening up of mandatory minimum energy efficiency standards for appliances, vehicles and buildings can play an important role in reducing GHG emissions. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency	Capacity building of local bodies for planning and implementation energy efficiency means (Pg. 116, Karnataka SAPCC)	Belaku (Light) scheme to replace up to four incandescent bulbs with CFLs at a subsidised rates per household (Pg. 140, Karnataka SAPCC)	Mandatory use of solar water heaters, CFLs, ISI marked motor pump sets and integration of energy efficiency and renewable energy in new buildings (Pg. 140, Karnataka SAPCC)	Energy Conservation Building Code (ECBC)		
		reducing energy demand in lighting and cooling in Building sector (Pg. 131, Karnataka SAPCC)			PAT		
Careful monitoring and impact evaluation to ensure vigorous enforcement of minimum energy efficiency standards. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency						Yes
GHG Emissions can be reduced substantially through changes in consumption patterns and adoption of energy saving measures . <i>(SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)</i>	Energy Efficiency	Creation of the energy conservation fund (Pg. 116, Karnataka SAPCC)	The work of establishing Gas based power plant at Yelahanka will be started during 2016-17	Karnataka Renewable Energy Policy 2009-14 (Pg. 140, Karnataka SAPCC)			Yes
Financial incentives (e.g. consumer rebates) can be complemented along with minimum energy efficiency standards to encourage energy demand management and appliance efficiency. <i>(Para 7, Pg. 20, 3.2, NCE SYR India Chapter)</i>	Energy Efficiency	Creation of the energy conservation fund (Pg. 116, Karnataka SAPCC)	The work of establishing Gas based power plant at Yelahanka will be started during 2016-17	Karnataka Renewable Energy Policy 2009-14 (Pg. 140, Karnataka SAPCC)			

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Strengthening government administrative capacity to ensure vigorous enforcement of minimum energy efficiency standards. (Para 2, Pg. 41, 6.1, NCE SYR India Chapter)	Energy Efficiency	Capacity building of local bodies for planning and implementation energy efficiency means (Pg. 116, Karnataka SAPCC)	Belaku (Light) scheme to replace up to four incandescent bulbs with CFLs at a subsidised rates per household (Pg. 140, Karnataka SAPCC)	Mandatory use of solar water heaters, CFLs, ISI marked motor pump sets and integration of energy efficiency and renewable energy in new buildings			
Increasing the flow of concessional domestic debt to renewable projects through creation or strengthening of development banking institutions can help with the high financing costs in renewable energy projects in India. (Para 8, Pg. 25, 3.4, NCE SYR India Chapter)	Renewable Energy	Development of indigenous and cost effective solar technology (Pg. 117, Karnataka SAPCC)	Solar Karnataka Programme for 25,000 solar rooftops of 5 to 10 kW with net metering	Incentivisation of installation of solar water heater by BESCO through tariff discounts			
		Creation of the energy conservation fund (Pg. 116, Karnataka SAPCC)	energy conservation fund				Yes
		Fiscal incentives to promote setting up of renewable technology manufacturing units in the state (Pg. 117, Karnataka SAPCC)					
		Solar Mission provide for the requisite resources (Table 11.3.24, Pg. 189, Karnataka SAPCC)	Solar Karnataka Programme for 25,000 solar rooftops of 5 to 10 kW with net metering	Incentivisation of installation of solar water heater by BESCO through tariff discounts .			Yes
Using public sector approach e.g. creation of a National Renewable Power Corporation to undertake major renewable investments with world class levels of management and technological dynamism. (Para 8, Pg. 25, 3.4, NCE SYR India Chapter)(Para 4, Pg. 41, 6.1, NCE SYR India Chapter)	Renewable Energy			Karnataka Solar Policy 2014-21			Yes

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
<p>Government initiatives to reduce the high cost of renewable projects can stimulate private investments in renewables. (Para 4, Pg. 41, 6.1, NCE SYR India Chapter)</p>	Renewable Energy	<p>Rapid scaling up of activities to implement the Renewable Energy Policy through time-bound targets wherever instruments of the National Solar Mission provide for the requisite resources (Table 11.3.24, Pg. 189, Karnataka SAPCC)</p>	<p>It is proposed to design a project for generation of 150 MW of solar energy with private investment under PPP model by installing solar panels of about 1.8 crores square feet area on the roof top of warehouse godowns of KSWC.</p>	<p>Decision of creating a Green Energy Fund (Akshaya Shakti Nidhi) to generate financial resources within the state to implement its policy</p>			Yes
		<p>Development of indigenous and cost effective solar technology (Pg. 117, Karnataka SAPCC)</p>					
		<p>Fiscal incentives to promote setting up of renewable technology manufacturing units in the state (Pg. 117, Karnataka SAPCC)</p>					
<p>Use of cleaner energy sources have synergies and between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)</p>	Renewable Energy			KARNATAKA RENEWABLE ENERGY POLICY 2009-14			Yes
<p>Substitution of renewable energy for imported coal at the margin can have vital economic and social benefits such as greater energy security and a cleaner environment. (Para 3, Pg. 24, 3.4, NCE SYR India Chapter)</p>	Renewable Energy						

Sustainable Smart Cities

Figure 26: Recommendation addressed through Smart and Sustainable Cities in Karnataka



The Smart Cities Mission was launched in 2015 with a budget of Rs. 98,000 crores which identifies 7 cities in Karnataka to be developed as smart cities. Karnataka also has the solar city mission to address Reforms to achieve more compact, productive and green cities. Despite these initiatives, however, 67% of the recommendations made under this category are unaddressed. Of the rest, 16% are addressed through both policy focus and budgetary support and 17% are taken cognizance of through policy statements or focus.

Table 37: Policy advice from IPCC and NCE for Smart and sustainable Cities addressed in Karnataka

Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / intervention or Specific Policy Statement or Target	State Schemes	State Policy	National Scheme	National Policy	State Budget allocation
Urban planning and upgrading programs can be one of the adaptation options for land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Smart and Sustainable Cities	all interventions under urbanization in the SAPCC			Solar City Programme under which a Solar City Cell and a committee will be formed		Yes
High restriction on floor space indexes (FSI) needs to be relaxed. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities				Solar City Programme under which a Solar City Cell and a committee will be formed		
Reforms to achieve more compact, productive and green cities need to move simultaneously and in coordination. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities						
Need of rent control laws (reform). (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities						
Need of better systems of appraise land values and determine property rights. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities						
A comprehensive impact evaluation of Jawaharlal Nehru Urban Renewal Mission is needed to learn and improve effectiveness for a renewed and better urban investment and reform agenda. (Para 8, Pg. 39, 5.2, NCE SYR India Chapter) (Para 2, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities				Addressed through impact evaluation studies conducted by TISS and Crisil		

Status of implementation of Recommendations not identified as priorities under SAPCC

Other than the State themes, there are additional themes and their respective recommendation from the IPCC and NCE including various themes under Power sector reforms. The state government has launched a joint Power for All initiative with the Government of India in order to ensure power supply without any interruptions to all consumers, especially adequate supply to agriculture farmers. In addition, the clean technology fund and funding from multilateral development banks is channeled towards innovation and investment in environmentally sound infrastructure and technology.

In the Adaptation oriented recommendations Disaster preparedness was addressed with more than 18% of the recommendations coming under a policy focus coupled with budgetary support through programmes such as storm and wastewater management, development of flood prone and high risk areas etc. 27.27% were taken cognizance of through policy statements and initiatives such as the Disaster Management Legislation and Relief and Rehabilitation Policy, National Disaster Management Policy etc. The rest (54.55%) of the recommendations remain unaddressed.

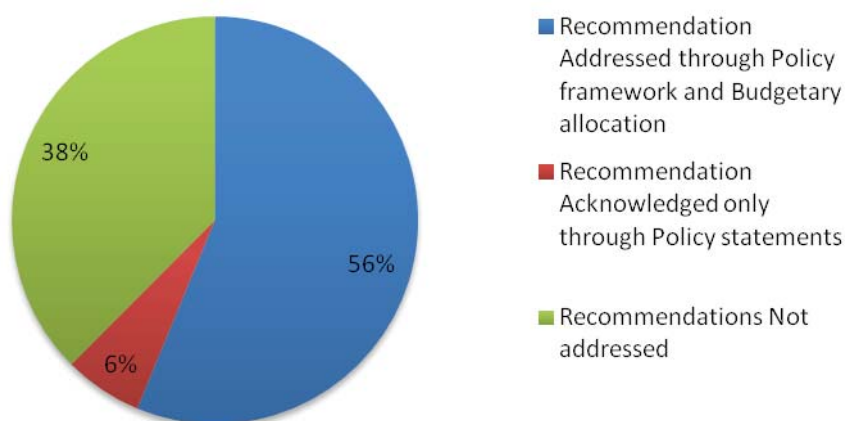
The adaptation specific recommendations, especially technological adaptation measures have not been addressed in the state action plan. However, there is a budget allocation for reduction in energy demand in buildings and integrating passive cooling structures in building plans. There is a web-enabled GIS System for Disaster Management under KSNDMC (Karnataka State Natural Disaster Monitoring Centre) that addresses the IPCC recommendation of monitoring early warning systems as a technological adaptation measure. The recommendations pertaining to disaster preparedness have been looked at in a narrow scope under the state action plan such that the state's disaster management policy also addresses transcending areas such as setting up of disaster contingency funds and household evacuation planning as recommended by IPCC.

Recommendations from the Cross Cutting themes, and IPCC recommendations for International cooperation and enhanced capacity building have been mainly addressed through National schemes and policies.

Tamil Nadu

Agriculture

Figure 27: Recommendation addressed through Climate Resilient Agriculture in Tamil Nadu



56% of the recommendations in this category have been addressed through a policy focus coupled with budgetary allocations such as promoting use of new crops and animal varieties by setting up Tamil Nadu State Seed Development Agency for the supply of quality seeds for agricultural crops, Distribution of Milch Cows and Goats / Sheep etc. 6% of recommendations have been taken cognizance of through policy statements, while 38% of the recommendations such as improved public support or better public service delivery to farmers are not addressed.

Table 38: Policy advice from IPCC and NCE for Climate resilient Agriculture addressed in Tamil Nadu

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Sustainable agriculture and forestry have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Agriculture and Ecosystem				Soil Health Card Scheme under National Mission for Sustainable Agriculture (NMSA)		Yes
Using new crops and animal varieties as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Agriculture	Research and development on crop season, water conservation, integrating water usage, effect of change in temperature / humidity, varietal development for rice, pulses that will tolerate weather change and different soils.	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	yes	Government has established the Tamil Nadu State Seed Development Agency (TANSEDA) for the supply of quality seeds for agricultural crops.		Yes
Changed cropping, livestock and aquaculture practices as behavioral adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Agriculture	Brackish water Aquaculture for utilizing saline areas for shrimp/fish production	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	yes			
Cropland management, grazing land management and restoration of organic soils are important mitigation options for the agriculture sector. (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR)	Climate Resilient Agriculture		National Mission on Sustainable Agriculture under National Action Plan on Climate Change	yes	Agriculture Technology Management Agency - Training of farmers		Yes

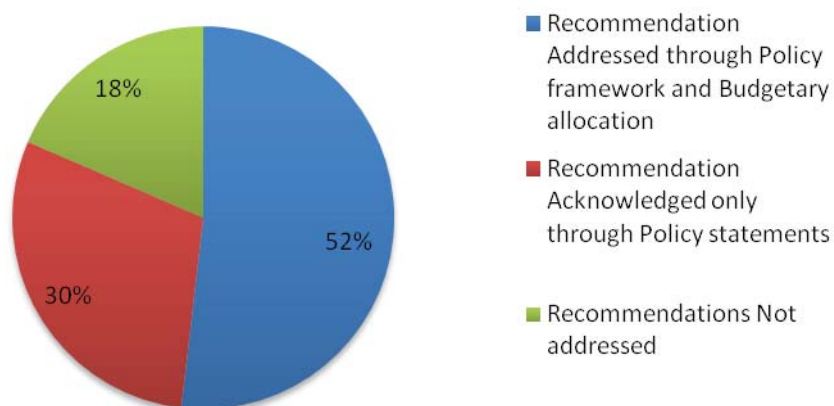
Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Adaptation strategies like changes in planting dates and crop varieties can offset some of the negative impacts of smaller temperature increases. <i>(Para 1, Pg. 10, 2.1, NCE SYR India Chapter)</i>	Climate Resilient Agriculture	Research and development on crop season, water conservation, integrating water usage, effect of change in temperature / humidity, varietal development for rice, pulses that will tolerate weather change and different soils.	National Initiative on Climate Resilient Agriculture	yes	Government has established the Tamil Nadu State Seed Development Agency (TANSEDA) for the supply of quality seeds for agricultural crops. The Tamil Nadu Horticulture Development Agency (TANHODA) has been supplying seeds and liquid fertilizers for horticultural crops promoting Integrated Farming System		Yes
Use of new methods of cultivation (e.g. System of Rice Intensification (SRI)) can help reduce water usage and methane emissions while improving resilience. <i>(Para 7, Pg. 33, 4.4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture		National Initiative on Climate Resilient Agriculture		Tamil Nadu Innovation Initiatives (TNAII) - Scheme (Smart Water Techniques in Rice)		Yes
Promoting energy efficient water pumps for better water management. <i>(Para 8, Pg. 33, 4.4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture	Water conservation Strategies	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	yes	Additional capital subsidy to promote cleaner and environment friendly technologies		
Using micro-irrigation methods such as drip and sprinkler irrigation for better water management. <i>(Para 8, Pg. 33, 4.4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture				Agricultural Mechanisation Programme		

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Reallocating spending from low-yielding subsidies towards high yielding agriculture R&D can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter) (Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture		'Pradhan Mantri Fasal Bima Yojana' (PMFBY).	Rs.239.51 crores			
Reallocating spending from low-yielding subsidies towards education can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter) (Para 5, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture						
Reallocating spending from low-yielding subsidies towards extension services and rural infrastructure can improve the economic effectiveness of public spending and environmental sustainability of agriculture. <i>(Para 6, Pg. 31, 4.4, NCE SYR India Chapter)(Para 4, Pg. 41, 6.2, NCE SYR India Chapter)</i>	Climate Resilient Agriculture				'Tamil Nadu Infrastructure Development		Yes
Policy reforms to use modern agricultural technologies and practices. <i>(Para 2, Pg. 27, 4, NCE SYR India Chapter)</i>	Climate Resilient Agriculture						
Improved public policy support in agriculture sector. <i>(Para 2, Pg. 30, 4.1, NCE SYR India Chapter)</i>	Climate Resilient Agriculture						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Compensating farmers by credible and tangible improvements in public service delivery and better infrastructure could solve the problem of agriculture subsidy reform to some extent. (Para 5, Pg. 41, 6.2, NCE SYR India Chapter)	Climate Resilient Agriculture						

Climate Resilient Ecosystem

Figure 28: Recommendation addressed through Climate Resilient Ecosystem in Tamil Nadu



30 % of the recommendations have been taken cognizance of through policy statements or focus. 52% of the recommendations have been addressed through budgetary allocation such as the Comprehensive Flood Protection Plan for Coastal Zone, or the National Calamity Contingency Fund. In addition, Tamil Nadu is also vigorously implementing the Tamil Nadu Tree Plantation programme under the National Afforestation and Ecodevelopment Programme. The remaining 78% of the recommendations have not been addressed at all.

Table 39: Policy advice from IPCC and NCE for Climate resilient Ecosystem addressed in Tamil Nadu

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Limiting warming over the 21 st century to below 2 ^o C relative to pre-industrial level requires larger reliance on Carbon Dioxide Removal (CDR) (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change	yes			

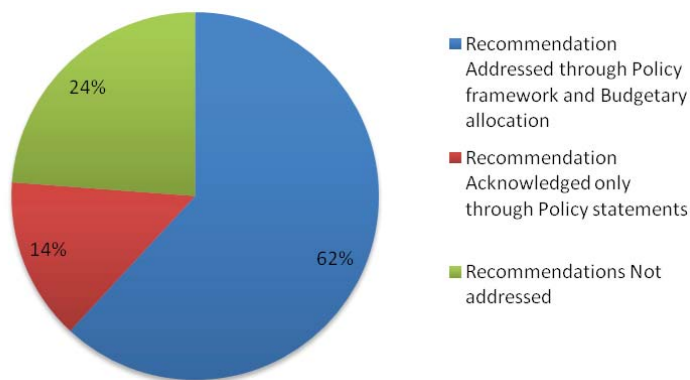
Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Sustainable agriculture and forestry have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Agriculture and Ecosystem				Soil Health Card Scheme under National Mission for Sustainable Agriculture (NMSA)		Yes
Protection of Ecosystem for carbon storage has synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change	yes	Tamil Nadu afforestation project		
Ecosystem adaptation can be done effectively by coastal afforestation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Green cover for coastal calamities	National Afforestation Programme		Tamil Nadu Afforestation Project		Yes
Ecosystem management adaptation is enhanced by watershed and reservoir management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Environment Policy, 2006		Command Area Development and Water Management Programme		
Ecosystem management adaptation is enhanced by watershed and reservoir management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Environment Policy, 2006		Irrigated Agriculture Modernization and Water-Bodies Restoration and Management		
Adaptation in ecosystem management can be conducted by reducing other stressors on ecosystems and habitat fragmentation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change	yes	Climate Change Adaptation Programme', works have been taken up in the Vennar sub-basin		
Maintenance of genetic diversity can enhance the adaptive capacity of ecosystem. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem				Massive Tree Planting Programme		Yes
Manipulation of disturbance regimes can lead to better ecosystem management (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						
Provision of protected areas can improvise adaptation in land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Environment Policy, 2006	yes	Land Development Scheme		

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Mangrove Conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Green cover for coastal calamities	National Mission for Green India under National Action Plan on Climate Change	yes	Tamil Nadu Afforestation Project		
Promoting Green infrastructure (e.g. shade trees and green roofs) as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem				Massive Tree Planting Programme	yes	
Controlling overfishing, fisheries co-management as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Promotion of inland fishing			Accident Insurance for Active Fishermen and National Saving-cum-Relief scheme for Marine Fishermen	yes	
Assisted species migration and dispersal as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem				Tree Planting		
Creation of ecological corridors as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change	yes			
Seed banks, gene banks and other ex-situ conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		Development and Strengthening of Infrastructure Facilities for Production and Distribution of Quality Seeds (Subsumed under the Sub-mission on Seeds and Planting Material)				
Cost effective mitigation options in forestry are: Afforestation, sustainable forest management and reducing deforestation (with large differences in their relative importance across regions) . (SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR)	Climate Resilient Ecosystem		National Mission for Green India under National Action Plan on Climate Change	yes	Tamil Nadu Afforestation Project		
Scaling up of existing initiatives to expand the quality and quantity of forests under the 'Green India Mission' . (Para 6, Pg. 41, 6.2, NCE SYR India Chapter)	Climate Resilient Ecosystem						

Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Ecological restoration as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		Rainforest Restoration Programme		Tamil Nadu Bio-diversity Conservation and Greening Project		
National and Government Policy and Programs can include integrated coastal zone management . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem		Integrated Coastal Zone Management Project				
National and Government Policy and Programs can include ecosystem based management, community based adaptation . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						
Policies that can help reduce excessive local pollution can benefit India improve the national welfare while still sustaining economic growth. (Para 1. Pg. 11, 2.3, NCE SYR India Chapter)	Climate Resilient Ecosystem		Environment Research Programme				
Policies that can help reduce inefficient natural resource use can benefit India improve the national welfare while still sustaining economic growth. (Para 1. Pg. 11, 2.3, NCE SYR India Chapter)	Climate Resilient Ecosystem		Ecosystem Research Programme				
Strong regulatory, governance and project selection mechanisms to reduce the risk that scarce public resources face because of government failures. (Para 8, Pg. 25, 3.4, NCE SYR India Chapter)	Climate Resilient Ecosystem						
Soil Conservation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem	Soil Conservation strategies	National Water Mission under National Action Plan on Climate Change	yes			
Payments for ecosystem services as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem						

Social Adaptation

Figure 29: Recommendation addressed through Social Adaptation in Tamil Nadu



The recommendations in this sector have been addressed through various state and national schemes such as the national rural health mission and the national Vaccine policy. Overall 62% of the recommendations in this sector have been addressed through policy measures or initiatives coupled with budgetary allocations. An additional 14% of the recommendations are taken cognizance of through policy initiatives that are not, however, supported by budgetary allocations. 24% of the recommendations in this sector have not been addressed.

Table 40: Policy advice from IPCC and NCE for Social Adaptation addressed in Tamil Nadu

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Building adaptive capacity is important for better selection and implementation of adaptation options. (SPM 3.3, Pg. 19, Para 5, IPCC AR5 SYR)	Social Adaptation		National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change	yes	ecological restoration and conservation of Pallikaranai wetland, and the eco-restoration		Yes
Adaptation options for poverty alleviation include improved access to and control of local resources. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				State Mission on Poverty Reduction		Yes
Increased decision making power can also help in livelihood enhancement. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Rajiv Gandhi Panchayat Sashaktikaran Abhiyan				Yes
Gender equity in education as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				Mission on skill development		Yes
Extension services as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		National Mission on Agriculture Extension and Technology (NMAET)	yes			

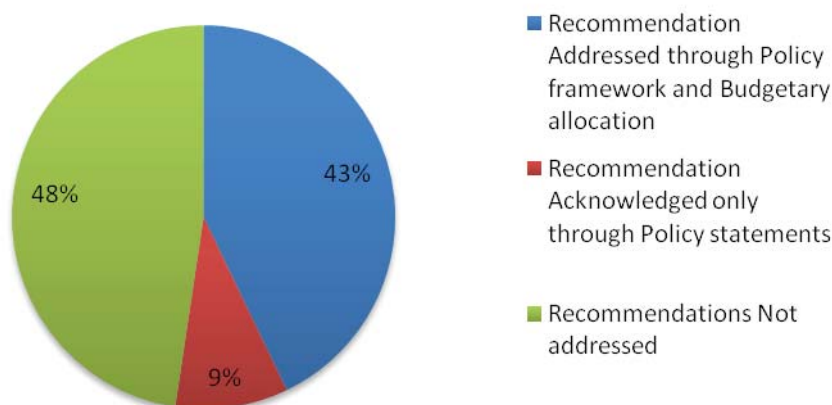
Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Sharing indigenous, traditional and local knowledge as educational and social adaptation measures. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Social Adaptation						
Creating knowledge sharing and learning platforms available as educational and social adaptation measures. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Social Adaptation		National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change	yes			
Climate services as social (informational) adaptation measure. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Social Adaptation		Climate Services Programme				
Use of indigenous climate observations as a social (informational) adaptation measure. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Social Adaptation				Climate Change Adaptation Programme', works have been taken up in the Vennar sub-basin		
Better targeted and much more effective spending on poverty reduction. <i>(Para 2, Pg. 40, 6, NCE SYR India Chapter)</i>	Social Adaptation				State Mission on Poverty Reduction		Yes
National governments can coordinate adaptation efforts of local and subnational governments by protecting vulnerable groups <i>(SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)</i>	Social Adaptation						
Some of the response adaptation options for human development can be improved access to education. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Social Adaptation		Operation Blackboard Scheme, 1987		Mission on skill development		Yes
	Social Adaptation		District Primary Education Programme				
Better nutrition and health facilities can also help in effective human development. <i>(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)</i>	Social Adaptation		Indira Gandhi Matritva Sahyog Yojana		New Health Insurance Scheme		Yes

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Reduced gender inequality and marginalization in other forms can be beneficial in enhancing adaptation in terms of human development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Beti Bachao Beti Padoos	yes			
Social safety nets along with social protection can help in effective poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		National Youth Policy, 2014				
	Social Adaptation		Saakshar Bharat Mission/ National literacy Mission		State Mission on Poverty Reduction		Yes
Using services such as food banks and distribution of food surplus for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		Public Distribution System				
Using services such as vaccination programs for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		National Vaccine Policy, 2005				
Using services such as essential public health services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation		National Rural Health Mission		New Health Insurance Scheme		Yes
Using services such as enhanced emergency medical services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation				Journalists Medical Fund scheme		Yes
Reliance on social networks as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Social Adaptation						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
A modern nationwide system of social protection needs to be developed to address the adverse impacts of subsidy removal on the rural poor and also it helps in broadening the agenda for equitable development. (Para 5, Pg. 41, 6.2, NCE SYR India Chapter)	Social Adaptation						

Climate Resilient Infrastructure

Figure 30: Recommendation addressed through Climate Resilient Infrastructure in Tamil Nadu



The urban development in Tamil Nadu is prone to vulnerabilities due to the frequent impact of extreme events. The Chennai City development mission and Integrated urban development mission focus on building resilient infrastructure in the state. 43% of the recommendations made in this sector have been addressed through policy initiatives coupled with budgetary allocations, but 48% of the recommendations remain unaddressed.

Table 41: Policy advice from IPCC and NCE for Climate Resilient Infrastructure addressed in Tamil Nadu

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Energy, safe housing and settlement structures and social support structure are helpful as human development adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure		National Urban Housing and Habitat Policy, 2007	yes	Mission for housing to achieve hut-free villages and slum-free cities		
Disaster risk management can be addressed through flood and cyclone shelters . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure		Flood Management Guidelines		Flood Management Programme		

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Disaster risk management can be addressed through building codes and practices as they can save lives and reduce structural damages. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Strengthening infrastructure to manage disaster	National Urban Housing and Habitat Policy, 2007	yes	Flood Management Programme		
Better transport and road infrastructures can also help in reducing the vulnerability by natural disasters. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Developing efficient integrated transport system	National Urban Transport Policy				
Structural/Physical Adaptation Response Options include some Engineered and built-environment options such as sea walls and coastal protection structures . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure						
Floating houses as a structural/ physical adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Strengthening infrastructure to manage disaster					
Using services such as municipal services including water and sanitation for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Abating enhanced air and water pollution in a Climate Change (CC) scenario					
Creating building standards and easements as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure		National Urban Housing and Habitat Policy, 2007	yes			
Upgrading and expanding transmission network to allow tapping of power from new wind and solar sites. (Para 6, Pg. 25, 3.4, NCE SYR India Chapter)	Climate Resilient Infrastructure		Jawaharlal Nehru National Solar Mission under National Action Plan on Climate Change	yes			
Upgrading urban infrastructure (scale and quantity) is required for better growth. (Para 7, Pg. 37, 5.1, NCE SYR India Chapter)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Infrastructure	Developing efficient integrated transport system	National Urban Housing and Habitat Policy	yes	Tamil Nadu Infrastructure Development		Yes
Broad reforms of land regulation are required for infrastructure development/up-gradation. (Para 7, Pg. 37, 5.1, NCE SYR India Chapter)	Climate Resilient Infrastructure				Chief Minister's Uzhavar Pathukappu Thittam 2011		Yes
Coordination of land regulation reforms with development of infrastructure initiatives is a key opportunity for clean urbanisation in India. (Para 6 and 7, Pg. 38, 5.2, NCE SYR India Chapter)	Climate Resilient Infrastructure				Chief Minister's Uzhavar Pathukappu Thittam 2011		Yes
A well-developed housing finance system is required. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	climate resilient infrastructure						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Local government's revenue (through reforms of property taxes) needs to be encouraged. (Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	climate resilient infrastructure		Reform of the Property Tax under Jawaharlal Nehru Urban Renewal Mission		Energy Efficiency Programmes[replacement of Conventional Tube lights in street light by the Compact Fluorescent lamps (CFLs)]		
Institutional approaches involves multiple actors and include economic options such as insurance, public private partnership, laws and regulations such land zoning laws and national and government policies and programs such as economic diversification play a key role in promoting the transition from planning to effective implementation of adaptation. (SPM 4.4, Pg. 29, Para 11, IPCC AR5 SYR)	climate resilient infrastructure/ climate resilient livelihoods						
Land zoning laws can lead to better land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional Adaptation/ urban infrastructure						
Laws to encourage insurance purchasing as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	climate resilient infrastructure						
Defining property rights and land tenure security as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	climate resilient infrastructure						
Property tax reforms that focus on taxing land values rather than building space can be effective in promoting development. (Para 4, Pg. 39, 5.2, NCE SYR India Chapter)	climate resilient infrastructure						
Better policies and planning to control land use and energy demand for urbanization. (Para 4, Pg. 40, 6, NCE SYR India Chapter)	climate resilient infrastructure						
Land tenure can be another soft adaptation measure for poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional Adaptation		National Land Records Modernization Programme	Rs.355.81 crores			

Sustainable Water Management

Surprisingly, sustainable water management does not figure as a priority in the Tamil Nadu State Action Plan on Climate Change. Despite that, however, 82% of the recommendations in this category are being addressed through state policy initiatives coupled with budgetary allocations. An additional 9% of the recommendations are taken cognizance of through policy statements and priorities not necessarily supported through budgetary allocations. Thus, Only 9% of the recommendations under this category remain unaddressed.

Figure 31: Recommendation addressed through Sustainable Water Management in Tamil Nadu

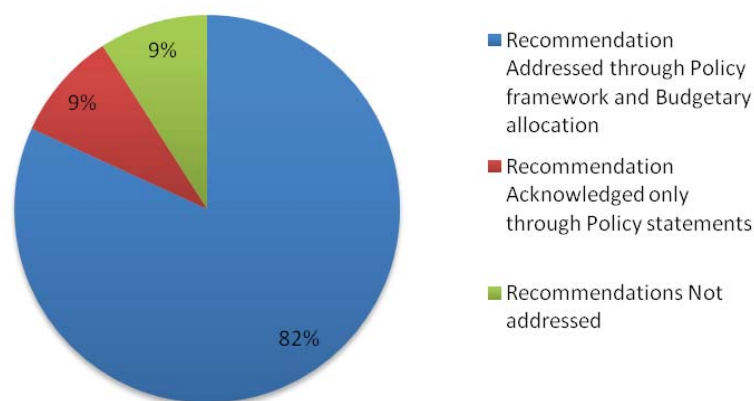


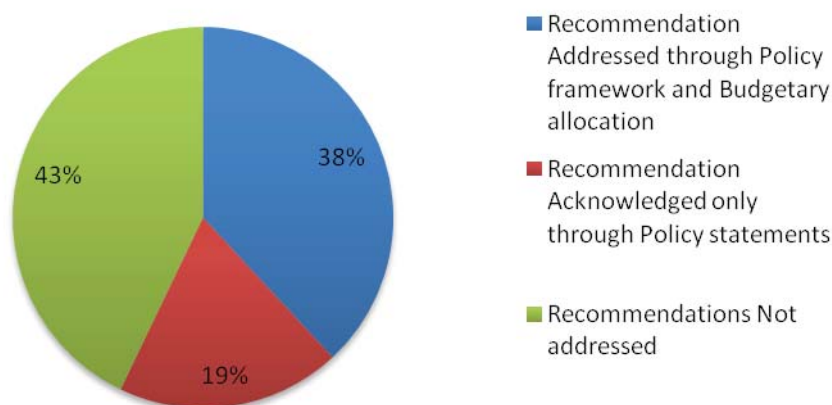
Table 42: Policy advice from IPCC and NCE for Sustainable Water Management addressed in Tamil Nadu

Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
National and Government Policy and Programs can include municipal water management programs . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Abating enhanced air and water pollution in a Climate Change (CC) scenario					
National and Government Policy and Programs can include integrated water resource management . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Desilting & Widening of Channels and Drains, strengthening of embankments & removing water weeds from channels	National Water Mission under National Action Plan on Climate Change	yes	Mission for water resource management and revival of Kudimaramath		
Recycling of water have synergies and trade-offs between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Sustainable Water Management		National Water Mission under National Action Plan on Climate Change	yes			
Disaster risk management can be addressed through diversifying water resources. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		National Water Policy, 2012	yes			
Disaster risk management can be addressed through improved drainage . (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		National Water Mission under National Action Plan on Climate Change	yes	Flood Management Programme		

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Better water storage is also a structural/ physical adaptation response. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Repairing, renovating and restoring tanks and traditional water bodies	National Water Mission under National Action Plan on Climate Change	yes	Master plan for artificial recharge scheme		
Use of desalinization as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		National Water Mission under National Action Plan on Climate Change	yes			
Pricing water to encourage universal provision and careful use as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		National Rural Drinking Water Program (NRDWP)	yes			
Water regulations and agreements as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Construction of anicuts and regulators	National Water Policy, 2012	yes			
Soil and water conservation as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management	Abating enhanced air and water pollution in a Climate Change (CC) scenario			Mission for water resource management and revival of Kudimaramath		
Storm drain clearance as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Sustainable Water Management		National Water Mission under National Action Plan on Climate Change	yes			

Energy

Figure 32: Recommendation addressed through Energy in Tamil Nadu



19% of the recommendations in this category have been taken cognizance of through policy initiatives that are not coupled with any budgetary initiatives. The specific measures that have been taken under this bucket of actions include Energy efficiency norms and standards through Energy Conservation Building Code (ECBC) and National labeling scheme address the recommendations for Energy Efficiency. In addition, 38% of the recommendations have been addressed through policy initiatives coupled with budgetary allocations which include Green Energy Corridor Project, Solar Rooftop Capital Incentive scheme, UJALA scheme for distribution of LED bulbs etc. However, 43% of the schemes remain unaddressed.

Table 43: Policy advice from IPCC and NCE for Energy addressed in Tamil Nadu

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Behaviour, lifestyle and culture influence energy use and associated emissions and have high mitigation potential in some sectors specially when complementing technological and structural change. (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Energy Efficiency						
Voluntary codes along with mandatory minimum energy efficiency standards can play an important role in reducing GHG emissions. (Para 2, Pg. 41, 6.1, NCE SYR India Chapter) (Para 7, Pg. 20, 3.2, NCE SYR India Chapter)	Energy Efficiency		Standards and Labelling Scheme	yes			
Expanded information initiatives along with mandatory minimum energy efficiency standards can play an important role in reducing GHG emissions. (Para 2, Pg. 41, 6.1, NCE SYR India Chapter)	Energy Efficiency						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Decarbonizing (reducing the carbon intensity) electricity generation as well as efficiency enhancement and behavioural changes without compromising development are important mitigation measures to limit global warming to 2°C. <i>(SPM 4.3, Pg. 28, Para 3, IPCC AR5 SYR)</i>	Energy Efficiency						
Regulatory approaches such as energy efficiency standards and information measures such as labelling programs are environmentally effective and can help consumers make better-informed decisions. <i>(SPM 4.4, Pg. 30, Para 3, IPCC AR5 SYR)</i>	Energy Efficiency				Green Energy Corridor Project		Yes
Near-term reductions in energy demand are very important in cost-effective mitigation strategies. <i>(SPM 4.3, Pg. 29, Para 1, IPCC AR5 SYR).</i>	Energy Efficiency						
Adopting methods such as improved energy efficiency or reducing the proportion of coal in the country's fuel mix will be necessary to reduce GHG emissions. <i>(Para 2, Pg. 14, 2.3, NCE SYR India Chapter)</i>	Energy Efficiency	Adoption of Enhanced Energy Efficient generation including supercritical technology			Energy Efficiency Programmers (replacement of Conventional Tube lights in street light by the Compact Fluorescent lamps (CFLs)		Yes
Mandatory minimum energy efficiency standards can be an effective tool.	Energy Efficiency	Grid connected Renewable Energy Generation – Hydro Electric Projects	Energy Conservation Building Codes (ECBC)				
Fuel efficiency standards for new cars can be an important step towards better management of energy demand in the transport sector. <i>(Para 1, Pg. 21, 3.2, NCE SYR India Chapter)</i>	Energy Efficiency		Standards and Labelling				
Improving agglomeration productivity to upgrade growth and economic efficiency. <i>(Para 4, Pg. 40, 6, NCE SYR India Chapter)</i>	Energy Efficiency						

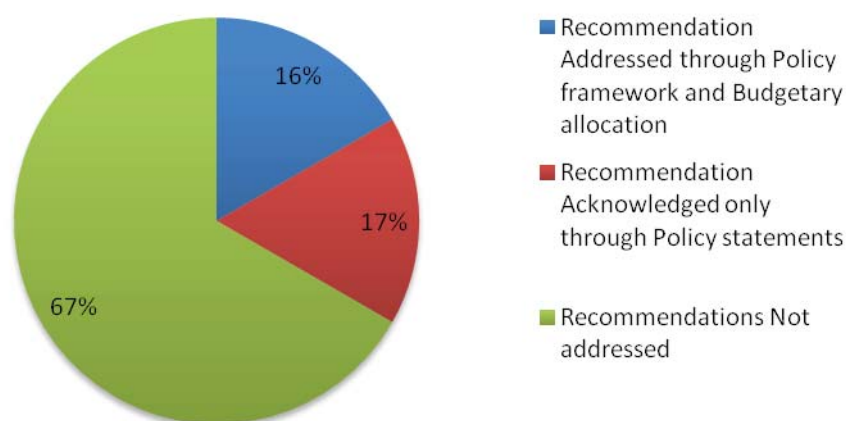
Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Introduction/tightening up of mandatory minimum energy efficiency standards for appliances, vehicles and buildings can play an important role in reducing GHG emissions. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency		Standards and Labelling		Energy Efficiency Programmers (replacement of Conventional Tube lights in street light by the Compact Fluorescent lamps (CFLs))		Yes
Careful monitoring and impact evaluation to ensure vigorous enforcement of minimum energy efficiency standards. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency		Standards and Labelling				
Increasing the flow of concessional domestic debt to renewable projects through creation or strengthening of development banking institutions can help with the high financing costs in renewable energy projects in India. <i>(Para 8, Pg. 25, 3.4, NCE SYR India Chapter)</i>	Renewable Energy						
Government initiatives to reduce the high cost of renewable projects can stimulate private investments in renewables. <i>(Para 4, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Renewable Energy		National Solar Mission under National Action Plan on Climate Change	yes	Micro Hydel Projects up to 100 kW Capacity - Rs.40,000/- per KW		Yes
GHG Emissions can be reduced substantially through changes in consumption patterns and adoption of energy saving measures . <i>(SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)</i>	Energy Efficiency				Energy Efficiency Programmes (replacement of Conventional Tube lights in street light by the Compact Fluorescent lamps (CFLs))		Yes
Financial incentives (e.g. consumer rebates) can be complemented along with minimum energy efficiency standards to encourage energy demand management and appliance efficiency. <i>(Para 7, Pg. 20, 3.2, NCE SYR India Chapter)</i>	Energy Efficiency						
Strengthening government administrative capacity to ensure vigorous enforcement of minimum energy efficiency standards. <i>(Para 2, Pg. 41, 6.1, NCE SYR India Chapter)</i>	Energy Efficiency						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Use of cleaner energy sources have synergies and between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Renewable Energy	Offshore wind generation program (50 MW + 150 MW)	National Renewable Energy Act 2015		Energisation of Street Lights with Solar Energy (ESLSE)		
Use of cleaner energy sources have synergies and between adaptation and mitigation measures can co-benefit both the sectors. (SPM 3.3, Pg. 20, Para 2, IPCC AR5 SYR)	Renewable Energy	Offshore wind generation program (50 MW + 150 MW)	National Renewable Energy Act 2015		Energisation of Street Lights with Solar Energy (ESLSE)		
Substitution of renewable energy for imported coal at the margin can have vital economic and social benefits such as greater energy security and a cleaner environment. (Para 3, Pg. 24, 3.4, NCE SYR India Chapter)	Renewable Energy				Green Energy Corridor Project	1593	
Using public sector approach e.g. creation of a National Renewable Power Corporation to undertake major renewable investments with world class levels of management and technological dynamism. (Para 8, Pg. 25, 3.4, NCE SYR India Chapter)(Para 4, Pg. 41, 6.1, NCE SYR India Chapter)	Renewable Energy						

Sustainable Smart Cities

Under the Smart Cities Mission, 12 cities have been identified to be developed as smart cities in Tamil Nadu. While 16% of the recommendations are being addressed through policy initiatives coupled with budgetary allocations, another 17% are being taken cognizance of through policy priorities. Despite this, however, 67% of the recommendations have not been addressed at all.

Figure 33: Recommendation addressed through Smart and Sustainable Cities in Tamil Nadu



Status of implementation of Recommendations not identified as priorities under SAPCC

Recommendations falling under the ambit of disaster preparedness in the state are being addressed through state schemes such as the Comprehensive Flood Protection Plan for Coastal zone management and the National Calamity Contingency Fund. 16% of these recommendations are addressed through a policy focus coupled with budgetary provisions, while 17% of the recommendations have been taken cognizance of through policy statements and initiatives. However, 67% of the recommendations remain unaddressed.

While there exist national schemes and policies to adopt technological adaptation measures, state schemes and policies have gaps with respect to that.

The national scheme i.e. Rajiv Gandhi Panchayat Sashaktikaran Abhiyan addresses the recommendation regarding increase in decentralized decision making power as a social adaptation measure and livelihood enhancement.

Recommendations from the Cross-Cutting themes, and IPCC recommendation for International cooperation and enhanced capacity building have been mainly addressed through National schemes and policies.

Table 44: Policy advice from IPCC and NCE for Smart and sustainable Cities addressed in Tamil Nadu

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Reforms to achieve more compact, productive and green cities need to move simultaneously and in coordination. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities						
Urban planning and upgrading programs can be one of the adaptation options for land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Smart and Sustainable Cities		National Mission on Sustainable Habitat under National Action Plan on Climate Change		Tamil Nadu Infrastructure Development		Yes
High restriction on floor space indexes (FSI) needs to be relaxed. (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities		National Urban Housing and Habitat Policy, 2007				
Need of rent control laws (reform). (Para 1, Pg. 42, 6.3, NCE SYR India Chapter)	Smart and Sustainable Cities						

Policy Advice from IPCC and NCE	Thematic Focus	identified solution / intervention or Specific Policy Statement or Target	National Schemes	Budgetary allocation	State Schemes	State Policies	State Budget allocation
Need of better systems of appraise land values and determine property rights. <i>(Para 1, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Smart and Sustainable Cities						
A comprehensive impact evaluation of Jawaharlal Nehru Urban Renewal Mission is needed to learn and improve effectiveness for a renewed and better urban investment and reform agenda. <i>(Para 8, Pg. 39, 5.2, NCE SYR India Chapter) (Para 2, Pg. 42, 6.3, NCE SYR India Chapter)</i>	Smart and Sustainable Cities						

Key Findings

The key findings of the study would fall into various categories, namely:

- a) Status of preparedness of States in Addressing Climate Change. This has been assessed based on current policies of states in relation to the recommendations made by the IPCC's 5th Assessment Report and the New Climate Economy Report.
- b) Areas / gaps in addressing climate change.
- c) Key vulnerability assessment of states on certain parameters.
- d) Key Mitigation potential assessment of states.

In terms of status of preparedness of states in addressing climate change, our research has shown that across all states, approximate, only 33 percent of the total recommendations of the IPCC AR5 and NCE reports seem to be taken cognizance of either in the form of policy framework or at the very least find an acknowledgment in policy framework/programmes of the various states in question. However, if the preparedness of states were to be assessed based on the extent of recommendations of the IPCC's AR5 and NCE being translated into policies and frameworks that are supported through associated budgetary allocations, unfortunately only 27 percent of the recommendations can be considered to have been fully addressed.

Further, our research also shows that, the states in question have managed to translate more recommendations that fall under the category of "mitigation" into policy frameworks, as opposed to adaptation. However, having said this, it must be noted here that there are policies and programmes that exist at the states level, which can be easily adapted to address some of the recommendations of the IPCC's 5th Assessment Report and the NCE, that fall in the category of "adaptation".

Details of the status of preparedness, is found in the table at the end of this section.

Other gaps in addressing climate change, is mainly in the implementation of various policies and programmes. Some of the main reasons for inadequacies in the implementation are as follows:

- a) Lack of a dedicated institutional or governance framework for conceptualizing, implementing, monitoring and tracking policies and programmes that would address climate change.
- b) In the light of the above, poor or inadequate coordination between and amongst various Ministries and Departments involved in implementing Climate Related Projects that are Multi-Departmental/Ministerial in nature.
- c) In the light of point 'a' above, lack of coordination of various departments/ministries in coming together to plan projects that can holistically address climate change.
- d) Mainstreaming Climate Change into regular departmental/ministerial activities is lacking.

The vulnerability analysis of the 4 states that we have focused on shows that only Goa, among all the four states is relatively less vulnerable to impacts of climate change owing to the structure of its economy as well as its employment pattern as also the lack of any directly discernible impacts of climate change on its natural resources. The rest of the states, viz. Andhra Pradesh, Karnataka and Tamil Nadu are all highly vulnerable to the unfolding impacts of climate change.

In terms of addressing mitigating carbon emissions to address climate change, the states of Tamil Nadu, Karnataka and Andhra Pradesh do have policies in place that could result in scaling up renewable energy deployment for meeting its energy needs. Tamil Nadu for instance is already a leader in Wind Energy Generation, being the state with the highest wind potential with a fairly good Plant Load Factor for Wind Generation (26-29 percent). The state of Goa is relatively slower in renewable energy generation as compared to the other three states.

In terms of energy efficiency, yet again, the states of Karnataka, Tamil Nadu and Andhra Pradesh have done relatively better in pushing for energy efficiency applications, both domestic energy efficiency as well as industrial energy efficiency.

Karnataka and Tamil Nadu have also a fairly robust afforestation and reforestation policy, with both the states having a fairly good and a large forest cover.

However, having said this, the four states can do a lot more in mitigating carbon emissions, as they have huge untapped potentials of renewable energy and energy efficiency.

	Total Recommendations	Andhra Pradesh						Goa						Karnataka						Tamil Nadu										
		Recommendation Addressed through Policy framework and Budgetary			Recommendation Acknowledged only through Policies statements			Recommendation Not addressed			Recommendation Addressed through Policy framework and Budgetary			Recommendation Acknowledged only through Policies statements			Recommendation Not addressed			Recommendation Addressed through Policy framework and Budgetary			Recommendation Acknowledged only through Policies statements			Recommendation Not addressed				
		Number	Percentage	Percentage	Number	Percentage	Percentage	Number	Percentage	Percentage	Number	Percentage	Percentage	Number	Percentage	Percentage	Number	Percentage	Percentage	Number	Percentage	Percentage	Number	Percentage	Percentage	Number	Percentage	Percentage		
Mitigation	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Carbon Sink																														
Renewable Energy	5	3	0.6	2	0.4	0	3	0.6	0	0	0	2	0.4	2	0.4	2	0.4	2	0.4	2	0.4	1	0.2	3	0.6	1	0.2	1	0.2	
Energy Efficiency	16	4	0.25	5	0.3125	7	0.4375	5	0.313	4	0.25	7	0.438	4	0.25	9	0.563	3	0.188	5	0.313	3	0.188	8	0.5	0.5	0.188	8	0.5	
Smart and Sustainable Cities	6	1	0.1667	1	0.1667	4	0.6667	2	0.333	0	0	4	0.667	1	0.167	1	0.167	1	0.167	4	0.667	1	0.167	1	0.167	1	0.167	4	0.667	
Improved Livestock	3	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Legal and institutional reforms for low carbon development	2	1	0.5	1	0.5	0	0	0	0	1	0.5	1	0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Power sector reforms (transmission, distribution, generation, infrastructure and reforms)	17	2	0.1176	1	0.0588	14	0.8235	1	0.059	0	0	0	0	2	0.118	3	0.177	12	0.706	2	0.118	0	0	2	0.118	0	0	15	0.882	
Technological Mitigation Measures	5	2	0.4	1	0.2	2	0.4	2	0.4	2	0.4	1	0.2	2	0.4	2	0.4	2	0.4	2	0.4	2	0.4	1	0.2	5	1	0	0	
Other Mitigation measures	4	0	0	1	0.25	3	0.75	0	0	0	0	4	1	0	0	1	0.25	3	0.75	0	0	0	0	0	0	0	4	1		

Adaptation	Climate Resilient	16	6	0.375	2	0.125	8	0.5	8	0.5	1	0.063	7	0.438	4	0.25	5	0.313	7	0.438	9	0.563	1	0.063	6	0.375
	Climate Resilient Ecosystem	25	9	0.36	15	0.6	1	0.04	8	0.296	16	0.593	3	0.111	7	0.28	9	0.36	9	0.36	14	0.519	8	0.296	5	0.185
	Climate Resilient Livelihood	6	3	0.5	2	0.3333	1	0.1667	4	0.667	1	0.167	1	0.167	5	0.833	0	0	1	0.167	3	0.5	1	0.167	2	0.333
	Sustainable Water Management	11	7	0.6364	2	0.1818	2	0.1818	4	0.364	3	0.273	4	0.364	1	0.091	8	0.727	2	0.182	9	0.818	1	0.091	1	0.091
	Legal and institutional reforms for low carbon development	3	0	0	1	0.3333	2	0.6667	2	0.667	0	0	1	0.333	2	0.667	1	0.333	0	0	1	0.333	0	0	2	0.667
	Social Adaptation	21	9	0.4286	7	0.3333	5	0.2381	8	0.381	5	0.238	8	0.381	7	0.333	7	0.333	7	0.333	13	0.619	3	0.143	5	0.238
	Climate Resilient Infrastructure	21	5	0.2381	8	0.381	8	0.381	11	0.524	1	0.048	9	0.429	2	0.095	7	0.333	12	0.571	9	0.429	2	0.095	10	0.476
	Disaster Preparedness	11	8	0.7273	1	0.0909	2	0.1818	4	0.364	4	0.364	3	0.273	2	0.182	3	0.273	6	0.546	7	0.636	1	0.091	3	0.273
	Technological Adaptation measures	7	4	0.5714	3	0.4286	0	0	1	0.143	3	0.429	3	0.429	2	0.286	3	0.429	2	0.286	3	0.429	1	0.143	3	0.429
	Other issue areas	17	4	0.2353	2	0.1176	11	0.6471	0	0	0	0	17	1	0	0	8	0.471	9	0.529	2	0.118	2	0.118	13	0.765
Cross cutting	International Cooperation	4	0	0	3	0.75	1	0.25	0	0	4	1	0	0	2	0.5	0	0	2	0.5	3	0.75	0	0	1	0.25
	Enhanced Capacities for Mitigation and Adaptation	14	1	0.0714	2	0.1429	11	0.7857	0	0	5	0.357	9	0.643	1	0.071	4	0.286	9	0.643	9	0.643	2	0.143	3	0.214
Total		216	74	0.3426	60	0.2778	82	0.3796	66	0.306	52	0.241	84	0.389	51	0.236	73	0.338	92	0.426	102	0.472	28	0.13	88	0.407

Recommendations & Conclusion

The Indian policy framework and the policy framework of the four states, namely, Goa, Andhra Pradesh, Tamil Nadu and Karnataka, though not adequate to deal with the challenges of climate change, seem to have the where withal to meet these challenges. The following are some of the issues/areas that need to be addressed or put in place in order to ensure that the states enhance their capacities and preparedness to address climate change.

- a) States to Develop a Long Term “Development Vision” which factors in the climate challenges and reduction of risks emanating from climate change.
- b) In line with the “Development Vision”, states to develop a implementation road map with milestones and targets.
- c) To put in place institutional and governance structures that would ensure holistic and integrated development planning and implementation, as against the current pattern of planning and implementation of programmes and policies in silos.
- d) In line with point 'c” above, ensure that adequate financing is available for integrated development, rather than the current practice of departmental/ministerial budgets alone.
- e) States seem to have a penchant for pursuing hard technological solutions to address climate change. However, soft skills and capacities that are required to tackle climate change tend to not be addressed. For example, adequate focus on capacity building, training, information sharing, creating repositories of good practices etc.
- f) States also seem to go in for solutions that are tried and tested without actually looking at whether these solutions continue to be appropriate with changing times and situations. For example, a couple of decades back, coal was perhaps the most viable source of electricity. However in today's world, renewable energy has proved to be more viable source of electricity, but states, continue to pursue options of generating electricity from coal, despite this.
- g) The Central Government needs to ensure that States are kept abreast of developments at international climate negotiations at various forums including the United Nations Framework Convention on Climate Change (UNFCCC) from time to time.
- h) States need to create specific institutional arrangements that can enable the States to meaningfully assist the Central Government in meeting its reporting and other obligations to the UNFCCC and its governance arrangements.

While many of the above recommendations have been discussed and debated for a few years now, it is about the right time that, they are translated into concrete actions. The reason for this is that with the ratification of the Paris Agreement and its coming into force, countries across the globe are now required to put in place policies and programmes, which would ensure effective implementation of the Paris Agreement. From an Indian perspective, effective implementation of the Paris Agreement implies action by both the national and the state government to formulate policies and programmes to address climate change in order to ensure the compliance of the targets envisaged in the Paris Agreement. Further, mere policies and policy framework would not perhaps address climate change in a manner that is effective, unless, some of the recommendations as detailed above are taken into consideration and implemented.

Annexure 1: Andhra Pradesh

Andhra Pradesh						
Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Availability of Carbon Capture and Storage (CCS) technology can help reduce the adverse effects of mitigation on value of fossil fuels. (SPM 3.4, Pg. 25, Para 2, IPCC AR5 SYR)	Technological Mitigation		National Mission for Green India under National Action Plan on Climate Change			
Enhanced capacities to mitigate and adapt are an important foundation step for managing climate change risks for many regions and sectors. (SPM 4.1, Pg. 26, Para 6, IPCC AR5 SYR)	Cross cutting adaptation and mitigation		National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change	State Action Plan on Climate Change (SAPCC) of Andhra Pradesh		
			National Environment Policy, 2006			
			Capacity Building on Biosafety			
			A CDM - Capacity Building Programme			
Income, assets and livelihood diversification are some of the mitigation options that address the issue of livelihood security (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Livelihood	Promote diversified and dispersed industries, including small/medium scale agro processing, to stabilise agricultural livelihoods. (Pg. 104, Table 22, Andhra Pradesh SAPCC)	National Rural Employment Guarantee Act (NREGA)			
Encourage microfinance as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Livelihood	Micro credit facility for subsidising livelihood. (Pg. 106, Table 25, Andhra Pradesh SAPCC)	National Bank for Agriculture and Rural Development (NABARD)	Abhaya Hastham (Velugu Pension and Insurance Scheme)		Yes
				Matsya Mitra Groups (SHGs of Fisherwomen)		
				SHG Bank Linkage Programme		Yes
Livelihood diversification as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Livelihood	Promote diversified and dispersed industries, including small/medium scale agro processing, to stabilise agricultural livelihoods. (Pg. 104, Table 22, Andhra Pradesh SAPCC)	National Rural Employment Guarantee Act (NREGA)			
			National Rural Livelihood Mission			
Expanding economic opportunities for people who constitute forest communities can strengthen resilience to climate change. (Para 6, Pg. 33, 4.4, NCE SYR India Chapter)	Climate Resilient Livelihood		National Mission for Green India under National Action Plan on Climate Change	Joint Forest Management Scheme in Andhra Pradesh	Andhra Pradesh Forest Policy	Yes
Efficient irrigation and water saving technologies as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Mitigation	Full utilisation of the sustainable surface water irrigation potential, to stabilise agricultural production. (Pg. 102, Table 18, Andhra Pradesh SAPCC)	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Neeru Chettu Programme		Yes
			National Initiative on Climate Resilient Agriculture	Agriculture Action Plan (2015-16)		Yes
			National Water Mission under National Action Plan on Climate Change			
			Pradhan Mantri Sinchayee Yojana			

Andhra Pradesh						
Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Application of modern agricultural technologies and practices that boost crop and livestock productivity and which economise on inputs such as land, water and fertilizers can benefit in raising the farmer's income, strengthen resilience to climate change and abate GHG emissions. (Para 2, Pg. 27, 4, NCE SYR India Chapter)	Technological Mitigation	Replacement of inorganic fertilizers by Bio-fertilizers (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Mission on Sustainable Agriculture under National Action Plan on Climate Change National Mission on Agriculture Extension and Technology (NMAET)	Creation of viable farm livelihoods Agriculture Action Plan (2015-16)		Yes Yes
Adequately resourced public initiatives in the livestock sector can increase animal productivity and can control total numbers, strengthen resilience and reduce GHG emissions. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter) (Para 6, Pg. 41, 6.2, NCE SYR India Chapter)	Improved Livestock management	Improved animal fields and digesters. (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Livestock Policy National Initiative on Climate Resilient Agriculture	Mobile Veterinary Clinics Upgrading Vaccine Production Unit/Standardization Unit / Disease Diagnostics Livestock Development Programmes		Yes Yes Yes
Methane emissions can be reduced by enhancing the digestibility of animal feeds by providing better quality of animal diets. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter)	Improved Livestock management		National Initiative on Climate Resilient Agriculture	Feed & Fodder Development Programme		Yes
Better animal health and reproduction management can help increase the proportion of healthy and productive animals thereby reducing methane emissions, reducing pressure on water and other natural resources and making animals resilient to climate change. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter)	Improved Livestock management	Improved animal fields and digesters. (Pg. 101, Table 17, Andhra Pradesh SAPCC)	National Programme for Prevention on Animal Diseases National Project for Cattle and Buffalo breeding	Livestock Development Programmes Artificial Insemination Centers		Yes Yes
Food storage and preservation facilities as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures		NABARD Warehousing Scheme	AP Warehousing scheme		
Hazard and vulnerability mapping as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures	Study the climate change vulnerability of existing water supply and sewerage/sanitation systems. (Pg. 106, Table 25, Andhra Pradesh SAPCC)	Earthquake Hazard Assessment Multi-hazard Vulnerability Mapping	AP Hazard Mitigation Project APSDPS Early Warning Centre		Yes Yes
Monitoring early warning systems as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures	Systems for dissemination of warnings. (Pg. 103, Table 19, Andhra Pradesh SAPCC)	National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change High Impact Severe Weather Warning System Early Warning System for Tsunami and Storm Surges Modernization of Observation & Forecast of India Meteorological Department (IMD) Phase II	APSDPS Early Warning Centre		Yes
Building insulation as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures				Energy Conservation Act	

Andhra Pradesh						
Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Using mechanical and passive cooling and developed technology as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures		National Urban Housing and Habitat Policy, 2007		Energy Conservation Act	
Access to technology can also help in livelihood enhancement. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures		Science, Technology and Innovation Policy, 2013	AP Community Based Tank Management Project		Yes
Ecosystem management adaptation can also be done by community-based natural resource management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) SPM Table 4.2, Pg. 27, IPCC AR5 SYR	Other Adaptation issues	Afforestation and eco-development through community based programmes (JFM) (Pg. 103, Table 20, Andhra Pradesh SAPCC)	Joint Forest Management Programme	As per the National forest policy, Action has been initiated to raise 50 Cr nursery seedlings for afforestation in next rainy season.		Yes
Participatory scenario development as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues		Pani Panchayat	JFM		
Conducting integrated assessments as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues	Public education on prevention of diseases related to climate change and resulting from environmental pollution. (Pg. 105, Table 24, Andhra Pradesh SAPCC)	MOEFCC mandates integrated assessment through Environment Clearance	As per the National forest policy, Action has been initiated to raise 50 Cr nursery seedlings for afforestation in next rainy season.		Yes
Household preparation and evacuation planning as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	Development of rapid response capabilities to handle the impact of climate change related events. (Pg. 105, Table 24, Andhra Pradesh SAPCC)		AP Hazard Mitigation Project		Yes
Migration as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Disaster risk reduction is a very important adaptation measure in reducing poverty. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Platform on Disaster Risk Reduction	AP Hazard Mitigation Project		Yes
Storm and wastewater management is an important hard adaptation measure that can help reduce disaster. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	Study and remodel existing water supply, sanitation and sewerage systems to reduce climate change vulnerability. (Pg. 106, Table 25,	National Water Mission under National Action Plan on Climate Change	storm water drainage scheme, Underground Drainage scheme for Tirupati, Storm Water		Yes
Land-use and spatial planning can be enhanced by development of flood prone and high risk areas. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		Flood Management Guidelines	Polavaram Project including Pattiseema Lift Irrigation Scheme & Thotapalli Barrage Development Scheme		Yes

Andhra Pradesh						
Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Insurance as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) SPM Table 4.2, Pg. 27, IPCC AR5 SYR	Other Adaptation issues		NABARD National Crop Insurance Scheme			
Catastrophe bonds as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Disaster contingency funds as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Calamity Contingency Funds	State Disaster Response Fund under National Cyclone Mitigation Project		Yes
Systematic monitoring and remote sensing as social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change National Natural Resource Management Scheme Space Based Information Support for Decentralized Planning National Database for Emergency Management National Information System for Climate and Environment Studies ISRO Disaster Management Programme	AP State Remote Sensing Application Centre		Yes
Awareness raising and integrating climate change learning into education as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	Public awareness programmes on conservation of forests and biodiversity. (Pg. 103, Table 20, Andhra Pradesh SAPCC)	National Environmental Awareness Campaign Environment Education, Awareness & Training (EEAT) Scheme Environment Education in School System Environmental Appreciation Course Environmental Concepts in Management & Business Studies Eco-clubs (National Green Corps) Global Learning and Observations to Benefit the Environment (GLOBE)	Setting up of Climate Change Knowledge Center at EPTRI under SAPCC (AP)		Yes
Conducting participatory action research and social learning as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues					

Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Innovation and investments in environmentally sound infrastructures and technologies can decrease greenhouse gas emissions and improve resilience to climate change. (SPM 4.1, Pg. 26, Para 4, IPCC AR5 SYR)	Technological Mitigation					
Financial incentives as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues	Incentives for rooftop solar power generation and provision of grid connectivity. (Pg. 106, Table 25, Andhra Pradesh SAPCC)	National Mission on Sustainable Habitat under National Action Plan on Climate Change	Solar Energy Programme		Yes
Cash transfers as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Livelihood		Generation Based Incentives for Grid Connected Wind Power Projects	Solar Energy Conservation Mission		Yes
Mechanisms that set up carbon prices, including cap and trade systems and carbon taxes must be given importance in order to ensure a cost effective mitigation approach. (SPM 4.4, Pg. 30, Para 2, IPCC AR5 SYR)	Power Sector Reforms			Solar Pump Sets Programme		Yes
Economic instruments such as subsidies, tax rebates or exemptions, grants, loans and credit lines must be applied across sectors. (SPM 4.4, Pg. 30, Para 5, IPCC AR5 SYR)	Cross cutting adaptation and mitigation					Yes
Adoption of complimentary policies such as income tax rebates or other benefit transfer mechanisms could help avoid the potential adverse effects of mitigation policies (e.g. energy sector). (SPM 4.4, Pg. 30, Para 6, IPCC AR5 SYR)	Power Sector Reforms		NEMMP	Andhra Pradesh Land Licensed Cultivators Act, 2011 Assured credit facilit		Yes
Better assessment of global adaptation costs, funding and investments is required as limited evidences suggest that there is a gap between global adaptation costs and funds. (SPM 4.4, Pg. 31, Para 1, IPCC AR5 SYR)	Other Adaptation issues			Solar Energy Programme		Yes
Elimination of fuel subsidies can be undertaken alongside the modernisation of India's social protection framework that would help relieve the impacts of volatility in world energy prices and other risks affecting the poor people. (Para 8, Pg. 18, 3.2, NCE SYR India Chapter)(Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					

Andhra Pradesh						
Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Institutional and governance reforms such as scaling back power/fuel subsidies and setting realistic prices to create financial viability are required to push forward the approach of Electricity Act [2003]. (Para 3, Pg. 20, 3.2, NCE SYR India Chapter) (Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Reform of fuel subsidies is important to encourage more efficient energy use in transport. (Para 1, Pg. 21, 3.2, NCE SYR India Chapter)	Power Sector Reforms	Rationalize power tariffs for currently subsidized sectors. (Pg. 104, Table 21, Andhra Pradesh SAPCC)				
To determine the optimal energy mix for India, it is important to take all the social costs and benefits of different fuels into account for maximizing India's social efficiency and social welfare. (Para 6, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Fuel taxes can act as the most efficient instrument to achieve socially optimal fuel mix, increase government revenues, providing resources to reduce other distorting taxes, to increase productive development spending or to fund cash transfers to compensate poor fuel consumers. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter) (Para 3, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms			AP Fuel Tax		Yes
Fuel taxes complemented with concessional development financing can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Public investment policies implemented with fuel taxes can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Coordination and institution-building (e.g. subsidies) to overcome existing policy failures. (Para 2, Pg. 27, 4, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					
Formation of State Finance Commissions to determine the allocation of state revenues to local governments can create better urban growth. (Para 5, Pg. 39, 5.2, NCE SYR India Chapter)	Cross cutting adaptation and mitigation		Article 2431			
Build consensus for strong structural and fiscal reform to signal intent. (Para 3, Pg. 40, 6, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					

Andhra Pradesh						
Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Reducing the costs of infrastructure to up-grade growth and economic efficiency. (Para 4, Pg. 40, 6, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					
Fuel subsidy reforms should be coupled with well-designed and targeted measures to protect the poor and vulnerable groups from high fuel prices. (Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Comprehensive, carefully sequenced, equitable and sustainable fuel subsidy reform plan. (Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Reducing emission of non-CO2 agents, expressed as "CO2-equivalent emissions", can be a significant component of mitigation strategies. (SPM 3.4, Pg. 23, Para 1, IPCC AR5 SYR)	Other Mitigation Issues					
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires higher rates of emission reductions from 2030 to 2050. (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Other Mitigation Issues					
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires rapid scale-up of low carbon energy from 2030 to 2050. (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Other Mitigation Issues					
Dietary change and reduction in food waste can also help in lowering the emissions. (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Other Mitigation Issues					
Adoption of existing cost-effective energy-efficient appliance technologies can result in large reductions in India's energy consumption and GHG emissions. (Para 5, Pg. 20, 3.2, NCE SYR India Chapter)[Para 1, Pg. 41, 6.1, NCE SYR India Chapter]	Technological Mitigation					
National governments can coordinate adaptation efforts of local and subnational governments by providing information, policy and legal frameworks (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Cross cutting adaptation and mitigation					
National governments can coordinate adaptation efforts of local and subnational governments by financial support (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Other Adaptation issues					

Andhra Pradesh						
Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Local governments and private sectors are considered critical for adaptation progress assuming their roles in scaling up adaptation of communities, households, and civil society and managing risk information and financing. (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Other Adaptation issues					
For decision making process in adaptation planning and implementation, recognition of diverse interests, circumstances, social-cultural contexts and expectations are required. (SPM 3.3, Pg. 19, Para 7, IPCC AR5 SYR)	Other Adaptation issues					
For effective adaptation, knowledge about indigenous, local and traditional practices, including indigenous peoples' holistic view of community and environment (SPM 3.3, Pg. 19, Para 7, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues					
Transformations in economic, social, technological, and political decisions and actions can enhance adaptation and promote sustainable development. (SPM 3.3, Pg. 20, Para 3, IPCC AR5 SYR).	Other Adaptation issues					
Public private partnership as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues			Public Private Policy Act 2011		
Practical strategies such as Social and technical innovations, behavioural shifts or institutional and managerial changes that produce substantial shifts in outcomes. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues			Sector wise PPP Scheme		Yes
Political strategies such as political, social, cultural and ecological decisions and actions consistent with reducing vulnerability and risk and supporting adaptation, mitigation and sustainable development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues					
Potential linkages among regional, national and sub-national climate policies must be encouraged in order to increase the climate change mitigation benefits. (SPM 4.4, Pg. 29, Para 7, IPCC AR5 SYR)	Other Adaptation issues					

Andhra Pradesh						
Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
National government, local government and private sector coordination needs to be recognised for scaling up adaptation of communities, households and civil society and in further managing risks information and financing. (SPM 4.4, Pg. 29, Para 10, IPCC AR5 SYR)	Other Adaptation issues					
Synergies between private sector and public financing mitigation and adaptation. (SPM 4.4, Pg. 30, Para 8, IPCC AR5 SYR)	Cross cutting adaptation and mitigation					
Relevant tools like suitable governance structures and adequate institutional and human capacity together can enhance the effectiveness of integrated responses of mitigation and adaptation strategies. (SPM 4.5, Pg. 32, Para 4, IPCC AR5 SYR).	Cross cutting adaptation and mitigation					
Opportunities for enhanced resilience, reduced emissions and more sustainable development can be achieved through integrated responses especially in the context of energy planning and implementation, interactions among water, food, energy, and biological carbon sequestration. (SPM 4.5, Pg. 32, Para 4, IPCC AR5 SYR)	Power Sector Reforms					
For India to increase its growth requires policy-makers to find and unblock the critical obstacles and constraints to structural change and inclusive growth. (Para 4, Pg. 9, 2.1, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					
Better allocation of responsibilities between various levels of government for better urban service delivery. (Para 6, Pg. 39, 5.2, NCE SYR India Chapter)(Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					
To effectively mitigate GHG emissions and other climate change impacts, cooperative responses including international cooperation are required. (SPM 3.1, Pg. 17, Para 5, IPCC AR5 SYR)	Mitigation/International Cooperation/ Cross cutting	Development of rapid response capabilities to handle the impact of climate change related events. (Pg. 105, Table 24, Andhra Pradesh SAPCC)	National Mission on Strategic Knowledge for Climate Change International Conventions			
Complementary actions across levels including international cooperation are required for effective adaptation. (SPM 3.1, Pg. 17, Para 5, IPCC AR5 SYR)	Mitigation/International Cooperation/ Cross cutting		National Mission on Strategic Knowledge for Climate Change International Conventions			

Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Lessons/ outcomes of Kyoto Protocol with respect to participation, implementation, flexibility mechanisms and environmental effectiveness must be taken into consideration for effective international cooperation. (SPM 4.4, Pg. 29, Para 6, IPCC AR5 SYR)	Mitigation/International Cooperation/ Cross cutting					
International cooperation for supporting adaptation planning and implementation must be given a priority for the creation of effective adaptation strategies. (SPM 4.4, Pg. 29, Para 8, IPCC AR5 SYR)	Mitigation/International Cooperation/ Cross cutting		National Mission on Strategic Knowledge for Climate Change International Conventions			
Improvement in institutions as well as coordination and cooperation in governance is helpful to overcome regional limitations accompanying mitigation, adaptation and disaster risk reduction. (SPM 4.1, Pg. 26, Para 6, IPCC AR5 SYR)	Legal and institutional reforms for low carbon development (Mitigation and adaptation)					
Laws to support disaster risk reduction as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Platform on Disaster Risk Reduction	Andhra Pradesh Reorganisation Act		
Defining fishing quotas, patent pools and technology transfers as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures			Relief to Marine fishermen during ban period		Yes
National and Government Policy and Programs can include mainstreaming of national and regional adaptation plans. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Cross cutting adaptation and mitigation					
National and Government Policy and Programs can include subnational and local adaptation plans. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Cross cutting adaptation and mitigation					
National and Government Policy and Programs can include disaster planning and preparedness. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Disaster Management Policy	AP Hazard Mitigation Project		Yes
Institutional and governance reforms such as unbundling and corporatizing State Electricity Board are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Institutional and governance reforms such as forming independent regulatory bodies at the state and central level are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter) (Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					

Andhra Pradesh

Policy Advice from IPCC and NCE	Thematic Focus	State Identified Solutions	National Schemes and Policies	State Schemes	State Policies	State Budget Allocation
Institutional and governance reforms such as development of a performance-oriented culture in the sector are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter) (Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Insulating distribution companies and regulatory bodies from political interference by state governments is a dynamic political economy dimension of reform. (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)	Power Sector Reforms					
Regulating policies along with fuel taxes can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms			Motor Vehicle Tax		
Strengthening of capacity and accountability of the government at a local level is required. (Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					
Intergovernmental transfers from the state level and the centre needs to be enhanced and well monitored with accountability to ensure resources are spent wisely. (Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					
Build strong low-carbon initiatives integrally into India's growth agenda. (Para 4, Pg. 26, 3.4, NCE SYR India Chapter)	Legal and institutional reforms for low carbon development (Mitigation)		12th FYP			

Annexure 2: Goa

Goa						
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation	
Availability of Carbon Capture and Storage (CCS) technology can help reduce the adverse effects of mitigation on value of fossil fuels. (SPM 3.4, Pg. 25, Para 2, IPCC AR5 SYR) Enhanced capacities to mitigate and adapt are an important foundation step for managing climate change risks for many regions and sectors. (SPM 4.1, Pg. 26, Para 6, IPCC AR5 SYR)	Mitigation Technological Fix	National Mission for Green India under National Action Plan on Climate Change				
	Adaptation & mitigation	National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change National Environment Policy, 2006				
Efficient irrigation and water saving technologies as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Mitigation Technological Fix	National Mission on Sustainable Agriculture under National Action Plan on Climate Change National Initiative on Climate Resilient Agriculture National Water Mission under National Action Plan on Climate Change				
	Mitigation Technological Fix	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	The financial allocation of Agriculture, Animal Husbandry and Fisheries		Yes	
Application of modern agricultural technologies and practices that boost crop and livestock productivity and which economise on inputs such as land, water and fertilizers can benefit in raising the farmer's income, strengthen resilience to climate change and abate GHG emissions. (Para 2, Pg. 27, 4, NCE SYR India Chapter)	Mitigation Technological Fix	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Integrated farming Systems		Yes	
	Climate Resilient Ecosystem/Carbon Sink	National Mission on Agriculture Extension and Technology (NMAET)		Forest Conservation Policy		
Afforestation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem/Carbon Sink	National Mission for Green India under National Action Plan on Climate Change State Compensatory Afforestation Fund Management and Planning Authority (State CAMPA) National Afforestation Programme National Environment Policy, 2006 National Forest Policy, 1988				
	Climate Resilient Ecosystem/Carbon Sink	National Afforestation Programme				
Reforestation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation Measures	NABARD Warehousing Scheme		Forest Conservation Policy		

Goa						
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation	
Hazard and vulnerability mapping as a technological adaptation measure. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR][SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Technological Adaptation Measures	Earthquake Hazard Assessment Multi-hazard Vulnerability Mapping				
Monitoring early warning systems as a technological adaptation measure. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR][SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Technological Adaptation Measures	National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change High Impact Severe Weather Warning System Early Warning System for Tsunami and Storm Surges				
Building insulation as a technological adaptation measure. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Technological Adaptation Measures	Modernization of Observation & Forecast of India Meteorological Department (IMD) Phase II				
Using mechanical and passive cooling and developed technology as a technological adaptation measure. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Technological Adaptation Measures		Deendayal Panchayati Raj Infrastructure Development Scheme			
Access to technology can also help in livelihood enhancement. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Technological Adaptation Measures		Goa Gram Samrudhi Scheme		Yes	
Ecosystem management adaptation can also be done by community-based natural resource management. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Adaptation	Science, Technology and Innovation Policy, 2013	Integrated farming Systems			
Participatory scenario development as a social (informational) adaptation measure. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Adaptation	Joint Forest Management Programme				
Conducting integrated assessments as a social (informational) adaptation measure. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Adaptation					
Household preparation and evacuation planning as behavioural adaptation strategy [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Disaster Preparedness		Housing Scheme		Yes	
Migration as behavioural adaptation strategy [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Disaster Preparedness					
Disaster risk reduction is a very important adaptation measure in reducing poverty. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Disaster Preparedness	National Platform on Disaster Risk Reduction	Cyclone Shelters cum coastal fire stations to built under National Cyclone Risk Mitigation Project	Disaster Management Legislation and Relief and Rehabilitation Policy	Yes	
Storm and wastewater management is an important hard adaptation measure that can help reduce disaster. [SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	Disaster Preparedness		Disaster Management Scheme at Panchayat Level		Yes	

Goa						
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation	
Land-use and spatial planning can be enhanced by development of flood prone and high risk areas. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	Flood Management Guidelines	Disaster Management Scheme at Panchayat Level	Disaster Management Legislation and Relief and Rehabilitation Policy	Yes	
Insurance as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other adaptation measures					
Catastrophe bonds as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Disaster contingency funds as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	National Calamity Contingency Funds				
Systematic monitoring and remote sensing as social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change				
Awareness raising and integrating climate change learning into education as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	National Natural Resource Management Scheme National Environmental Awareness Campaign Eco-clubs (National Green Corps)				
Conducting participatory action research and social learning as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Adaptation					
Innovation and investments in environmentally sound infrastructures and technologies can decrease greenhouse gas emissions and improve resilience to climate change. (SPM 4.1, Pg. 26, Para 4, IPCC AR5 SYR)	Mitigation Technological Fix					
Financial incentives as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other adaptation measures	National Mission on Sustainable Habitat under National Action Plan on Climate Change				
Mechanisms that set up carbon prices, including cap and trade systems and carbon taxes must be given importance in order to ensure a cost effective mitigation approach. (SPM 4.4, Pg. 30, Para 2, IPCC AR5 SYR)	Power Sector Reforms					
Economic instruments such as subsidies, tax rebates or exemptions, grants, loans and credit lines must be applied across sectors. (SPM 4.4, Pg. 30, Para 5, IPCC AR5 SYR).	Adaptation & Mitigation		Addressed through various sectors			
Adoption of complementary policies such as income tax rebates or other benefit transfer mechanisms could help avoid the potential adverse effects of mitigation policies (e.g. energy sector). (SPM 4.4 , Pg. 30, Para 6, IPCC AR5 SYR)	Power Sector Reforms					
Better assessment of global adaptation costs, funding and investments is required as limited evidences suggest that there is a gap between global adaptation costs and funds. (SPM 4.4, Pg. 31, Para 1, IPCC AR5 SYR)	Other adaptation measures					
Elimination of fuel subsidies can be undertaken alongside the modernisation of India's social protection framework that would help relieve the impacts of volatility in world energy prices and other risks affecting the poor people. (Para 8, Pg. 18, 3.2, NCE SYR India Chapter)(Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					

Goa						
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation	
Institutional and governance reforms such as scaling back power/fuel subsidies and setting realistic prices to create financial viability are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Reform of fuel subsidies is important to encourage more efficient energy use in transport. (Para 1, Pg. 21, 3.2, NCE SYR India Chapter)	Power Sector Reforms					
To determine the optimal energy mix for India, it is important to take all the social costs and benefits of different fuels into account for maximizing India's social efficiency and social welfare. (Para 6, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms		24x7 Power For All scheme		yes	
Fuel taxes can act as the most efficient instrument to achieve socially optimal fuel mix, increase government revenues, providing resources to reduce other distorting taxes, to increase productive development spending or to fund cash transfers to compensate poor fuel consumers. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)(Para 3, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Fuel taxes complemented with concessional development financing can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Public investment policies implemented with fuel taxes can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Coordination and institution-building (e.g. subsidies) to overcome existing policy failures. (Para 2, Pg. 27, 4, NCE SYR India Chapter)	Adaptation & Mitigation					
Formation of State Finance Commissions to determine the allocation of state revenues to local governments can create better urban growth. (Para 5, Pg. 39, 5.2, NCE SYR India Chapter)	Adaptation & Mitigation	Article 2431				
Build consensus for strong structural and fiscal reform to signal intent. (Para 3, Pg. 40, 6, NCE SYR India Chapter)	Adaptation & Mitigation					
Reducing the costs of infrastructure to upgrade growth and economic efficiency. (Para 4, Pg. 40, 6, NCE SYR India Chapter)	Adaptation & Mitigation					
Fuel subsidy reforms should be coupled with well-designed and targeted measures to protect the poor and vulnerable groups from high fuel prices. (Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Comprehensive, carefully sequenced, equitable and sustainable fuel subsidy reform plan. (Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Reducing emission of non-CO2 agents, expressed as "CO2- equivalent emissions", can be a significant component of mitigation strategies. (SPM 3.4, Pg. 23, Para 1, IPCC AR5 SYR)	Mitigation					
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires higher rates of emission reductions from 2030 to 2050. (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Mitigation					
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires rapid scale-up of low carbon energy from 2030 to 2050. (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Mitigation					
Dietary change and reduction in food waste can also help in lowering the emissions. (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Mitigation					
Adoption of existing cost-effective energy-efficient appliance technologies can result in large reductions in India's energy consumption and GHG emissions. (Para 5, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Mitigation Technological Fix		UJALA Scheme		Yes	

Goa						
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation	
National governments can coordinate adaptation efforts of local and subnational governments by providing information, policy and legal frameworks (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Adaptation & Mitigation		Addressed through various sectors			
National governments can coordinate adaptation efforts of local and subnational governments by financial support (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Other adaptation measures					
Local governments and private sectors are considered critical for adaptation progress assuming their roles in scaling up adaptation of communities, households, and civil society and managing risk information and financing. (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Other adaptation measures					
For decision making process in adaptation planning and implementation, recognition of diverse interests, circumstances, social-cultural contexts and expectations are required. (SPM 3.3, Pg. 19, Para 7, IPCC AR5 SYR)	Other adaptation measures					
For effective adaptation, knowledge about indigenous, local and traditional practices, including indigenous peoples' holistic view of community and environment (SPM 3.3, Pg. 19, Para 7, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other adaptation measures					
Transformations in economic, social, technological, and political decisions and actions can enhance adaptation and promote sustainable development. (SPM 3.3, Pg. 20, Para 3, IPCC AR5 SYR).	Other adaptation measures					
Public private partnership as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other adaptation measures					
Practical strategies such as Social and technical innovations, behavioural shifts or institutional and managerial changes that produce substantial shifts in outcomes. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other adaptation measures					
Political strategies such as political, social, cultural and ecological decisions and actions consistent with reducing vulnerability and risk and supporting adaptation, mitigation and sustainable development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other adaptation measures					
Potential linkages among regional, national and sub-national climate policies must be encouraged in order to increase the climate change mitigation benefits. (SPM 4.4, Pg. 29, Para 7, IPCC AR5 SYR)	Other adaptation measures					
National government, local government and private sector coordination needs to be recognised for scaling up adaptation of communities, households and civil society and in further managing risks information and financing. (SPM 4.4, Pg. 29, Para 10, IPCC AR5 SYR)	Other adaptation measures					
Synergies between private sector and public sector should play an important role in financing mitigation and adaptation. (SPM 4.4, Pg. 30, Para 8, IPCC AR5 SYR)	Adaptation & Mitigation					
Relevant tools like suitable governance structures and adequate institutional and human capacity together can enhance the effectiveness of integrated responses of mitigation and adaptation strategies. (SPM 4.5, Pg. 32, Para 4, IPCC AR5 SYR).	Adaptation & Mitigation					
Opportunities for enhanced resilience, reduced emissions and more sustainable development can be achieved through integrated responses especially in the context of energy planning and implementation, interactions among water, food, energy, and biological carbon sequestration. (SPM 4.5, Pg. 32, Para 4, IPCC AR5 SYR)	Power Sector Reforms					
For India to increase its growth requires policy-makers to find and unblock the critical obstacles and constraints to structural change and inclusive growth. (Para 4, Pg. 9, 2.1, NCE SYR India Chapter)	Adaptation & Mitigation		Addressed through various sectors			

Goa						
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation	
Better allocation of responsibilities between various levels of government for better urban service delivery. (Para 6, Pg. 39, 5.2, NCE SYR India Chapter)(Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Adaptation & Mitigation					
To effectively mitigate GHG emissions and other climate change impacts, cooperative responses including international cooperation are required. (SPM 3.1, Pg. 17, Para 5, IPCC AR5 SYR)	Mitigation/International Cooperation/Cross cutting	National Mission on Strategic Knowledge for Climate Change International Conventions				
Complementary actions across levels including international cooperation are required for effective adaptation. (SPM 3.1, Pg. 17, Para 5, IPCC AR5 SYR)	Mitigation/International Cooperation/Cross cutting	National Mission on Strategic Knowledge for Climate Change International Conventions				
Lessons/ outcomes of Kyoto Protocol with respect to participation, implementation, flexibility mechanisms and environmental effectiveness must be taken into consideration for effective international cooperation. (SPM 4.4, Pg. 29, Para 6, IPCC AR5 SYR)	Mitigation/International Cooperation/Cross cutting	International Conventions				
International cooperation for supporting adaptation planning and implementation must be given a priority for the creation of effective adaptation strategies. (SPM 4.4, Pg. 29, Para 8, IPCC AR5 SYR)	Mitigation/International Cooperation/Cross cutting	International Conventions				
Improvement in institutions as well as coordination and cooperation in governance is helpful to overcome regional limitations accompanying mitigation, adaptation and disaster risk reduction. (SPM 4.1, Pg. 26, Para 6, IPCC AR5 SYR)	Adaptation & Mitigation (legal)					
Land tenure can be another soft adaptation measure for poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional adaptation	National Land Records Modernisation Programme			Yes	
Land zoning laws can lead to better land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional adaptation/Urban infrastructure	National Land Records Modernisation Programme	Coastal Regulation Zone		Yes	
Laws to support disaster risk reduction as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	National Platform on Disaster Risk Reduction		Disaster Management Legislation and Relief and Rehabilitation Policy		
Defining fishing quotas, patent pools and technology transfers as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological adaptation					
National and Government Policy and Programs can include mainstreaming of national and regional adaptation plans. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Adaptation & Mitigation					
National and Government Policy and Programs can include subnational and local adaptation plans. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Adaptation & Mitigation					
National and Government Policy and Programs can include disaster planning and preparedness. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	National Disaster Management Policy		Disaster Management Legislation and Relief and Rehabilitation Policy		
Institutional and governance reforms such as unbundling and corporatizing State Electricity Board are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Institutional and governance reforms such as forming independent regulatory bodies at the state and central level are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					

Goa						
Policy Advice from IPCC and NCE	Thematic Focus	National Schemes	State Schemes	State Policies	State Budget allocation	
Institutional and governance reforms such as development of a performance-oriented culture in the sector are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Insulating distribution companies and regulatory bodies from political interference by state governments is a dynamic political economy dimension of reform. (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)	Power Sector Reforms					
Regulating policies along with fuel taxes can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Strengthening of capacity and accountability of the government at a local level is required. (Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Adaptation & Mitigation					
Intergovernmental transfers from the state level and the centre needs to be enhanced and well monitored with accountability to ensure resources are spent wisely. (Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Adaptation & Mitigation					
Build strong low-carbon initiatives integrally into India's growth agenda. (Para 4, Pg. 26, 3.4, NCE SYR India Chapter)	Legal mitigation	12th FYP				

Annexure 3: Karnataka

Karnataka							
Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / Intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation	
Availability of Carbon Capture and Storage (CCS) technology can help reduce the adverse effects of mitigation on value of fossil fuels. (SPM 3.4, Pg. 25, Para 2, IPCC AR5 SYR)	Technological Mitigation		National Programme on Carbon Sequestration				
Enhanced capacities to mitigate and adapt are an important foundation step for managing climate change risks for many regions and sectors. (SPM 4.1, Pg. 26, Para 6, IPCC AR5 SYR)	Cross cutting adaptation and mitigation						
Income, assets and livelihood diversification are some of the mitigation options that address the issue of livelihood security (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilience Livelihood		MGNREGA	GangaKalyanaScheme; Land Purchase Scheme; Shramashakthi Scheme		Yes	
Encourage microfinance as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilience Livelihood			SHG-Bank Linkage Programme; Micro Loan with Subsidy Scheme		Yes	
Livelihood diversification as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilience Livelihood		MGNREGA			Yes	
Expanding economic opportunities for people who constitute forest communities can strengthen resilience to climate change. (Para 6, Pg. 33, 4.4, NCE SYR India Chapter)	Climate Resilience Livelihood	To ensure the minimization of GHG emissions a standard code of operations should be developed by and for KFD for activities such as planting, soil and water conservation, use of fertilizers and machinery (Pg. 86, Karnataka SAPCC)			Approximately 80,000 ha of plantation by Karnataka Forest Department in 2010-11 (Pg. 140, Karnataka SAPCC)	Yes	
Efficient irrigation and water saving technologies as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Mitigation	Development of Agro-biodiversity using indigenous varieties (Pg. 52, Karnataka SAPCC)			KARNATAKA STATE BIODIVERSITY STRATEGY AND ACTION PLAN (KBSAP)	Yes	
	Technological Mitigation	study of efficient crop water utilisation methods (Pg. 72, Karnataka SAPCC)					
	Technological Mitigation	measurement of flows in the irrigation canals for accounting losses and improving efficiency (Pg. 72, Karnataka SAPCC)					
Application of modern agricultural technologies and practices that boost crop and livestock productivity and which economise on inputs such as land, water and fertilizers can benefit in raising the farmer's income, strengthen resilience to climate change and abate GHG emissions. (Para 2, Pg. 27, 4, NCE SYR India Chapter)	Technological Mitigation	To ensure the minimization of GHG emissions a standard code of operations should be developed by and for KFD for activities such as planting, soil and water conservation, use of fertilizers and machinery (Pg. 86, Karnataka SAPCC)			It is proposed to provide LPG connections to general category families who reside within sensitive forest areas of Western Ghats and Wildlife Reserve Forests	Yes	

Karnataka							
Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / Intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation	
<p>Adequately resourced public initiatives in the livestock sector can increase animal productivity and can control total numbers, strengthen resilience and reduce GHG emissions. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter)(Para 6, Pg. 41, 6.2, NCE SYR India Chapter)</p> <p>Methane emissions can be reduced by enhancing the digestibility of animal feeds by providing better quality of animal diets. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter)</p> <p>Better animal health and reproduction management can help increasing the proportion of healthy and productive animals thereby reducing methane emissions, reducing pressure on water and other natural resources and making animals resilient to climate change. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter)</p>	Improved Livestock management Improved Livestock management Improved Livestock management	<p>long-term research into climate change impacts on crop growth and yield (Pg. 52, Karnataka SAPCC)</p> <p>Promotion of dry land agriculture techniques (Pg. 52, Karnataka SAPCC)</p> <p>Development of Agro-bio-diversity using indigenous varieties (Pg. 52, Karnataka SAPCC)</p> <p>climate-hardy livestock and development of nutritional strategies (Pg. 52, Karnataka SAPCC)</p> <p>climate-hardy livestock and development of nutritional strategies (Pg. 52, Karnataka SAPCC)</p> <p>Breeding of climate-hardy livestock and development of nutritional strategies (Pg. 52, Karnataka SAPCC)</p> <p>Promoting benefits of multifunctional agro forestry (Pg. 52, Karnataka SAPCC)</p> <p>Conducting studies to assess the relationship between climate change and animal health (Pg. 52, Karnataka SAPCC)</p> <p>measurement of flows in the irrigation canals for accounting losses and improving efficiency (Pg. 72, Karnataka SAPCC)</p> <p>Promoting best practices for conservation and sustainable utilisation of coastal resources (Pg. 98, Karnataka SAPCC)</p>	<p>KARNATAKA STATE BIODIVERSITY STRATEGY AND ACTION PLAN (KBSAP)</p> <p>KARNATAKA STATE BIODIVERSITY STRATEGY AND ACTION PLAN (KBSAP)</p>	<p>Karnataka Sheep and Goat Farmers' Co-operative Federation will be established</p> <p>Karnataka - State Breeding Policy</p> <p>Obscure Disease Research Unit at KVAFSU, Shimoga and Livestock Health Research and IEC center at Mulabagilu will be established</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>	<p>Yes</p> <p>Yes</p> <p>Yes</p> <p>Yes</p>	

Karnataka						
Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / Intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation
Food storage and preservation facilities as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) Hazard and vulnerability mapping as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures Technological Adaptation measures	Development of Agro-biodiversity using indigenous varieties (Pg. 52, Karnataka SAPCC)	KARNATAKA STATE BIODIVERSITY STRATEGY AND ACTION PLAN (KBSAP)			
		Establishment of a seed storage network (Pg. 52, Karnataka SAPCC)	Rashtriya Krishi Vikas Yojana (Pg. 139, Karnataka SAPCC)	Promoting Organic farming (Pg. 139, Karnataka SAPCC)		
		Conduct vulnerability and impact assessments (Pg. 52, Karnataka SAPCC)		Incentives for fish farming, construction of fish markets and Mathyashraya (housing for fisher folk) programme (Pg. 139, Karnataka SAPCC)		Yes
Monitoring early warning systems as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR) Building insulation as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures Technological Adaptation measures		Disaster Management Act 2005 Implementation of the Rajiv Awas Yojana (Housing scheme) and establishment of 1,300 permanent houses for slum dwellers (Pg. 141, Karnataka SAPCC)		Development of lung spaces (Pg. 140, Karnataka SAPCC)	Yes
Using mechanical and passive cooling and developed technology as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures	reducing energy demand in lighting and cooling in Building sector (Pg. 131, Karnataka SAPCC) Integrate passive cooling into Structure Plans (Pg. 131, Karnataka SAPCC)				
Access to technology can also help in livelihood enhancement. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) Ecosystem management adaptation can also be done by community-based natural resource management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures Other Adaptation issues			Joint Forest Planning and Management Plan		Yes
Participatory scenario development as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) Conducting integrated assessments as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) Household preparation and evacuation planning as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues Other Adaptation issues Disaster Preparedness			Joint Forest Planning and Management Plan		
Migration as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness				KARNATAKA STATE DISASTER MANAGEMENT POLICY	
Disaster risk reduction is a very important adaptation measure in reducing poverty. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness				KARNATAKA STATE DISASTER MANAGEMENT POLICY	Yes
Storm and wastewater management is an important hard adaptation measure that can help reduce disaster. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					

Karnataka						
Policy Advice from IPCC and NCE	Thematic Focus	Identified solution /intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation
Land-use and spatial planning can be enhanced by development of flood prone and high risk areas. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Insurance as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues		Weather Based Crop Insurance Scheme, Comprehensive Crop Insurance Scheme			
Catastrophe bonds as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Disaster contingency funds as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness				KARNATAKA STATE DISASTER MANAGEMENT POLICY	Yes
Systematic monitoring and remote sensing as social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Awareness raising and integrating climate change learning into education as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	promote beaches as zero waste areas through awareness programmes (Pg. 98, Karnataka SAPCC)	CRZ Notification Government of India			Yes
Conducting participatory action research and social learning as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues					
Innovation and investments in environmentally sound infrastructures and technologies can decrease greenhouse gas emissions and improve resilience to climate change. (SPM 4.1, Pg. 26, Para 4, IPCC AR5 SYR)	Technological Mitigation		Clean Technology Fund for India/Other loans from multilateral banks			Yes
Financial incentives as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues					
Cash transfers as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilience Livelihood					
Mechanisms that set up carbon prices, including cap and trade systems and carbon taxes must be given importance in order to ensure a cost effective mitigation approach. (SPM 4.4, Pg. 30, Para 2, IPCC AR5 SYR)	Power Sector Reforms					
Economic instruments such as subsidies, tax rebates or exemptions, grants, loans and credit lines must be applied across sectors. (SPM 4.4, Pg. 30, Para 5, IPCC AR5 SYR).	Cross cutting adaptation and mitigation					Yes
Adoption of complementary policies such as income tax rebates or other benefit transfer mechanisms could help avoid the potential adverse effects of mitigation policies (e.g. energy sector). (SPM 4.4, Pg. 30, Para 6, IPCC AR5 SYR)	Power Sector Reforms					Yes

Karnataka							
Policy Advice from IPCC and NCE	Thematic Focus	identified solution /intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation	
Better assessment of global adaptation costs, funding and investments is required as limited evidences suggest that there is a gap between global adaptation costs and funds. (SPM 4.4, Pg. 31, Para 1, IPCC AR5 SYR)	Other Adaptation issues						
Elimination of fuel subsidies can be undertaken alongside the modernisation of India's social protection framework that would help relieve the impacts of volatility in world energy prices and other risks affecting the poor people. (Para 8, Pg. 18, 3.2, NCE SYR India Chapter)(Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms						
Institutional and governance reforms such as scaling back power/fuel subsidies and setting realistic prices to create financial viability are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms						
Reform of fuel subsidies is important to encourage more efficient energy use in transport. (Para 1, Pg. 21, 3.2, NCE SYR India Chapter)	Power Sector Reforms						
To determine the optimal energy mix for India, it is important to take all the social costs and benefits of different fuels into account for maximizing India's social efficiency and social welfare. (Para 6, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms						
Fuel taxes can act as the most efficient instrument to achieve socially optimal fuel mix, increase government revenues, providing resources to reduce other distorting taxes, to increase productive development spending or to fund cash transfers to compensate poor fuel consumers. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter) (Para 3, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms	Restructuring the power tariffs in the agricultural sector to disincitivise avoidable electricity consumption (Table 11.3.1, Pg. 165, Karnataka SAPCC)		establish "Inland fisheries development Centre" in North Karnataka		Yes	
Fuel taxes complemented with concessional development financing can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms	Development of indigenous and cost effective solar technology (Pg. 117, Karnataka SAPCC)		Solar Karnataka Programme for 25,000 solar rooftops of 5 to 10 kW with net metering (Pg. 140, Karnataka SAPCC)	Incentivisation of installation of solar water heater by BESCOM through tariff discounts (Pg. 140, Karnataka SAPCC)		
Public investment policies implemented with fuel taxes can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms						
Coordination and institution-building (e.g. subsidies) to overcome existing policy failures. (Para 2, Pg. 27, 4, NCE SYR India Chapter)	Cross cutting adaptation and mitigation						
Formation of State Finance Commissions to determine the allocation of state revenues to local governments can create better urban growth. (Para 5, Pg. 39, 5.2, NCE SYR India Chapter)	Cross cutting adaptation and mitigation						
Build consensus for strong structural and fiscal reform to signal intent. (Para 3, Pg. 40, 6, NCE SYR India Chapter)	Cross cutting adaptation and mitigation		prime Minister Integrated Urban Poverty Eradication programme			Yes	

Karnataka						
Policy Advice from IPCC and NCE	Thematic Focus	identified solution /intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation
Reducing the costs of infrastructure to upgrade growth and economic efficiency. (Para 4, Pg. 40, 6, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					
Fuel subsidy reforms should be coupled with well-designed and targeted measures to protect the poor and vulnerable groups from high fuel prices. (Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms			Fuel Subsidy to BPL Consumers		Yes
Comprehensive, carefully sequenced, equitable and sustainable fuel subsidy reform plan. (Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Reducing emission of non-CO2 agents, expressed as "CO2-equivalent emissions", can be a significant component of mitigation strategies. (SPM 3.4, Pg. 23, Para 1, IPCC AR5 SYR)	Other Mitigation Issues					
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires higher rates of emission reductions from 2030 to 2050. (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Other Mitigation Issues					
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires rapid scale-up of low carbon energy from 2030 to 2050. (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Other Mitigation Issues				KARNATAKA RENEWABLE ENERGY POLICY 2009-14	
Dietary change and reduction in food waste can also help in lowering the emissions. (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Other Mitigation Issues					
Adoption of existing cost-effective energy-efficient appliance technologies can result in large reductions in India's energy consumption and GHG emissions. (Para 5, Pg. 20, 3.2, NCE SYR India Chapter) (Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Technological Mitigation				karnataka energy efficiency and conservation policy 2015-19	
National governments can coordinate adaptation efforts of local and subnational governments by economic diversification (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Livelihood		MGNREGA			Yes
National governments can coordinate adaptation efforts of local and subnational governments by providing information, policy and legal frameworks (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Cross cutting adaptation and mitigation					
National governments can coordinate adaptation efforts of local and subnational governments by financial support (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Other Adaptation issues					
Local governments and private sectors are considered critical for adaptation progress assuming their roles in scaling up adaptation of communities, households, and civil society and managing risk information and financing. (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	Other Adaptation issues					
For decision making process in adaptation planning and implementation, recognition of diverse interests, circumstances, social-cultural contexts and expectations are required. (SPM 3.3, Pg. 19, Para 7, IPCC AR5 SYR)	Other Adaptation issues					

Karnataka						
Policy Advice from IPCC and NCE	Thematic Focus	Identified solution /intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation
For effective adaptation, knowledge about indigenous, local and traditional practices, including indigenous peoples' holistic view of community and environment (SPM 3.3, Pg. 19, Para 7, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues					
Transformations in economic, social, technological, and political decisions and actions can enhance adaptation and promote sustainable development. (SPM 3.3, Pg. 20, Para 3, IPCC AR5 SYR).	Other Adaptation issues					
Public private partnership as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues			Infrastructure Policy 2007 for the State Of Karnataka		
Practical strategies such as Social and technical innovations, behavioural shifts or institutional and managerial changes that produce substantial shifts in outcomes. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues					
Political strategies such as political, social, cultural and ecological decisions and actions consistent with reducing vulnerability and risk and supporting adaptation, mitigation and sustainable development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Other Adaptation issues					
Potential linkages among regional, national and sub-national climate policies must be encouraged in order to increase the climate change mitigation benefits. (SPM 4.4, Pg. 29, Para 7, IPCC AR5 SYR)	Other Adaptation issues					
National government, local government and private sector coordination needs to be recognised for scaling up adaptation of communities, households and civil society and in further managing risks information and financing. (SPM 4.4, Pg. 29, Para 10, IPCC AR5 SYR)	Other Adaptation issues					
Synergies between private sector and public sector should play an important role in financing mitigation and adaptation. (SPM 4.4, Pg. 30, Para 8, IPCC AR5 SYR)	Cross cutting adaptation and mitigation					
Relevant tools like suitable governance structures and adequate institutional and human capacity together can enhance the effectiveness of integrated responses of mitigation and adaptation strategies. (SPM 4.5, Pg. 32, Para 4, IPCC AR5 SYR).	Cross cutting adaptation and mitigation					
Opportunities for enhanced resilience, reduced emissions and more sustainable development can be achieved through integrated responses especially in the context of energy planning and implementation, interactions among water, food, energy, and biological carbon sequestration. (SPM 4.5, Pg. 32, Para 4, IPCC AR5 SYR)	Power Sector Reforms	Research the carbon sequestration potential of carbon-deficient dry land soils (Pg. 52, Karnataka SAPCC)		Subsidy of 50% upto to Rs.10 per kg will be provided through National Seed Corporation or Farmer Producing Organizations to the small and marginal farmers to use certified potato seeds.		
For India to increase its growth requires policy-makers to find and unblock the critical obstacles and constraints to structural change and inclusive growth. (Para 4, Pg. 9, 2.1, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					

Karnataka						
Policy Advice from IPCC and NCE	Thematic Focus	Identified solution / Intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation
Better allocation of responsibilities between various levels of government for better urban service delivery. (Para 6, Pg. 39, 5.2, NCE SYR India Chapter)(Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Cross cutting adaptation and mitigation					
To effectively mitigate GHG emissions and other climate change impacts, cooperative responses including international cooperation are required. (SPM 3.1, Pg. 17, Para 5, IPCC AR5 SYR)	International Cooperation/Cross Cutting	research into climate change impacts on crop growth and yield (Pg. 52, Karnataka SAPCC)				
Complementary actions across levels including international cooperation are required for effective adaptation. (SPM 3.1, Pg. 17, Para 5, IPCC AR5 SYR)	International Cooperation/Cross Cutting	Explore possibilities for collaboration with international research institutes to develop and adopt resource-efficient dry land techniques (Pg. 52, Karnataka SAPCC)				Yes
Lessons/outcomes of Kyoto Protocol with respect to participation, implementation, flexibility mechanisms and environmental effectiveness must be taken into consideration for effective international cooperation. (SPM 4.4, Pg. 29, Para 6, IPCC AR5 SYR)	International Cooperation/Cross Cutting					
International cooperation for supporting adaptation planning and implementation must be given a priority for the creation of effective adaptation strategies. (SPM 4.4, Pg. 29, Para 8, IPCC AR5 SYR)	Mitigation/International Cooperation/Cross cutting	Explore possibilities for collaboration with international research institutes to develop and adopt resource-efficient dry land techniques (Pg. 52, Karnataka SAPCC)				Yes
Improvement in institutions as well as coordination and cooperation in governance is helpful to overcome regional limitations accompanying mitigation, adaptation and disaster risk reduction. (SPM 4.1, Pg. 26, Para 6, IPCC AR5 SYR)	Legal and institutional reforms for low carbon development (mitigation and adaptation)					
Land tenure can be another soft adaptation measure for poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal and institutional reforms for low carbon development (adaptation)/Climate Resilient Infrastructure				Land Resources and Policy of Karnataka	
Land zoning laws can lead to better land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal and institutional reforms for low carbon development (adaptation)/Climate Resilient Infrastructure		CRZ Notification and Special Economic Zones			
Laws to support disaster risk reduction as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness				KARNATAKA STATE DISASTER MANAGEMENT POLICY	
Defining fishing quotas, patent pools and technology transfers as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures				Fisheries Policy of Karnataka 2010	
National and Government Policy and Programs can include mainstreaming of national and regional adaptation plans. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Cross cutting adaptation and mitigation					

Karnataka							
Policy Advice from IPCC and NCE	Thematic Focus	Identified solution /intervention or Specific Policy Statement or Target	National Scheme and policies	State Schemes	State Policy	State Budget allocation	
National and Government Policy and Programs can include disaster planning and preparedness. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness						
Institutional and governance reforms such as unbundling and corporatizing State Electricity Board are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms						
Institutional and governance reforms such as forming independent regulatory bodies at the state and central level are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms						
Institutional and governance reforms such as development of a performance-oriented culture in the sector are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms						
Insulating distribution companies and regulatory bodies from political interference by state governments is a dynamic political economy dimension of reform. (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)	Power Sector Reforms						
Regulating policies along with fuel taxes can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms			Motor Vehicles Tax		Yes	
Strengthening of capacity and accountability of the government at a local level is required. (Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Cross cutting adaptation and mitigation						
Intergovernmental transfers from the state level and the centre needs to be enhanced and well monitored with accountability to ensure resources are spent wisely. (Para 3, Pg. 42, 6.3, NCE SYR India Chapter)	Cross cutting adaptation and mitigation						
Using services such as essential public health services for better adaptation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)					The Karnataka State Integrated Health Policy		
Build strong low-carbon initiatives integrally into India's growth agenda. (Para 4, Pg. 26, 3.4, NCE SYR India Chapter)	Legal and institutional reforms for low carbon development (Mitigation)						

Annexure 4: Tamil Nadu

Tamil Nadu						
Policy Advice from IPCC and NCE	New Themes	Identified solution /Intervention or Specific Policy Statement or Target	National Schemes	State Schemes	State Policies	State Budget allocation
Availability of Carbon Capture and Storage (CCS) technology can help reduce the adverse effects of mitigation on value of fossil fuels. (SPM 3.4, Pg. 25, Para 2, IPCC AR5 SYR)	Techno Fix		National Mission for Green India under National Action Plan on Climate Change			Yes
Efficient irrigation and water saving technologies as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Techno Fix	Research and development on crop season, water conservation, Integrating water usage, effect of change in temperature / humidity, varietal development for rice, pulses that will tolerate weather change and different soils.	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Water conservation Strategies Desilting & Widening of Channels and Drains, strengthening of embankments & removing water weeds from channels		Yes
Application of modern agricultural technologies and practices that boost crop and livestock productivity and which economise on inputs such as land, water and fertilizers can benefit in raising the farmer's income, strengthen resilience to climate change and abate GHG emissions. (Para 2, Pg. 27, 4, NCE SYR India Chapter)	mitigation Techno Fix	Research and development on crop season, water conservation, Integrating water usage, effect of change in temperature / humidity, varietal development for rice, pulses that will tolerate weather change and different soils.	National Mission on Sustainable Agriculture under National Action Plan on Climate Change	Government has established the Tamil Nadu State Seed Development Agency (TANSEDA) for the supply of quality seeds for agricultural crops. The Tamil Nadu Horticulture Development Agency (TANHODA) has been supplying seeds and liquid fertilisers for horticultural crops promoting Integrated Farming System		Yes
Adequately resourced public initiatives in the livestock sector can increase animal productivity and can control total numbers, strengthen resilience and reduce GHG emissions. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter)(Para 6, Pg. 41, 6.2, NCE SYR India Chapter)	Improved Livestock Management	Strategies for animal husbandry and dairy development sector	National Livestock Policy			
Methane emissions can be reduced by enhancing the digestibility of animal feeds by providing better quality of animal diets. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter)	Improved Livestock Management	Strategies for animal husbandry and dairy development sector	National Initiative on Climate Resilient Agriculture	'Fodder Development Scheme'		Yes
Better animal health and reproduction management can help increasing the proportion of healthy and productive animals thereby reducing methane emissions, reducing pressure on water and other natural resources and making animals resilient to climate change. (Para 5, Pg. 33, 4.4, NCE SYR India Chapter)	Improved Livestock Management		National Programme for Prevention on Animal Diseases	Distribution of Milch Cows and Goats / Sheep		Yes
Afforestation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem/ Carbon Sink		National Mission for Green India under National Action Plan on Climate Change			Yes
Reforestation as an ecosystem adaptation strategy. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Climate Resilient Ecosystem/ Carbon Sink		National Afforestation Programme	Tamil Nadu Afforestation Project		Yes

Tamil Nadu						
Policy Advice from IPCC and NCE	New Themes	Identified solution /intervention or Specific Policy Statement or Target	National Schemes	State Schemes	State Policies	State Budget allocation
Food storage and preservation facilities as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures		NABARD Warehousing Scheme			Yes
Hazard and vulnerability mapping as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures					
Monitoring early warning systems as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures		High Impact Severe Weather Warning System			
Building insulation as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures					
Using mechanical and passive cooling and developed technology as a technological adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures		National Urban Housing and Habitat Policy, 2007			Yes
Access to technology can also help in livelihood enhancement. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological Adaptation measures		Science, Technology and Innovation Policy, 2013	'Tamil Nadu State Rural Livelihood Mission'		Yes
Ecosystem management adaptation can also be done by community-based natural resource management. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR) (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures		Joint Forest Management Programme	ecological restoration and conservation of Palikaranal wetland, and the eco-restoration		Yes
Participatory scenario development as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures					
Conducting integrated assessments as a social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures		Joint Forest Management Programme			
Household preparation and evacuation planning as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Migration as behavioural adaptation strategy (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness			coastal Disaster Risk Reduction Project		Yes
Disaster risk reduction is a very important adaptation measure in reducing poverty. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness			coastal Disaster Risk Reduction Project		Yes
Storm and wastewater management is an important hard adaptation measure that can help reduce disaster. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness	Abating enhanced air and water pollution in a Climate Change (CC) scenario	National Water Mission under National Action Plan on Climate Change			
Land-use and spatial planning can be enhanced by development of flood prone and high risk areas. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness			Comprehensive Flood Protection Plan (Entire Coastal zone management)		Yes

Tamil Nady						
Policy Advice from IPCC and NCE	New Themes	identified solution /intervention or Specific Policy Statement or Target	National Schemes	State Schemes	State Policies	State Budget allocation
Insurance as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)(SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures					
Catastrophe bonds as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Disaster contingency funds as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Calamity Contingency Funds			Yes
Systematic monitoring and remote sensing as social (informational) adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Mission on Strategic Knowledge for Climate Change under National Action Plan on Climate Change	coastal Disaster Risk Reduction Project		Yes
Awareness raising and integrating climate change learning into education as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness					
Conducting participatory action research and social learning as educational and social adaptation measures. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures					
Innovation and investments in environmentally sound infrastructures and technologies can decrease greenhouse gas emissions and improve resilience to climate change. (SPM 4.1, Pg. 26, Para 4, IPCC AR5 SYR)	Techno Fix			Tamil Nadu Infrastructure Development		Yes
Financial incentives as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures		National Mission on Sustainable Habitat under National Action Plan on Climate Change			Yes
Mechanisms that set up carbon prices, including cap and trade systems and carbon taxes must be given importance in order to ensure a cost effective mitigation approach. (SPM 4.4, Pg. 30, Para 2, IPCC AR5 SYR)	Power Sector Reforms					
Adoption of complimentary policies such as income tax rebates or other benefit transfer mechanisms could help avoid the potential adverse effects of mitigation policies (e.g. energy sector). (SPM 4.4, Pg. 30, Para 6, IPCC AR5 SYR)	Power Sector Reforms					
Better assessment of global adaptation costs, funding and investments is required as limited evidences suggest that there is a gap between global adaptation costs and funds. (SPM 4.4, Pg. 31, Para 1, IPCC AR5 SYR)	other adaptation measures					

Tamil Nadu						
Policy Advice from IPCC and NCE	New Themes	identified solution /intervention or Specific Policy Statement or Target	National Schemes	State Schemes	State Policies	State Budget allocation
Elimination of fuel subsidies can be undertaken alongside the modernisation of India's social protection framework that would help relieve the impacts of volatility in world energy prices and other risks affecting the poor people. (Para 8, Pg. 18, 3.2, NCE SYR India Chapter)(Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Institutional and governance reforms such as scaling back power/fuel subsidies and setting realistic prices to create financial viability are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms		rajiv gandhi gramini (Pg vitrak yojana)(rgglvy).			Yes
Reform of fuel subsidies is important to encourage more efficient energy use in transport. (Para 1, Pg. 21, 3.2, NCE SYR India Chapter)	Power Sector Reforms		rajiv gandhi gramini (Pg vitrak yojana)(rgglvy).			Yes
To determine the optimal energy mix for India, it is important to take all the social costs and benefits of different fuels into account for maximizing India's social efficiency and social welfare. (Para 6, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Fuel taxes can act as the most efficient instrument to achieve socially optimal fuel mix, increase government revenues, providing resources to reduce other distorting taxes, to increase productive development spending or to fund cash transfers to compensate poor fuel consumers. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)(Para 3, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Fuel taxes complemented with concessional development financing can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Public investment policies implemented with fuel taxes can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Fuel subsidy reforms should be coupled with well-designed and targeted measures to protect the poor and vulnerable groups from high fuel prices. (Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Comprehensive, carefully sequenced, equitable and sustainable fuel subsidy reform plan. (Para 8, Pg. 40, 6.1, NCE SYR India Chapter)	Power Sector Reforms					

Tamil Nadu						
Policy Advice from IPCC and NCE	New Themes	identified solution /intervention or Specific Policy Statement or Target	National Schemes	State Schemes	State Policies	State Budget allocation
Reducing emission of non-CO2 agents, expressed as 'CO2- equivalent emissions', can be a significant component of mitigation strategies. (SPM 3.4, Pg. 23, Para 1, IPCC AR5 SYR)	Mitigation					
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires higher rates of emission reductions from 2030 to 2050. (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	other mitigation measures					
Limiting warming over the 21st century to below 20 C relative to pre-industrial level requires rapid scale-up of low carbon energy from 2030 to 2050. (SPM 3.4, Pg. 24, Para 1, IPCC AR5 SYR)	Mitigation					
Dietary change and reduction in food waste can also help in lowering the emissions. (SPM 4.3, Pg. 29, Para 2, IPCC AR5 SYR)	Mitigation					
Adoption of existing cost-effective energy-efficient appliance technologies can result in large reductions in India's energy consumption and GHG emissions. (Para 5, Pg. 20, 3.2, NCE SYR India Chapter)[Para 1, Pg. 41, 6.1, NCE SYR India Chapter]	Techno Fix			Energy Efficiency Programmes(replacement of Conventional Tube lights in street light by the Compact Fluorescent Lamps (CFLs)		Yes
National governments can coordinate adaptation efforts of local and subnational governments by financial support (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	other adaptation measures					
Local governments and private sectors are considered critical for adaptation progress assuming their roles in scaling up adaptation of communities, households, and civil society and managing risk information and financing. (SPM 3.3, Pg. 19, Para 6, IPCC AR5 SYR)	other adaptation measures					
For decision making process in adaptation planning and implementation, recognition of diverse interests, circumstances, social-cultural contexts and expectations are required. (SPM 3.3, Pg. 19, Para 7, IPCC AR5 SYR)	other adaptation measures					
For effective adaptation, knowledge about indigenous, local and traditional practices, including 'indigenous peoples' holistic view of community and environment (SPM 3.3, Pg. 19, Para 7, IPCC AR5 SYR)[SPM Table 4.2, Pg. 27, IPCC AR5 SYR]	other adaptation measures					
Transformations in economic, social, technological, and political decisions and actions can enhance adaptation and promote sustainable development. (SPM 3.3, Pg. 20, Para 3, IPCC AR5 SYR).	other adaptation measures					

Tamil Nadu						
Policy Advice from IPCC and NCE	New Themes	identified solution /intervention or Specific Policy Statement or Target	National Schemes	State Schemes	State Policies	State Budget allocation
Public private partnership as an economic institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures					
Practical strategies such as Social and technical innovations, behavioural shifts or institutional and managerial changes that produce substantial shifts in outcomes. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures					
Political strategies such as political, social, cultural and ecological decisions and actions consistent with reducing vulnerability and risk and supporting adaptation, mitigation and sustainable development. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	other adaptation measures					
Potential linkages among regional, national and sub-national climate policies must be encouraged in order to increase the climate change mitigation benefits. (SPM 4.4, Pg. 29, Para 7, IPCC AR5 SYR)	other adaptation measures	Weather Mitigation			Weather Mitigation	
National government, local government and private sector coordination needs to be recognised for scaling up adaptation of communities, households and civil society and in further managing risks information and financing. (SPM 4.4, Pg. 29, Para 10, IPCC AR5 SYR)	other adaptation measures					
Opportunities for enhanced resilience, reduced emissions and more sustainable development can be achieved through integrated responses especially in the context of energy planning and implementation, interactions among water, food, energy, and biological carbon sequestration. (SPM 4.5, Pg. 32, Para 4, IPCC AR5 SYR)	Power Sector Reforms					
To effectively mitigate GHG emissions and other climate change impacts, cooperative responses including international cooperation are required. (SPM 3.1, Pg. 17, Para 5, IPCC AR5 SYR)	Mitigation/International Cooperation/Cross cutting		National Mission on Strategic Knowledge for Climate Change			Yes
Complementary actions across levels including international cooperation are required for effective adaptation. (SPM 3.1, Pg. 17, Para 5, IPCC AR5 SYR)	Mitigation/International Cooperation/Cross cutting		National Mission on Strategic Knowledge for Climate Change			Yes
Lessons/ outcomes of Kyoto Protocol with respect to participation, implementation, flexibility mechanisms and environmental effectiveness must be taken into consideration for effective international cooperation. (SPM 4.4, Pg. 29, Para 6, IPCC AR5 SYR)	Mitigation/International Cooperation/Cross cutting					

Tamil Nadu						
Policy Advice from IPCC and NCE	New Themes	identified solution /intervention or Specific Policy Statement or Target	National Schemes	State Schemes	State Policies	State Budget allocation
International cooperation for supporting adaptation planning and implementation must be given a priority for the creation of effective adaptation strategies. (SPM 4.4, Pg. 29, Para 8, IPCC AR5 SYR)	Mitigation/International Co-operation/Cross cutting		National Mission on Strategic Knowledge for Climate Change			Yes
Land tenure can be another soft adaptation measure for poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional Adaptation		National Land Records Modernisation Programme			Yes
Land zoning laws can lead to better land-use and spatial planning. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional Adaptation/urban infrastructure					
Laws to support disaster risk reduction as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Platform on Disaster Risk Reduction	coastal Disaster Risk Reduction Project		Yes
Defining fishing quotas, patent pools and technology transfers as regulatory institutional adaptation measure. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Technological adaptation					
National and Government Policy and Programs can include disaster planning and preparedness. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Disaster Preparedness		National Disaster Management Policy	coastal Disaster Risk Reduction Project		Yes
Institutional and governance reforms such as unbundling and corporatizing State Electricity Board are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Institutional and governance reforms such as forming independent regulatory bodies at the state and central level are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Institutional and governance reforms such as development of a performance-oriented culture in the sector are required to push forward the approach of Electricity Act (2003). (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)(Para 1, Pg. 41, 6.1, NCE SYR India Chapter)	Power Sector Reforms					
Insulating distribution companies and regulatory bodies from political interference by state governments is a dynamic political economy dimension of reform. (Para 3, Pg. 20, 3.2, NCE SYR India Chapter)	Power Sector Reforms					

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Policy Advice from IPCC and NCE	New Themes	Identified solution /intervention or Specific Policy Statement or Target	National Schemes	State Schemes	State Policies	State Budget allocation
Regulating policies along with fuel taxes can encourage alternative clean energy sources. (Para 7, Pg. 24, 3.4, NCE SYR India Chapter)	Power Sector Reforms					
Build strong low-carbon initiatives integrally into India's growth agenda. (Para 4, Pg. 26, 3.4, NCE SYR India Chapter)	Legal mitigation					
Land tenure can be another soft adaptation measure for poverty alleviation. (SPM Table 4.2, Pg. 27, IPCC AR5 SYR)	Legal institutional Adaptation		National Land Records Modernisation Programme			Yes

