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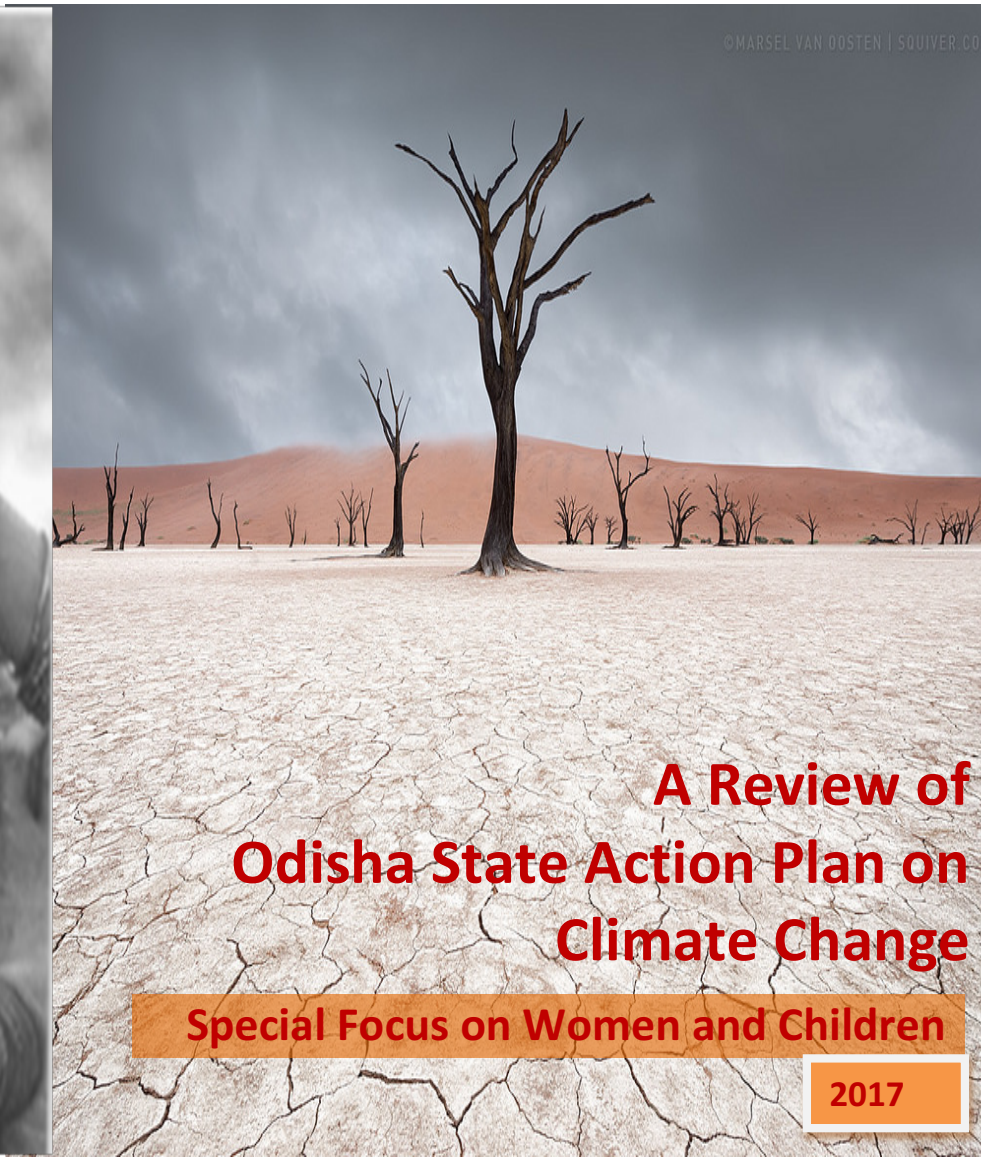

A Review of Odisha State Action Plan on Climate Change

Special Focus on Women and Children

2017

ऑक्सफैम इंडिया
OXFAM
India

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Contents

Reviewed by Oxfam India and CYSD.

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List of Tables

Abbreviations

BMI	Body Mass Index
CESU	Central Electricity Supply Unit
DFID	Department for International Development
DRR	Disaster Risk Reduction
FARC	Fly Ash Research Centre
FHH	Female-Headed Households
GDI	Gender Development Index
GEM	Gender Empowerment Measure
GHGS	Green House Gases
GoO	Government of Odisha
HDI	Human Development Index
HDR	Human Development Report
ICDS	Integrated Child Development Scheme
ICZMP	Integrated Coastal Zone Management Project
IEC	Information Education and Communication
IIT	Indian Institute of Technology
IMR	Infant Mortality Rate
IPCC	Intergovernmental Panel on Climate Change
JSSK	Janani Shishu Suraksha Karyakram
NAPCC	National Action Plan on Climate Change
NGO	Non-Governmental Organization
NHM	National Health Mission
NTFP	Non-Timber Forest Product
OFSDP	Odisha Forest Sector Development Programme
OHPC	Odisha Hydro Power Corporation
OMFED	Odisha State Cooperative Milk Producers' Federation Ltd
OREDA	Odisha Renewable Energy Development Agency
OSDMA	Odisha State Disaster Management Authority
PHC	Primary Health Centre
RKSK	Rashtriya Kishor Swasthya Karyakram
RSBK	Rashtriya Bal Swasthya Karyakram
SAPCC	State Action Plan for Climate Change

SBA	Swachh Bharat Abhiyan
SDG	Sustainable Development Goals
SFDRR	Sendai Framework for Disaster Risk Reduction
SPCB	State Pollution Control Board
SSA	Sarva Shiksha Abhiyan
U5MR	Under Five Mortality Rate
ULB	Urban Local Body
WFP	World Food Programme

1. Introduction

1.1. Background

Climate change is now a global phenomenon and its impact on livelihood, health and wellbeing, and overall quality of life is not deniable. No country is free from the overall impacts of climate change, but poor people of developing countries have been disproportionately affected by the adverse effects. The increasing changes in the climate intensify the problems in human security that developing countries like India have been facing. It has been stated that 94 per cent of the world's major natural disasters between 1990 and 1998 occurred in developing countries (Oxfam, 2002)[1] and their root causes lie in global climatic changes. Vulnerability in the context of climate change is a function of sensitivity, exposure and adaptive capacities. Hence, a highly vulnerable system is one that is highly sensitive to modest changes in climate and one for which the ability to adapt is severely constrained (IPCC, 2007)[2]. It is widely accepted that women and children in developing countries constitute the most disadvantaged groups in society. Poor women are seriously affected by climate change-induced environmental degradation and natural disasters in every developing and underdeveloped country.

Odisha lies between latitudes 17.780N and 22.730N, and between longitudes 81.37E and 87.53E. It is the 9th largest state by area and the 11th largest state by population in India. The state has an area of 155,707 km^2, which is 4.87 per cent of the total area of India, and a coastline of 450 km^2. In the eastern part of the state lies the coastal plain. It extends from the Subarnarekha river in the north to the Rushikulya river in the south. The State is broadly divided into four geographical regions, i.e. Northern Plateau, Central River Basins, Eastern Hills and Coastal Plains. The climate of the state is characterized by hot summer and cold winter in the interior parts. The state has historically been highly prone to climate change and multiple hazards – mainly cyclones, droughts and floods. Natural disasters devastate millions of lives and livelihoods in Odisha each year. More children and women suffer from the effects of natural disasters and this is predicted to worsen as storms, floods and droughts become more severe and frequent because of climate change. Lack of medical facilities, malnutrition, disrupted supply of pure drinking water and lack of proper sanitation facilities make the lives of women and children increasingly vulnerable.

1.2. Climate Change and its impact

There is widespread scientific consensus that the world's climate is changing very fast for which the human activities as well as some natural factors are responsible. The evidences suggest both current and future effects of climate change on human health, including injuries and illnesses from severe weather events, floods and heat exposure; resulting in increase in allergic, respiratory and water borne diseases; and threats to food, electricity and water supplies etc. Indirect effects may

1 Gender, Development and Climate Change, Oxfam GB (2002)

[2] Climate Change: Impacts, Adaptation and Vulnerability, Working Group II, IPCC (2007)

include anxiety, depression and the consequences of mass migration and regional conflicts. Apart from the effects on living entities, climate change also influences other physical activities on earth including glacial position and changing shape, change in mean sea level, acidification of rain, precipitation pattern, low pressure and cyclone. In addition, food production, health, socio-economic conditions, global biodiversity and world economy are also influenced by climate change.

For more than a decade now, Odisha has been experiencing contrasting extreme weather conditions claiming many lives, from heat waves to super cyclone, from droughts to floods. As a result, the economy of the state has been ripped apart. A heat wave in 1998 killed around 1,500 people in the state. The mean daily maximum and minimum temperature of the state is gradually increasing. The entire southern and western part of the state has witnessed an exceptional rise in daily maximum and minimum temperature. Earlier, western Odisha was a known calamity hotspot, but now the coastal areas are also experiencing the same heat waves.[3]

Odisha is mainly rainfall dependent as its irrigation network does not cover the entire state. The agriculture sector is vulnerable to the vagaries of climate-induced weather changes. Food security is also threatened in different parts of Odisha due to climate change induced disasters. Rise in temperature and sea level has made agriculture vulnerable as the gushing sea water combined with erratic rain often destroys the crops. Sea water is more often gushing into the agricultural land, filling it with saline water, which is directly affecting farmers and slowly weakening the productivity of the state. Agriculture across the coast of Odisha is now facing a serious climate emergency. The climatic variations could further multiply the vulnerability of poor by adversely affecting their health and livelihoods and impeding the development of the state. It is evident that climate change in Odisha has the potential to tremendously aggravate water stress, food security and health system. An attempt has been made for a detailed analysis of climate change and its impact in the second chapter.

1.3. Rationale

The adverse impacts of climate change are most striking in developing nations because of their geographical and climatic conditions, their high dependence on natural resources, and their limited capacity to adapt to the changing climate. Within these countries, the poor, who have the least resources and the least capacity to adapt, are the most vulnerable (IPCC, 2014). Projected changes in the incidence, frequency, intensity, and duration of climate extremes; for example, heat waves, heavy precipitation, and drought; as well as more gradual changes in the average climate will notably threaten their livelihoods; and further widen the inequities between the developing and developed regions. Odisha's geographic location on the east coast of India and its climatic condition reveal that the state has historically been highly prone to climate change and multiple hazards. Ray Bennett (2009) reported that Odisha is a land of multiple disasters. For over a decade

[3] Climate Change and Orissa: Fact Sheet, Centre for Science and Environment, New Delhi

now, Odisha has been teetering from one extreme weather condition to another. A study of the effects of disasters reveals that between 1963 and 1999, Odisha experienced 13 major disasters, which killed 22,228 people (state government figure; the non-government figure puts the toll at around 40,000) and rendered more than 34 lakhs of people homeless (Mohapatra, 2006). According to the state government's Human Development Report 2004, property loss has been steadily growing every year over the past few decades due to climate change and disasters (GoO, 2004). Thus, the impact of climate change has been associated with a number of changes which have serious implications for life in the state.

There is emphasis on integration of climate action strategies in existing schemes and policies both at national and sub-national levels. The priority has been to build a resilient and low emissions society. The Government of India's National Action Plan on Climate Change (NAPCC), 2008 was a comprehensive strategy for dealing with the inevitable impact of climate change, which required adaptation measures in several critical areas as well as mitigation of emissions of Green House Gases (GHGs). The Union Government has also set up twelve missions to respond to climate change through different mitigation and adaptation measures. Odisha was one of the early states to formulate a comprehensive Orissa Climate Change Action Plan (OCCAP, 2010-2015) followed by Odisha Climate Change Action Plan (OCCAP, 2015-2020) to address climate change issues. The plans formulated by an inter-departmental team are a coordinated government response to this important problem. Eleven sectoral missions such as Agriculture, Coast and Disaster, Energy, Fisheries and Animal Resources, Forests, Health, Industries, Mining, Transport, Urban and Water Resources were focused on in OCCAP, 2010-2015. In addition, another sector namely Waste Management has been focused in OCCAP, 2015-2020. The activities as envisaged in the Climate Change Action Plans are being implemented by different departments and agencies. Further, a Climate Change Cell has been set up in the Forest and Environment Department to closely coordinate all the recommended actions and also work towards resource mobilization to implement different components of the action plan in a systematic and time bound manner.

Though Odisha Climate Change Action Plan (here after SAPCC) is a welcome step towards identifying vulnerability and an agenda for taking suitable adaptation and mitigation measures, much more needs to be done for its effective implementation. Although climate change affects everyone, certain populations suffer disproportionately. Women are typically more likely to be negatively affected by the impacts of climate change and access to power and resources than men. Further, children are vulnerable by nature. Socially, they rely on a caregiver and have difficulties expressing themselves. Also, biologically, they have weaker immune systems and poorer temperature regulation. Hence, women and children need different ways of coping with, and adapting to, disaster and climate impacts. Thus, there is an urgent need for bringing visibility of their vulnerability to climate risk and build the capacity of mandated institutions and departments to take up planned policy and appropriate corrective measures.

The SAPCC, 2015-2020 has gone through changes to align the proposed activities with the required adaptation agenda. Though it is claimed that the SAPCC is under implementation, the

process is not so known in the public domain. This needs to be mainstreamed with the development agenda. Involvement of various stakeholders in the implementation of SAPCC as well as their capacity building is yet to materialise. The SAPCC still remains the responsibility of a few officials in the State, and cross-cutting responses are missing. Also, since the SAPCC misses the reference of women and children as vulnerable sections of society; the document needs to be updated with the latest impacts visible and design appropriate responses prioritizing those at the forefront of facing impacts. Moreover, the priorities and actions reflected in the SAPCC and their actual realization on the ground need further probing. Further, three major international frameworks were agreed in 2015 to strengthen resilient and sustainable development models. The year started with the adoption of a new Disaster Risk Reduction (DRR) Framework in March 2015 in Sendai, Japan, called the Sendai Framework for Disaster Risk Reduction (SFDRR-2015-30); then a new set of development goals — the Sustainable Development Goals (SDG 2015-30) were adopted by the UN General Assembly in New York in September; and finally a new climate change agreement — the Paris Agreement — under the UNFCCC (United Nations Framework Convention on Climate Change) was agreed in December 2015. Along with the adoption of these major frameworks, it is important to review the SAPCCs (2010-15 and 2015-20) and recommend suitable corrective measures both at the policy and practice levels to take the agenda forward.

1.4. Objectives

The present study is intended to focus on the following objectives.

- To analyse the vulnerability of children and women in Odisha in the context of climate change.
- To review the status of implementation of Odisha SAPCC (2010-2015) with regard to planning vs. realization, implementation strategies, addressing women and child vulnerabilities and the monitoring and evaluation (M&E) framework.
- To review Odisha SAPCC (2015-2020) to know the extent to which the key priorities are addressing the vulnerabilities, appropriateness of the action plans aligned with key priorities, scope for collaboration/ convergence, and the M&E mechanism.
- To review budget process, allocation and expenditure pattern for SAPCC 2010-2015 and 2015-2020.
- To review some of the key flagship programmes like Swachh Bharat Abhiyan (SBA), Sarva Shiksha Abhiyan (SSA), Integrated Child Development Scheme (ICDS) and National Health Mission (NHM) in the context of SAPCC commitments.
- To recommend suitable corrective measures both at the policy and practice levels to take the climate change agenda forward.

1.5. Methodology

This is more of a qualitative study in nature which primarily depended upon secondary review of literature. Some of the important documents included National Action Plan on Climate Change (NAPCC), 2008; Orissa Climate Change Action Plan (2010-2015); Progress Report on Odisha Climate Change Action Plan (2015); Sustainable Development Goals (2015); Odisha Climate Change Action Plan (2015-2020); Odisha State Disaster Management Plan (2016). These were thoroughly reviewed through the lens of vulnerability with special focus on children and women; budget allocation and expenditure pattern; integration and convergence among different departments and agencies; the process of implementation of SAPCC and the monitoring / review mechanism. While reviewing the SAPCCs careful attention was given to the priority areas and activities outlined and the accomplishments under different sectors, keeping an eye on the vulnerability of children and women to climate change.

Emphasis was given on budget analysis including allocations and expenditure from 2010 onwards towards implementation of the two SAPCCs in Odisha. State action plans and budget on climate change and disaster risk reduction / management and their implementation status were analysed and recommendations drawn towards developing institutions and mechanisms to enable inclusion of children and women in the design and planning process as well. The findings will be useful for strengthening the institutional mechanism to build capacity within the concerned departments towards mainstreaming resilience in development planning.

Four major flagship programmes /schemes like SBA, SSA, ICDS and NHM were analysed in the perspective of climate change with focus on vulnerabilities of children and women.

Further, bilateral discussions with the officials of concerned departments including Forest and Environment, Revenue & Disaster Management, Women & Child Development, School & Mass Education, Agriculture & Farmers Empowerment, Panchayati Raj, Health & Family Welfare and OSDMA were held to capture required information relating to budget allocation, convergence and monitoring the process of implementation of SAPCC at different levels.

1.6. Scope and Limitations

Efforts have been made to clearly articulate the vulnerability of children and women to climate change and their needs referring to the secondary literature; bilateral discussion with the officials of concerned departments; and views / inputs of different stakeholders including thematic experts, development practitioners, and academia through organizing multi-stakeholder consultations. Accordingly, the need for capacity building of mandated institutions and departments towards mainstreaming resilience in development planning and effective practical action at the appropriate level have been derived.

However, the process of review of the SAPCCs is confined to the following aspects only.

- Analysis and review of secondary sources of information relating to climate change.
- Review of the Odisha SAPCCs (2010-15 & 2015-20) with special focus on vulnerability of children and women to climate change.
- Only four flagship programmes / schemes – SBA, SSA, ICDS and NHM – have been analysed in the perspective of climate change with focus on vulnerabilities of children and women.

2. Vulnerability Analysis of Children and Women in Odisha

2.1. The Context

Climate change, one of the most urgent issues of our time, has been impacting populations and ecosystems around the globe. But the impacts are not being felt equally.[4] Women and children are among the most vulnerable populations in the world, suffering the most from illness, poverty and disparity. Despite important roles within their communities, too many women and children lack access to quality health care, compounding many other threats to their health and well-being. Studies have shown that women disproportionately suffer the impacts of disasters, severe weather events, and climate change because of cultural norms and the inequitable distribution of roles, resources and power.

Women are engaged in traditional roles as mothers and family caregivers. Men may be able to migrate for economic opportunities, but women are more likely to remain home to care for children and elderly or sick family members.

Climate change has a significant impact on securing household water, food, and fuel — activities that usually are the responsibility of women and girls. In times of drought and erratic rainfall, women and girls must walk farther and spend more of their time collecting water and fuel. Girls may have to drop out of school to help their mothers with these tasks, continuing the cycle of poverty and inequity. Changing climates also affect the health of crops and livestock; and women, who are often responsible for producing the food eaten at home, must work harder for less food.

Vulnerability of Women

- Poor representation in the household and community level decision making processes.
- Poor access to information, skills, resources, and finance.
- Suffering from discriminatory division of labour – often overworked and underpaid.
- Many a time, the loss of sources of income (such as livestock, kitchen gardens usually controlled by women) erodes their economic status.
- The collapse of physical space (shelters) and subsequent social dislocation further increases their vulnerability towards sexual exploitation.
- Poor political participation, gender insensitivity, discriminatory governance systems, skewed economic entitlements of women result in women being the worst sufferers in disaster situations.

(Source: Voicing Silence - Experience of Women with Disasters in Orissa, OSDMA, 2002/ page -3)

Women are also more vulnerable because they have less access to education and information that would allow them to manage climate-related risks to agriculture and livestock. Women have considerably less access than men to critical information on weather alerts and cropping patterns, affecting their capacity to respond effectively to climate variability. Women often have limited or no control over family finances and assets. In many communities, women are underrepresented in community politics, and thus have little influence over community strategies for adapting and over policies that support women's rights and priorities. Without participation by women, programmes

[4] Climate change connection: **2009, UNFPA AND WEDO**

to replace traditional crops with those better suited to the changing environment might focus only on the needs of men and not address the problems women face with household gardens.

Odisha State policy for Girls and Women, 2014 is committed towards creating an environment for girls that promote equal opportunities, eliminates discrimination and ensures empowerment through changes in societal attitudes. Many innovative initiatives have been taken for the development and empowerment of girls and women. Empowering women and achieving gender equality are important goals in themselves, but are also critical components of managing climate change and creating a sustainable future.

It has been experienced that children bear the brunt of disasters. Schools and ICDS centres remain closed and children are forced to stay in cyclone and flood shelters till the normalcy returns. Basic health and ICDS services get affected due to disruption in connectivity and the inundation or damage of the facilities. In case of migration, the children become victims of violence and abuses of various form in the worksites.

Protection, especially for children, becomes a more severe problem in times following disasters as parents are pre-occupied with how to re-establish income and food sources for the household, resulting in many children being left unattended. Traffickers take advantage of the situation offering promises of work when poor families are in need of income. Unattended children in these communities can be at heightened risk of disrupted school attendance and increased vulnerability to trafficking. Boys tend to be at a higher risk of being sold into child or bonded labours as it is fairly common between the ages 12-16 to migrate for work in construction, hotel and or textile factories. Girls on the other hand are at a higher risk of sexual exploitation.[5]

2.2. Women and Children in Odisha

In India, Odisha is the state most vulnerable to climate change. Women and children constitute 49.46 per cent and 14.1 per cent respectively to the state's population. The overall literacy rate of the state is 72.9 per cent. Women's literacy rate is 64.01 per cent. The infant mortality rate (IMR) and under five mortality rate (U5MR) in the state are 40 and 49 respectively. In respect of nutritional status of women, the women's body mass index (BMI) is 26.4 per cent which is more than the national average of 22.9 per cent. About 44.6 per cent of the children, aged 6-59 months suffer from anaemia. Similarly, more than half of women in the age group of 15-49 years are also found to be suffering from anaemia of which 47.6 per cent of women are pregnant. The maternal mortality rate of the state has declined from 258 (2009) to 235 per 100,000 live births (2012) but still is the fourth highest in the country. The share of women workforce to total workforce is 32.1 per cent. Out of the total women workforce, 71 per cent are engaged in agriculture sector. Amongst 35 states in India, Odisha ranks 32 in GDI and 29 in GEM. Looking at these indicators, it is clear that women and children are the most vulnerable groups in Odisha.

[5] PRAYAS (Volume – 1), Child Protection in Emergencies (Page – 173), OSDMA, 2016

Table:1 Status of women and Children in Odisha

Indicators	Status
Sex ratio	979
Child sex ratio (0-6 years)	941
Literacy rate	72.87
Male literacy rate	81.59
Female literacy rate	64.01
Infant mortality rate (IMR)	40
Under-five mortality rate (U5MR)	49
Children under 5 years who are underweight	34.4
Children age 6-59 months who are anaemic	44.6%
Nutritional Status of Adults (age 15-49 years)	
Women whose Body Mass Index (BMI) is below normal (BMI < 18.5 kg/m2)	26.4%
Non-pregnant women age 15-49 years who are anaemic	51.2%
Pregnant women age 15-49 years who are anaemic	47.6%
All women age 15-49 years who are anaemic (%)	51%
Maternal Mortality Rate (MMR)	222
Women work participation rate	27.2
Women involved in agriculture (out of total women workforce)	71%
Gender Related Development Index (GDI)	0.524
GDI Rank (out of 35)	32
Gender Empowerment Measure (GEM)	0.393
GEM Rank (out of 35)	29

Source: National Sample Survey of India, 2011 & National Family Health Survey – 4, 2016

2.3. Impact of Climate Change and vulnerability

Threats of Climate Change	Impact on Women & Children
Drought Flood Cyclone Rising temperature Deforestation Desertification Soil erosion	**Physical impact**: Soreness, Sleeping disturbance, Food disturbance, Gynaecological problems, Injuries, Miscarriages, Aches and pain, Physical impairments, Rape. **Emotional impact:** Anxiety, Fear, Humiliation, Dreams and nightmares Degradation, Disbelief, Restlessness, Shame, Embarrassment Denial, Irritability and Anger **Socioeconomic impact:** Dealing with new societal roles like being a widow, single parent, or head of house. Inability to work, Feeling isolated, Feeling stigmatized. Withdrawal from external life, Loss of trust, Disorganization and discontinuity of life routines and Increased drop out of children

2.3.1. Flood and its impact on Women and Children

"In the agricultural sector, rural women in developing countries are the primary producers of staple food, a sector that is highly exposed to the risks that come with drought and uncertain rainfall." Human Development Report 2007-08. Fighting climate change

Floods have caused serious problems of food security, water and sanitation for the local people, and also posed a grave danger in the field of health and hygiene. Women are the worst affected. Their workload gets heavier in terms of feeding and taking care of children, cleaning and recovery of household items, and tending to sick family members. The coastal belt of the state, hit by the super cyclone in 1999, is still in the process of restoring the livelihoods of the people following the impacts; frequent floods in subsequent periods have set back recovery of livelihoods.

When the floodwater recedes the workload on the women gets heavier as they clean the house and recover whatever assets remain. With the floodwater in the villages, wet fuelwood and unsafe drinking water add to women's problems. The collection of drinking water and fuel for cooking become daunting tasks for the women during this time.

The devastation caused by floods is apparent in the damage they do to crops, houses or livestock, but this tends to conceal reproductive needs to which the women have to cater, and their own less visible but crucial needs; for example, the need for secluded spaces for defecation. Women face acute personal discomfort and embarrassment and in some areas they have adopted the coping strategy of eating less in order to avoid embarrassment. What is especially taxing for menstruating women is the lack of space and the unavailability of the local hygienic resources they normally use in such situations. The women also suffer from irregular menstruation cycles and emotional traumas of depression, anxiety and irritation. Instances of pregnant women having false labour pains due to stress during floods and premature deliveries have also been reported. Those needing medical attention could not be transferred to medical care units and thus most of the deliveries took place in the most unhygienic conditions, thereby risking the well-being of both mother and the new born. Anxiety and frustration in families, and conflicts and discontentment were on the rise with loss of property, belongings, and food security in disaster situations. Depression and irritation were common in local communities. Domestic violence also increased as men struggled to cope with the indignity and frustration of enforced inactivity and the loss of authority and earning capacity.

As regards the process of relief distribution, it was seen that women (especially the lactating mothers or pregnant) were not adequately targeted during the relief phase. In addition, women in the flood-affected areas were seen not to queue up at relief distribution points, unless it was a woman headed household or men were absent in the family.

2.3.2. Drought and its impact on Women and Children

Drought is a common and regular phenomenon in western Orissa, occurring every three to four years. The districts of Kalahandi, Nuapara, Bolangir, Sonepur, Kandhamal, and parts of Bargarh, Sambalpur, Deogarh, Jharsuguda, and Sundargarh are drought prone. Since the Fourth Five-Year Plan (1965-70), 39 blocks of these districts have been covered under the Drought Prone Area Programme. Despite this special approach, these districts are still notorious for frequent hunger, starvation deaths, distress sales of children, migration etc. But the irony is that these districts are rich in natural resources.

The frequent reasons for drought are mainly insufficient rainfall (at 800-1200 mm a year, the average is good, but the pattern of rainfall is erratic); poor water harvesting strategies and the erosion of traditional water harvesting methods; the poor water retention capacity of the soil (due to the loose soil structure and undulating topography of the region) etc. Droughts result in migration of the local people, loss of household assets that are sold or mortgaged to meet their needs and indebtedness. Besides, droughts increase health hazards, such as anaemia, dysentery and malnutrition, and the spread of sexually transmitted diseases among migrant labourers. All these lead to continuous and conspicuous poverty in the region.

While drought affects the family as a whole, it is observed that women are more vulnerable to the impacts. The migration of men aggravates the pressure on women, children and the aged, who are left behind. The women are in charge, with the responsibility of managing the families with the minimum available resources of money, food grains, and saleable assets. During normal times, women from many families are not allowed or discouraged to go outside for any daily wage labour. Traditional social norms limit women's roles to household functions and circumscribed community level activities (such as participating in the local market or village fair). But droughts force women into roles that take them out of the house, to take on more visible roles in community processes, and to access Government relief measures. During drought years, the workload increases drastically both for the men and women, but the new nature of workload affects the women most. This struggle for survival compels women to go out and perform non-traditional roles. The women face many challenges. When the men migrate in search of work, the temporary single status of women leads to material and sexual exploitation of them on many occasions.

It is evident that drought affects women in multiple ways. At the household level, some of these impacts are (a) the time available for rest during normal days is used for collection of resources for meeting basic survival needs, which is a prominent factor to increase the stress level; (b) deterioration of women's health affects their reproductive status; (c) the exploitation of women increases in all forms of market activities, especially in connection with the sale of Non-Timber Forest Products (NTFPs); and (d) supplementary wage works are taken up by the women to meet the family needs. At the community level, the impacts of disaster expose the women to a variety of functions that they have not been accustomed to and have lack of knowledge as well. This creates a situation for potential maximum exploitation.

2.3.3. Shortage of food and its Impact on women and children

Disasters, especially droughts and emergency situations, are the most common causes of food shortage in the world (WFP). As normal practice, discrimination against women and girls are found everywhere in the state. This discrimination is intensified in the form of family violence during disasters. The reason is food scarcity. Women have a specific role and experiences in food production and preparation. So, it is important to involve them in the food security planning and decision-making processes of the family. Instead of making the women and children victims, they should be taken as potential change agents.

2.4. Consequences of Climate Change

The differentiated impacts of climate change on women are numerous. Here is how climate change, sustainable development and population issues intersect i.e. the specific impacts on women and children that will help in the development of effective, gender-sensitive policies and programmes.

Issue	**Impacts of Climate Change**	**Direct and Indirect Impacts on Women & Children**
Natural resources: land, water, & forest	• Drought and/or flooding from temperature changes and erratic weather • Decreased soil fertility • Resource scarcity • Shortage of clean, potable water	• Increased household work burden and time spent on gathering water, food and fuel such as firewood (sometimes leading to lower school enrolment rates, decreased literacy rates, or early marriage) • Exposure to contaminated water sources • In regions with restricted land rights, women potentially forced off/without access to fertile land • Loss of traditional land tenure
Natural disasters	• Warming oceans • Changing weather patterns/seasons • Erratic and more intense weather events	• Lack of access to education/information about weather • Restricted ability to respond (e.g. women often unable to leave home without male companion) • Lack of survival skills regularly taught to boys, such as swimming or tree climbing • Women regularly excluded from disaster recovery decision-making
Health	• Increase in infectious, water-borne or vector-borne diseases, e.g. malaria, due to increased	• Pregnant and lactating women, along with the very young and very old, are most vulnerable to health threats

Issue	Impacts of Climate Change	Direct and Indirect Impacts on Women & Children
	temperatures and intensified storms • Heat-related illness • Malnutrition • Increased air pollution, allergies and asthma • Mental disorders such as anxiety and depression	• Increased lack of health care services, immunizations, family planning, reproductive health care in disaster zones • Potential increase in maternal and infant mortality rates due to lack of care • Lack of services and hygienic supplies in relief shelters for pregnant, lactating or menstruating women
Shortage of food	Decreased crop yields or crop failure	• Increased hunger and calorie reduction for women and children • Increased health and mortality risks
Population growth	• Growth expected in areas at risk to severe climatic changes and where people rely on natural resources for survival	• Competition for increasingly scarce government and natural resources • Most vulnerable populations (e.g. women) continue to be under threat • High fertility rates impact women's health
Urbanization	• Rural-to-urban migration increases due to environmental degradation, reduced productivity and conflict over resources • Informal shelters and communities expand	• Settlements — sometimes informal — may be unhealthy and dangerous, lack water and sanitation and be built on vulnerable land • Urban formal markets tend to benefit men • Poor urban women lack health services • Urban poverty projected to increase[18]
Migration & displacement	• Disaster events can lead to displacement,[19] temporary and permanent, internal and international • Environmental degradation and competition for resources prompts women and men to move • Forced migration due to regional vulnerability possible	• Women comprise at least half of world migrant populations, but their needs are not prioritized in migration policies • Women often lack resources to move, but post-disaster may lack resources to cope at home • Forced migration could exacerbate women's vulnerability and lack of access to resources and livelihood options

Issue	Impacts of Climate Change	Direct and Indirect Impacts on Women & Children
Household composition	• Loss of/change in family composition due to migration/displacement and/or fatalities from natural disasters	• Rise in female-headed households (FHH) • Limited resources for FHH in recovery/insurance programmes or funds that prioritize access for men • Lack of land rights jeopardizing women's food and livelihood security • Gendered divisions of labour reinforced • Decreased numbers of women in some households due to female disaster mortality
Conflict & violence	• Competition over limited resources can trigger conflict or displacement • Shortages in regular rainfall and overall scarcity of natural resources can increase chances of civil war by 50 per cent • Increased anxiety and distress over livelihood insecurity	• Conflict amplifies existing gender inequalities • While men are more likely to be killed or injured in fighting, women suffer greatly from other consequences of conflict, such as rape, violence, anxiety and depression • Higher levels of violence in the home and in post-disaster relief shelters

2.5. Scope for addressing Women and Children Vulnerabilities in SAPCC

- On SAPCC-2010-15 provisions in meeting the vulnerabilities of women and children in the state, the following points are coming up for further reflection
- Though there has been no reflection in the 2015 SAPCC progress report on rapid screening of state agricultural policy, there are a lot of provisions for welfare of women in the form of developing women friendly agriculture implements, provision of credit facility to take up agriculture activities independently, training young women on post-harvest management and food processing, SHGs to be preferred to deal with agri-input businesses etc
- Construction of farm ponds and post-harvest management training has helped women farmers to enhance their economic empowerment through vegetable cultivation and value addition of food grains. Cultivation and consumption of vegetables also meet nutritional deficiencies of children and women, especially in tribal pockets.
- During cyclone and flood situations, women and children are comparatively more vulnerable. Construction of multipurpose cyclone shelters along the coastal belts has

created great opportunity for the safety and security of women and children during cyclones.

- Activities of community preparedness for disaster management will create awareness among women on precautionary measures that need to be taken up in order to make them and their children safe during natural calamities.
- Activities undertaken for promoting biogas and biomass fuel consumption under the renewable energy policy would be helpful to women and children in enhancing their standard of living through building a pollution free environment.
- Energy efficiency measures in supplying water would help through longer period of water supply, which will ultimately be helpful for the women to maintain proper sanitation in the families.
- Early warning disease surveillance activities to control vector borne diseases will be very helpful to poor women in the villages to keep their hens safe from bird flus, which would ultimately enhance economic empowerment of poor women.
- Activities undertaken for reforestation will have a great impact on income generation status of women, especially in tribal pockets. Through collection and selling of NTFPs, the economic status of women can be enhanced.
- Plantations to cover bald hills would have significant impact to reduce carbon stock and temperature in the atmosphere, which will also be helpful to keep the children safe from sunstroke and extreme heat.
- Children are susceptible to diseases like hepatitis, diarrhoea, typhoid, dysentery and jaundice. The health care sector needs to develop specific plans to protect children from these diseases.
- Setting up separate heat stroke room with AC facility in the PHCs would be a good step to address children's vulnerability to heat stroke.
- A road map to monitor environmental pollution in the mining areas has been developed by the state pollution control board which will also help keep the children and women safe from various kinds of diseases caused by environmental pollution.
- Development of plan for installing water meter by the urban sector will be very helpful to check water waste at the household level. This initiative will have enormous impact on the ability of women to meet their water needs.
- Solid waste management and lighting roads through energy efficiency technologies have been of great help to meet the vulnerability of women and children in selected cities and need to be scaled up.
- The river health monitoring study by the state pollution control board is a significant step to meet women's and children's vulnerability to water borne diseases.

3. Status of Implementation of SAPCC, 2010-15 & 2015-2020

Odisha is a state which has a 480-km-long coastline. The state is bestowed with many natural resources like forests, mineral resources, ground water, rivers etc. Having the possession of huge natural resource, Odisha still ranks 13 in the poverty index among all states of the country. The major reason of this poverty is climate induced natural disasters. Odisha is a state where around 70 per cent of the population is dependent upon agriculture for their livelihood. Agricultural activities of the state are mostly found to be relying on good monsoon and climatic conditions. But, since the last few decades, Odisha has been experiencing frequent cyclone, flood, drought, heat wave etc. Due to these calamities, the economic condition of the people and the state are suffering a lot. Many areas of low line costal belt have been submerged due to rise in sea level. With this backdrop, the state government decided to formulate the state action plan for climate change in order to reduce the impact of disasters. In this process, the state chief minister appointed a high-level coordination committee headed by the chief secretary to steer the preparation of SAPCC. Eleven sectoral missions were identified to be covered by the first climate change action plan. Individual working groups under the chairmanship of concerned departmental secretaries (who are also the members of the high-level coordination committee) were formed to deliberate their relevant climate change issues. Support for the process was available from the World Bank and DFID. In order to prepare the final climate change action plan, the working groups interacted with sectoral experts, representatives of civil society organizations and businessmen through a series of meetings at different regional locations. Based on the feedback of regional consultations, a state level workshop at Bhubaneswar was held. The 2010-15 state SAPCC was the product of those consultations.

With regard to bring out the new edition of SAPCC in the state (2015-2020), it seems to be a policy decision of the state government. As per the provision of the government, a SAPCC shall remain in force for a period of five years (on the basis of financial year). The period of SAPCC 2010-15 expired on March 2015 and the new SAPCC is now in force for the period 2015-2020.

There has been lot of changes in the climatic conditions of the state during the lifetime of the first SAPCC. Several changes are now required in the strategy to fight against the evolving climate challenges. Other reasons for bringing out the subsequent SAPCC (2015-2020) are (i) to remove the gaps in the first SAPCC and (ii) to develop a sound operational action plan for next five years. The most vital observation is that the state government without depending upon the assistance of central government had executed SAPCC 2010-15 in the state, but in many aspects it seemed to be lacking in achieving the plans and targets. There were many socio, cultural and economic constraints responsible for these non-achievements. Therefore, keeping these gaps in mind, it was sensible to develop the second edition of SAPCC for the period 2015-20.

3.1. SAPCC (2010-15): Commitments Vs. Status

Planning is considered to be the base for materialization of any development initiative. Proper planning makes it easy for implementers to achieve the objectives. Many a times, it is found that due to lack of coherence between the planning of activities and objectives, the programme doesn't reach its ultimate goal. This section in a matrix form tries to reflect on the planning and realization of key priorities and activities of different sectors in the SAPCC document of Odisha for the year 2010-15. The column on commitment is directly derived from the SAPCC document. These commitments talk about the priority areas of different sectors. The status column depicts activities that have been taken up so far to meet the commitments. While listing down the status against the commitments, a thorough review of progress report for 2010-15 SAPCC has been made.

Sector: Agriculture		
Code	**Commitments**	**Status**
AG/KP/1	Rapid screening and strategy assessment of State Agriculture Policy	With regard to the rapid screening and strategy assessment of State Agriculture Policy, no such action is found to have been taken up.
AG/KP/2	Establishing an effective institutional delivery mechanism to promote best practices on climate change	In order to promote best practices on climate change, training for farmers has been taken up under the programmes of RKVY, state employment mission, ATMA and national horticulture mission
AG/KP/3	Capacity building on adapting to climate change	As an adaptation measure, 1,390 programmes have been taken up on water use efficiency, post-harvest management, soil water conservation, climate change etc.
AG/KP/4	Continuing the livelihood focused, people centric integrated watershed development in rain fed areas	As adaptation measures, a series of livelihood focused, people centric integrated watershed activities like plantation in the catchment area, construction of farm ponds, check dams etc have been implemented in the rain fed areas. About 1.66 lakh hectares of land has been covered by this programme.
AG/KP/5	Increasing the area under perennial fruit plantation	Activities for perennial fruit plantations were undertaken under the programmes of MGNREGS, National Horticulture Mission, state plan and DCCD. Mango and guava were the major species of fruit bearing trees planted.
AG/KP/6	Developing water use efficient micro irrigation methods and individual / community farm ponds	As adaptation measure, activities were undertaken in the form of popularizing sprinkler sets, sprinkler main guns, developing community / individual farm ponds and micro medium irrigation systems.

		But, no such activity is found to protect small natural water bodies like wetlands, springs etc.
AG/KP/7	Improving monitoring and surveillance techniques in the context of climate change	As an adaptation measure, E-pest surveillance has been implemented in 30 districts of the state.
AG/KP/8	Developing sustainable soil, water and crop management practices	Promotion of organic farming has been taken up by use of organic fertilizers. In this context, 45,000 hectares of agricultural land have been brought under organic farming.
AG/KP/9	Breeding studies on major crops for tolerance / resistance	No action is found to be undertaken
AG/AK/10	Conducting climate linked research	Under climate linked research, following actions are found to have been undertaken: promotion of SRI and cluster demonstration; line sowing / line transplanting; integrated pest management promotion and demonstration.
Sector: Coasts and Disaster Risk Management		
CD/KP-1	Flood mapping, flood forecasting and down scaled climate change projections modelling	No actions are taken up
CD/KP-2	Assessment of erosion prone areas with the help of digital elevation model	No assessment is done
CD/KP-3	Studying coastal erosion	No study is taken up
CD/KP-4	Conducting micro level vulnerability assessment	No assessment is done
CD/KP-5	Constructing flood shelters in unconventionally vulnerable locations	No action taken up under this planned priority
CD/KP-6	Needs assessment and constructing multipurpose cyclone shelters	365 multipurpose cyclone centres have been constructed and work for 14 others are in progress which will provide shelter to 1,000 population each. This action is planned under adaptation measure and implemented as a key priority.
CD/KP-7	Developing a hydrological framework	No action is taken up

CD/KP-8	Dredging and river mouth widening to improve flood management	No action is taken up
CD/KP-9	Strengthening coastal protection methods	No action is taken up
CD/KP-10	Developing a techno legal regime for construction of disaster resilient housing and public infrastructure	No action is taken up
CD/KP-11	Integrating climate change risk in the state's disaster management policy	No action is taken up
CD/KP-12	Setting up an integrated training and capacity building protocol	Setting up an integrated training and capacity building institute for disaster management
CD/KP-13	Assessment of risks due to lightning and thunderstorm	No such assessment taken up.
CD/KP-14	Improving flash flood management	No action is taken up
CD/KP-15	Prediction through appropriate modelling of the impact of sea level rise on coastal ecosystem	No action is taken up
CD/KP-16	Study of impact of global warming on the biodiversity of coastal ecosystem with special emphasis on flagship species	As an adaptation measure a regional costal process study was taken up for the first time in the country under the ICZM programme supported by the World Bank
Sector: Energy		
EN/KP-1	Generating cleaner energy through clean coal approaches	No action is taken up
EN/KP-2	Institutional Development of the energy department	As an adaptation measure, Green Energy Development Corporation Limited (GEDCOL) was formed in order promote investment to renewable energy project; renewable energy policy for the state has been formulated; in order to reduce commercial loss of electricity, 34 electric police stations have been set up in the state
EN/KP-3	Reducing transmission and distribution (T&D) losses	As mitigation measure capital expenditure programme was launched to improve distribution, infrastructure and reduce transmission and distribution losses under the Central Electricity Supply Unit (CESU)

EN/KP-4	Promoting demand side management (DSM) and energy efficiency	As mitigation measure, actions (energy conservation action plan, energy audit etc) for efficient use of energy have been taken up in government buildings, public sector undertakings and water supply system.
EN/KP-5	Encouraging effective fly ash utilization and emission reduction	The 2015 SAPCC progress report says a Fly Ash Research Centre (FARC) has been established in SPCB to oversee and enhance fly ash utilization. A high-level committee has been constituted under the chairmanship of the chief secretary to maximize the utilization of fly ash in the state.
EN/KP-6	Promotion of small and medium hydel plants	No action is found to have been taken up except the initiatives for preparing a couple of feasibility reports in setting up small hydel electricity plants.
EN/KP-7	Harnessing the biomass potential	As mitigation measure, only catchment wise assessment of biomass resource is done in the state.
EN/KP-8	Promotion of grid-based wind power generation	No concrete action is found to have been taken up to promote grid-based wind power generation in the state, except a few initial works by OREDA on identification of wind sites, assessment of wind power potential etc.
EN/KP-9	Maximizing solar power generation	As mitigation measure, 13 megawatts solar power plant is commissioned, provision of solar lanterns and stud lamps to all households using kerosene oil for illumination purpose, provision of solar PV based dual pumps for supplying piped drinking water in remote rural areas in non IAP districts, provision of rooftop solar power plants in government buildings, provision of solar water heating system in BMC area.
EN/KP-10	Developing bio fuels	The State has been successful in installing 2,25,954 biogas plants during 2011-12 and 7,002 in 2012-13. For developing biogas plants, training and capacity building programmes are being conducted from time to time.
Sector: Fisheries and Animal Resources		
FARD/KP-1	Vaccination against contagious diseases	As an adaptation measure, routine deworming and vaccination tasks in a planned manner have been

FARD/KP-2	Deworming and early disease warning system, emphasis on green fodder, pasture development and grazing	implemented to minimize mortality of small animals.
FARD/KP-3	Training on fodder production and fodder conservation, rotational grazing, rain water harvesting technology and biogas tanks management	No action has been taken up
FARD/KP-4	Conservation of local hardy animals	No action has been taken up
FARD/KP-5	Gobar gas tanks / packing to cylinders	No action has been taken up
FARD/KP-6	Easy and handy methane harvest at farmers' points	No action has been taken up
FARD/KP-7	Enhancing diseases early warning systems for human beings with climate change considerations	Regarding disease early warning system relevant to livestock, disease surveillance activities have been taken up for control of vectors of contagious diseases like bird flu, anthrax etc.
FARD/KP-8	Application of biotechnology and skilled animal breeding for development of better adopted species	Efforts have been made to promote indigenous hardy verities of cows, buffaloes and goats under Kalyani project and integrated goat development project respectively.
FARD/KP-9	Capacity building of livestock keepers	No action is taken up
FARD/KP-10	Research on disease early warning system relevant to livestock	No action is taken up
FARD/KP-11	Impact of climate change on inland and coastal aquaculture	Research study on climate change and its impact on fisheries has been undertaken
FARD/KP-12	Development of infrastructure for early warning systems in coastal areas for fishermen	No such infrastructure has been developed. However, early warning information on cyclone has been accessed from IMD and for fishery resources from INCOIS, Hyderabad
Sector: Forest & Environment		
FOR/KP-1	Increasing reforestation / afforestation activities in degraded forest areas	As mitigation and adaptation measures, activities like afforestation and avenue plantation have been taken up during the five-year plan period. Regarding afforestation, an area of 3,92,759 hectares of degraded forest has been covered by

		reforestation. Similarly, avenue plantation was done for 8,382 route kilometres (RKM).
FOR/KP-2	Protecting existing forest stocks to act as carbon sink with stronger conservation	In order to protect the existing forest stocks in the state, forest protection squads have been constituted and engaged under various schemes. These squads with the department personnel are protecting 48,90,000 sq. km of forests.
FOR/KP-3	Increasing planting on non-forest land and also exploring where new and increased tree planting could create barriers to storm and cyclone impacts in costal zones	As mitigation and adaptation measures, activities have been undertaken to increase mangrove forest in the depleting non-forest land and also distribution of seedlings to beneficiaries / farmers is done to take up plantation outside the forest area.
FOR/KP-4	Covering bald-hills with suitable species mix	As mitigation and adaptation measures, suitable species of plantation has been undertaken to cover bald hills. To this effect, 32,76,000 seedlings have been planted during 2011-12 to 2013-14.
FOR/KP-5	Increasing and protecting existing mangrove cover along the coast	Mangrove coverage increased by 300 hectares by taking up fresh plantations.
FOR/KP-6	Assessing fire management strategies	Actions like creation of fire protection squads, incentives to local communities / VSS for fire prevention and control, fire line maintenance, monitoring and fire mapping, procurement of fire fighting equipment etc have been undertaken under assessing fire management strategies.
FOR/KP-7	Improving tree plantation and forest management to integrate with watersheds and water resources management	Actions like drainage line treatment, check dams, percolation tanks, planting pits etc have been undertaken.
FOR/KP-8	Working to establish new systems to support community users	Preliminary actions have been initiated to enhance capacity of communities to manage risk through sustainable forest management plan
FOR/KP-9	Undertaking studies on indigenous trees species to assess their vulnerability to climate change	Studies have been undertaken on indigenous trees species to assess their vulnerability to climate change.
FOR/KP-10	Assessing additional threats to biodiversity and wildlife	As per SAPCC 2015-20, actions have been undertaken to assess additional threats to biodiversity and wildlife. In this respect,

		continuous monitoring of the ecosystem is done to determine when and what changes occur.
FOR/KP-11	Obtaining access to updated knowledge on climate change science and policy developments	Actions have been undertaken up to sensitize front line managers, policy makers and essential staff at all levels of the forest department
FOR/KP-12	Capacity building of Panchayat Raj institutions / Communities / JFM institutions to adapt to climate change	As an adaptation measure, the JFM committees have been made responsible for protection, conservation and regeneration of forest resources, while the GP is entrusted to manage the non timber forest produces. The VSS and Eco Development Committees have been empowered to protect the forest resources adjoining the villages.
FOR/KP-13	Monitoring carbon stock and biodiversity at regular intervals	No action is taken up
Sector: Health		
H/KP-1	Capacity building of the health sector on climate change	No action is taken up
H/KP-2	Integrating climate change considerations in the state health policy	No action is taken up
H/KP-3	Strengthening approaches to manage vector borne diseases that have worsened due to climate change impacts	Strategies, methodologies and new interventions have been developed to manage vector borne diseases that have worsened due to climate change impacts. In this regard four strategies like IEC & BCC, Early diagnosis and complete treatment, capacity building of health personnel and integrated vector management are planned.
H/KP-4	Strengthening approaches to deal with heat wave conditions exacerbated due to climate change	As an adaptation measure, activities have been taken up to develop separate heat stroke room with AC facilities starting from the PHC to medical colleges. Apart from this, a plan is being made on mapping of heat prone areas in the state and sensitize people on occupational health hazards
H/KP-5	Strengthening approaches to deal with the physical and psychological impacts due to extreme weather conditions caused by climate change	No action is taken up

H/KP-6	Addressing drought, nutrition and food security due to increased risk of drought, consequent decline in agriculture and increased malnutrition and food security	No action is taken up
H/KP-7	Undertaking measures to manage water borne diseases that have worsened due to climate change impacts	As per 2015 SAPCC progress report a lot of plans have been developed to reduce and counter the spread of water borne diseases like diarrhoea, dysentery, typhoid and hepatitis. As part of this, development plans have been made for identification and mapping of diarrhoea prone areas and groups in the state, imparting skill based training to medical officials and para medical personnel, disease surveillance, IEC development for increasing awareness, laboratory and environmental surveillance etc
H/KP-8	Research and studies on climate change and health impacts	No action is taken up
H/KP-9	Addressing food safety that is undermined as a result of increased ambient temperatures and extreme events	No action is taken up
H/KP-10	Studying the interlinkages between air quality and climate change, and implications on health	No action is taken up
Sector: Industry		
IND/KP-1	Integrating climate concerns in policies and plans	No action is taken up. Only plan is to modify the 2008 state industrial policy resolution by incorporating points like building of rain water harvesting structures by all industries, address issues of energy efficiency and waste management, encouraging production of fly ash bricks, prevent industrial disasters etc.
IND/KP-2	Assessing GHG profiles of major industrial clusters	A report on the carbon footprint of the state is being prepared by the F&E department in association with CII. The state pollution control board is also preparing an updated GHG profile. SPCB has also prepared a GHG profile of industrial sectors of the state.

IND/KP-3	Conducting heat-island study for Talcher and Jharsuguda area	Institutions of national repute have been asked to take up this study, but according to the 2015 SAPCC progress report, it has not been carried out yet
IND/KP-4	Training various stakeholders on climate change issues	Training modules on climate change issues have been prepared by the state pollution board, and training programmes have been organized by the department at 12 locations of the state. Groups like industrial houses, students, NGOs, citizen forums etc went through the training programmes on different issues.
IND/KP-5	Implementing a system of compensatory water harvesting	There is now a policy that industries have to develop water harvesting structures before they get a licence to operate.
IND/KP-6	Streamlining institutional arrangements and strengthening OSDMA to tackle extreme climate events in the coastal area	As per 2015-20 SAPCC report, actions have been taken up for streamlining institutional arrangement and strengthen OSDMA to tackle extreme climate events in the coastal area, but SAPCC progress report 2015 is silent on any activity to have been undertaken.
IND/KP-7	Carrying out energy efficiency studies	To ensure energy efficiency, the state designated agency is facilitating energy audit in industrial units across the state. Energy consumption has been estimated for 28 industrial units in the state. These units also have been set limit for energy consumption.
IND/KP-8	Promoting recovery, recycle and reuse of waste material	The state pollution control board has been facilitating disposal of indusial solid waste. A fly ash resource centre has been established for promoting the use of fly ash in the state. The industrial policy resolution has included policy to provide clearance to industrial units on effective management of solid waste.
IND/KP-9	Setting emission standards for thermal power plants	No action is taken up
Sector: Mining		
MIN/KP-1	Incorporating climate concerns in the state mineral policy	No action is taken up
MIN/KP-2	Analysing appropriate policies to promote energy efficiency	No action is taken up
MIN/KP-3	Realizing the potential of low grade mineral beneficiation	No action is taken up

MIN/KP-4	Strengthening environmental monitoring	The state pollution board with the support of World Bank has developed a road map to monitor the environmental parameters in the mining clusters. A voluntary disclosure format is being worked out to assess the carbon stock of industries.
MIN/KP-5	Protecting water bodies	No action is taken up
MIN/KP-6	Expanding and maintaining green zones	As an adaptation measure, the 2015-20 SAPCC report says that actions have been taken up for expanding and maintaining of green zones, whereas 2015 SAPCC progress report is silent on the subject.
MIN/KP-7	Building capacity and generating awareness	No action is taken up
MIN/KP-8	Realizing energy savings potential in mining	No action is taken up
Sector: Transport		
C & T/KP-1	Revising state transport policies	No action is taken up.
C & T/KP-2	Integrating urban and transport planning	No action is taken up
C & T/KP-3	Enhancing the use of rail	No action is taken up except procurement of three 30-seater FRP
C & T/KP-4	Moving towards low carbon fuel	No action is taken up
C & T/KP-5	Piloting low carbon, green highways	Activities of avenue plantation have been taken up by the forest department in the state. During last three years (2011-12 to 2013-14) around 8,305 RKM have been covered by plantations
C & T/KP-6	Encouraging fuel use efficiency and tightening enforcement	No action is taken up
C & T/KP-7	Promoting non-motorized transport	No action is taken up
C & T/KP-9	Estimating carbon emissions from the sector	Carbon footprint study has been initiated by the forest and environment department through CII. The draft report is ready and as per the report energy, industry and industrial sector carbon footprint has grown up substantially.
C & T/KP-10	Developing inland waterways	During 2011-12 and 2012-13, the directorate of IWT has taken up feasibility study for opening five inland water routes for low cost transportation and carbon reduction

Sector: Urban Development		
HUD/KP-1	Building capacity on climate change	As an adaptation measure, training programmes for staff have been conducted covering various aspects of climate change and strategies to combat against climate change. Besides this, their roles and responsibilities in tackling climate change issues have also been reflected in the training programmes.
HUD/KP-2	Incorporate climate consideration in water supply and sewerage design	No action is taken up
HUD/KP-3	Working towards greater water efficiency	Sensitization programmes have been conducted for city dwellers on non-revenue water loss and methods of water conservation. For ensuring effective use of water, there is a plan to install water meters.
HUD/KP-4	Preparing a climate friendly MSW management plan	As mitigation measure, in selected cities, solid waste management activities have been undertaken by the respective municipalities.
HUD/KP-5	Orienting towards energy efficient street lighting through CDM	Energy efficient street lighting has been installed in selected cities of the state. This project is being implemented through PPP mode.
HUD/KP-6	Developing climate responsible master plans	A decision has been taken to develop 106 master plans of which master plans of 15 ULBs will reflect climate aspects.
HUD/KP-7	Strengthening infrastructure for promoting non-motorized transport	Actions have been taken up to reduce motorized transportation through introduction and use of more public buses.
HUD/KP-8	Improvements to water harvesting in urban areas with restoration of water tanks and artificial recharge	As per 2015-20 SAPCC report, rejuvenation of ponds and tanks have been undertaken for improvement in the status of water availability in urban area, but 2015 SAPCC progress report does not say anything about it.
HUD/KP-9	Developing models of urban slum water flows and capacities of existing drainage systems with climate change	Under JNNURM activities have been taken up for improving natural storm water drains to avoid water logging in Bhubaneswar and Puri towns. Except this, no other activities are found in the 2015 SAPCC progress report.
Sector: Water Resources		
WR/KP-1	Expansion of hydrometry network	With World Bank support, rain water gauge, gauge discharge stations, gauge stations and full climatic stations have been installed at different locations of the state under the hydrology project phase-1.

		Similarly, real time data acquisition system has been taken up in phase-2.
WR/KP-2	Development of flood forecasting models	No action is taken up
WR/KP-3	Downscaling of global circulation model	No action is taken up
WR/KP-4	Increasing the water use efficiency in irrigation	Increasing water use efficiency in irrigation projects for 45,000 hectares of land through Command Area Development Agency. Apart from this, 45 canals in minor and medium irrigation projects are being lined.
WR/KP-5	Constructing and protecting water harvesting structures	Lots of activities have been undertaken for construction of water harvesting structures. In this context, the progress report depicts calling of tender for construction of two barrages in the state. Actions have been taken up for constriction of check dams and community farm ponds across the state. Renovation activity for tanks has also been taken up in different locations of the state.
WR/KP-6	Improving drainage systems	Considerable achievement has been made by excavation and renovation of major drainage systems of the state. Suitable structural changes have also been done in these drainage systems. For desiltation of drainage water, department of ocean engineering, Madras IIT has been assigned to provide technical support.
WR/KP-7	River health monitoring and ecosystems environmental flow demand studies	The state pollution control board is conducting river health monitoring study of nine major rivers out of 11 on a regular basis. Regarding water quality of rivers, bio monitoring is being carried out at 24 selected sites in the state.
WR/KP-8	Raising awareness with pani panchayats through farmers, training programmes and creating agro-climate stations	The Pani Panchayat Support Unit, CAD-PIM directorate and WALMI are conducting awareness programmes on issues like water management, water conservation, rain water harvesting and water quality. Various IEC activities have been developed and undertaken to mobilize the farmers' community.
WR/KP-9	Integrated water resource management	A road map on integrated water resource management has been developed in the state with the support of Asian Development Bank.

(*Source: Orissa Climate Change Action Plan, 2010-15; Progress Report on Implementation of Odisha Climate Change Action Plan, 2015 & Odisha Climate Change Action Plan, 2015 - 2020)*

3.2. Monitoring and Evaluation Framework

Monitoring and evaluation (M&E) play a very significant role in determining the success and failure of programmes. Regular and quality M&E are essential to make a programme successful. Quality M&E need a systematic and pre-designed framework. In the context of SAPCC 2010-15, there has been an M&E framework in order to map the progress, impacts and achievements of the action plan. Looking at the SAPCC 2010-15 M&E framework, it seems to be very logical, systematic and scientific. Instead of a lot of heads, the framework contains very strategic heads under the categories of key impacts to monitor, targets to monitor, key programmes to evaluate, frequency and feedback loop. But the major setback is the non-availability of any baseline data based on which the M&E of the SAPCC can be performed. Whatever M&E is done for the SAPCC, it is against the selective choice of areas by the evaluator. In many cases, targets are not explicitly mentioned against planned activities. In such cases, M&E becomes difficult. Looking at the overall coverage of indicators in the M&E format, it seems there should have been a few more indicators under different sectors which may now be included in order to make the framework sharper and inclusive. In this regard, a few examples are cited below.

- Programme for organic farming may be placed as a key programme to be evaluated. Under the key impacts to monitor, there may be focus on changes in the farming pattern by tribal communities in hilly regions.
- Types and frequencies of diseases to aquatic animals may be placed under key impacts to monitor for the sectors of fisheries and animal resources.
- Cultural degradation and indigenous practices of people may be placed under key impacts to monitor for the industrial sector

Further to the process of M&E of SAPCC activities, the Climate Change Action Plan Cell (CCAPC) develops the M&E framework and supplies it to different selected departments for data collection against the progress of SAPCC provisions. Through use of the M&E framework, the departments collect the information and send to the action plan cell for data verification, analysis and evaluation. Then the CCAPC publishes a report and disseminates it to relevant departments as well as other key agencies.

But, in this regard, except a progress report against the 2010-15 SAPCC document, no such report is found which can inform the public on the impacts and vulnerability of climate change in the state.

3.3. Implementation Strategy

In order to implement the SAPCC activities, a climate change cell has been formed in the department of forest and environment. As a nodal agency, the department of forest and environment has appointed a person as director of the cell to look into the implementation of climate change actions in the SAPCC. Along with the director, two other persons also have been

appointed in the cell to support the director in the smooth implementation of the SAPCC. In the process of implementing the SAPCC provisions, the climate change cell in the forest and environment department is performing the following activities.

- Coordinating with technical agencies to help departments in developing specific policies and establishing implementation pathways for carbon conscious development.
- Assisting to develop mechanisms to evaluate progress towards the state's goals in order to adjust strategies and action plans accordingly
- Communicating the benefits of programmes to mitigate climate changes and have been engaged with various stakeholders proactively to fill the gaps in the SAPCC document.

Key Observations:

Looking at the M&E processes and implementation strategy, the following points may be taken into account in order to narrow gaps

- As actions are being implemented by the departments, ideally the departments should not be involved in the data collection.
- The three-person body of CCAPC should be expanded by involving more experts from different fields in order to make the CCAPC more effective and competent in the development, monitoring and evaluation of SAPCC provisions and coordinating the agencies.
- Similar to the CCAPC at the state level, climate action plan cells should be set up at the district and block levels in order to oversee proper implementation, monitoring and evaluation of the SAPCC provisions.
- In order to make people aware about climate change vulnerabilities, publication of knowledge products may be taken up by the CCAPC on bimonthly basis. Besides this, bimonthly progress report on implementation of SAPCC may also be prepared by the CCAPC.
- Severe lack of convergence is found among government departments while developing the SAPCC document. Many relevant departments like W&CD, Tribal development, S&ME etc have been kept out of the scope of the SAPCC.

3.4. Odisha Climate Change Action Plan (2015-2020): Commitments Vs Gaps

Key Priority Area	Activity Planned	Major Vulnerabilities in the sector due to climate change	Remarks - Gaps Analysis
Sector: Agriculture			
Continue the livelihood-focused, people-centric integrated watershed development programmes in rain-fed areas vulnerable to climatic variations. (AG/KP-1)	6,00,000 hectares of land would be brought into the people centric integrated watershed development programme with the budgetary estimation of Rs 720 crore, which will be equally borne by the central and state governments	1. Monsoon period is highly uneven and erratic 2. Extreme weather events leading to crop failure 3. Declined soil fertility 4. Multiple crop diseases 5. Reduced quantity of crop production 6. Drying up perennial water sources 7. Increase salinity of coastal agriculture land 8. Incidence of malnutrition with women and children increases	Looking at the nature and types of vulnerabilities, the priority areas and activities planned under the sector seem to be quite comprehensive in SAPCC 2015-20. But some more activities may be added to make it more climate responsive. The suggested activities are: 1. Setting up GP Level soil testing laboratory in order to facilitate the farmers to know the soil quality and to take up agricultural activities accordingly 2. Special incentives in form of more grain value, bank loan, free education and health services to farmers' families who take up organic farming regularly 3. Government may produce organic manure and pesticides and supply it at GP head quarter at minimum cost 4. More emphasis on cultivation of millets
Establish an institutional delivery mechanism to promote best practices on climate change (AG/KP-2)	A network of centres of excellence in the state will be established based on the climate smart principles. Besides around 9,000 personnel under grade A, B, and C will be trained across the state		
Capacity building of extension personnel (AG/KP-3)	In order to motivate the farmers, extension personnel across the state will be trained on climate smart agricultural practices		
Increase the area under fruit crops to help cope with uncertain weather patterns (AG/KP-4)	In order to promote crop diversification and nutrition status in the state an area of 75,000 hectares of degraded land will be		

	covered by fruit crops. An amount of Rs 560 crore will be spent for this.		and maize in the tribal up land pockets which can meet the food insecurity and malnutrition aspects of tribal people, especially women and children.
Develop water-efficient micro-irrigation methods: individual and community farm ponds (AG/KP-5)	Planned to develop community and individual farm ponds in the state. An area of 75,000 hectares will be under this initiative for which around Rs 280 crore will be spent		
Create awareness among farmers of climate change adaptation (AG/KP-6)	Sensitize farmers on climate change adaptation in rural areas		
Establish an automated weather station (AG/KP-7)	In order to improve weather risk management, a weather station will be established in the state. This station will be linked to KVK for generating better microclimate data.		
Establish a seed bank at the village level (AG/KP-8).	Establish village level seed bank to enhance adaptability by managing climate variability and seeding at the local level		
Promote SRI (AG/KP-9)	Promotion of SRI in the state in order to reduce methane emission, water use and ensuring higher outputs		

Encourage the adoption of climate resilient cropping techniques (AG/KP-10)	Climate resilient cropping technique will be used in four climate risk areas of the state		
Document Indigenous Technical Knowledge (ITK) in agriculture (AG/KP-11)	Document traditional climate adaptive agriculture practices in the state		
Green energy efficient models for farmers (AG/KP-12)	Use of Solar and other efficient pumps in order to reduce the carbon emissions and enhance productivity of the sector		
Sector: Coasts and Disaster Risk Management			
Undertake a micro-level vulnerability assessment of state resources in coastal areas (construction of saline embankments under the National Cyclone Risk Management Project, NCRMP (CD/KP-1)	40 per cent balance work of construction of coastal saline embankments will be taken up during the period	1. Frequent occurrence of cyclone, flood and drought 2. High soil erosion in the coastal area 3. Damage of natural barriers like sand dunes, mangrove forest, habitations 4. Damage of other forests 5. Loss of property and human resources 6. Production of fodder and water quality reduces	The activities planned under the key priorities seem to be logical, but a few more activities may be taken up to make it more inclusive. 1. The sand dunes which are the natural barriers in the low line coastal areas may be protected from high tides of the sea through planting of locally available creepers (KANSARI LATA-local name) 2. In order to protect mangrove forests and reduce dependence of local people on it, alternative livelihood options may be created for them. 3. Special drive may be taken up to shift
Construct multipurpose flood and cyclone shelters (MCS) and provide shelter-level equipment (CD/KP-2)	212 multipurpose cyclone shelters along with 12 flood centres will be constructed during the five-year period		
Develop a techno-legal regime for the construction of disaster-resilient public infrastructure (construction of	Construction of 90 approach roads to multipurpose cyclone and flood shelters in the state. Build 15,980 houses and 113		

approach roads to MCS buildings under the NCRMP) and include Odisha Disaster Recovery Project (ODRP) for housing, etc (CD/KP-3)	habitation developments with climate resilient infrastructure under Odisha Disaster Recovery Project by 2018-19. Rs 700 crore has been allocated for the construction of houses and habitations, out of which Rs 265 crore has already been spent.		the people living inside the mangrove forests with compensation and to take up mangrove plantation in the lands in their possession.
Set up an integrated capacity-building protocol covering shelter and a self-help group under the Community-Based Disaster Risk Reduction Framework (CBDRF), including college and school volunteers and officials at the state and district levels (CD/KP-4)	Capacity building of the community, GP representatives, teachers and students in schools and colleges, officials from district and state levels through an integrated framework in the areas of early warning, precautions related to health, hygiene and livelihood restoration.		
Sector: Energy			
Generate power through clean coal approaches (EN/KP-1)	Promoting super critical technology to reduce emission through less coal consumption in the state	1. Reduced hydro electricity production 2. Carbon emissions increase due to heavy dependence on thermal power production 3. Solar power generation affected due to cloud cover	Looking into vulnerabilities of the sector, it seems that the industrial waste product generated by the thermal power stations pose severe threat to the environment of the state. In this context, the state may form
Undertake institutional development (EN/KP-2)	Capacity building and restructuring of energy department and formation of		

	Green Energy Development Corporation Limited (GEDCOL)		comprehensive actions to encourage people to use renewable energy by installing solar panels at household level, biogas plants for lighting and cooking purposes and significant use of fly ash bricks as house building materials etc. Though, reflections have been put on these three aspects in the SAPCC, there is no strategy to make people aware of the access to these programmes.
Reduce T&D losses and improve the distribution system (EN/KP-3)	Develop disaster resilient power transfer system (transformers & towers) in the coastal area which can resist wind speeds of 300 km per hour		
Improve energy efficiency (EN/KP-4)	Strengthening the designated agency for more efficient energy use in the state through capacity building of energy auditors. Use energy efficient water pumps under Odisha lift irrigation corporation etc		
Utilize fly ash (EN/KP-5)	Improve utilization of fly ash in the state by the state fly ash mission through coordination with various agencies and industries		
Promote small and medium hydel (hydroelectric) plants (EN/KP-6)	The OHPC to prepare prefeasibility and detailed project report to boost hydel generation for more than 20 sites		
Promote biomass and wind generation (EN/KP-7)	In order to promote renewable energy in the state, more sites will be identified by		

	the OREDA with the support of centre for wind energy technology		
Maximize solar energy generation potential (GEDCOL) (EN/KP-8)	Develop a solar energy park at Mukhiguda		
Promote biogas and manure management (EN/KP-9)	OREDA to promote a large-scale biogas programme in the state with the support of OMFED		
Sector: Fisheries and Animal Resources			
Scientific Animal Health Management (FARD/KP-1)	100 veterinary institutions will be strengthened, 8,140 de-worming and health check-up camps will be organized, life-saving drugs will be available at 540 veterinaries and 3,040 livestock assistance centres.	1. Fish production decreases 2. Spreading of infectious diseases to small ruminants, poultry, birds and fishes 3. Increase operation cost of farm ponds 4. Reduced survival rate of sweet water fishes 5. Livestock damage due to flood and cyclone	Reflecting upon the priority areas and activities planned, it is observed from the SAPCC report that many of the priority areas are found to be lacking suitable activities. A few more activities may be taken up to meet the vulnerabilities in the sector. These activities are 1. Setting up shelter houses at the village level to protect animal resources like goats, cows and buffaloes during disasters like cyclone and flood 2. Large scale capacity building programmes for farmers at the GP level to educate them on climate resilient pisciculture
Capacity building of livestock keepers (FARD/KP-2)	31.400 livestock keepers will be sensitized on climate change concerns over five years.		
Improved feeding management (FARD/KP-3)	30,000 farmers will be given 110 lakh mini kits in order to produce 12.5 quintal of certified fodder seed in the state		
Breeding Management (FARD/KP-4)	90 lakh artificial insemination programmes will be		

	undertaken in five years and the frozen semen bank will also be strengthened		
Promote Biogas and manure management (FARD-KP-5)			
Research on Disease Early Warning System (FARD/KP-6)	314 block level disease reporting nodes will be connected to the disease surveillance system. This system will be converted to an early warning and preparedness system.		
Sector: Forest & Environment			
Increase the forest cover of the state by undertaking afforestation and reforestation measures (FOR/KP-1)	Identify the degraded and open forest area in the state and convert the area into forest coverage through natural regeneration.	1. Temperature rise adversely affects the micro flora and fauna in the state which is ultimately affecting biodiversity 2. Increased conflict between men and animals 3. Increased carbon stock in the atmosphere 4. Reduced soil quality	It is observed that soil quality in the tribal areas of the state is drastically declining due to plantation of Nilgiri trees in a large scale. This plantation is done for paper production. Due this plantation, the water table goes down which makes the soil infertile. There should be a plan of action to promote alternative livelihood options for the tribals in order to arrest the Nilgiri tree plantation. Similarly, depending upon the dynamics, alternative livelihood options may also be prepared for the people living in low land sea shore areas in order to end
Enhance the density of forests by undertaking assisted natural regeneration (ANR) and protecting existing forest stocks to act as a carbon sink with stronger conservation (FOR/KP-2)	To develop mixed and qualitative forest, stronger measures and community participation for forest protection. Assisted natural regeneration plantation will be taken up for 30,000 hectares per year under National Afforestation Programme, 9,700 hectares per year under CAMPA		

	programme, and 22,000 hectares per year under Ama Jungala Yojana of OFSDP.		their dependence on mangroves thereby increase the density as well as area of the forest. Action plan may also be prepared to stop brackish water prawn cultivation and thereby to arrest the increased salinity of soil and environmental pollution in the coastal area
Increase planting on non-forest land (FOR/KP-3)	Trees will be planted on non-forest lands. In this regard, 97 lakhs and 2,950 lakhs seedlings will be distributed for plantation in urban and other areas respectively		
Cover bald hills with suitable species mix (FOR/KP-4)	Around 4,734 square kilometres of bald hills will be brought into forest coverage through planting of suitable mixed species. In this regard 1,000 square km per year will be covered.		
Increase and protect existing mangrove cover and coastal biodiversity along the coast. (FOR/KP-5)	More area will be brought under mangrove plantation and the existing potential of mangrove forest will be protected		
Fire protection (FOR/KP-6)	Strategy of fire forecasting, fire prevention and fire-fighting will be developed. Modern technology will be used for fire forecasting and locating place of fire. Community		

	participation in fire prevention and fire-fighting will be encouraged through incentives. In order to prevent forest fires, 100 VHF radio sets will be purchased, 20 additional watch towers will be built and 1,792 km of road network will be maintained during five years period.		
Conserve and regenerate bamboo forests (FOR/KP-7)	Planting and regeneration of bamboo for 1,000 hectares of land per year under Odisha Bamboo Development Project, 700 hectares per year under National Bamboo Mission and 1,00,000 hectares per year under CAMPA		
Undertake sustainable management of forests and maximization of forest productivity, preparation of management plans, and scientific forest management through annual working plans (FOR/KP-8)	Soil and water conservation measures in watersheds will be undertaken to control runoff, to conserve water and to harvest water.		
Undertake research studies on indigenous	Study of long-term effects of climate		

flora and fauna and their vulnerability to climate change (FOR/KP-9)	change on plant species and world life will be taken up.		
Conserve wildlife and its habitat, assessing the threats to biodiversity and wildlife. (FOR/KP-10)	Develop meadows inside the forest to meet the food requirement of herbivores and to limit them inside the forest area. In order to meet the water needs of wild animals, water bodies will be created in the forest area and the existing water bodies will be renovated. In order to protect wild animals, 100 VHF radio sets will be purchased, 20 additional watch towers will be built and 1,792 km of road network will be maintained during five years' period.		
Implement joint forest management so that people can participate in conservation, management, and regeneration (FOR/KP-11)	Capacity building of community will be developed on sustainable forest management, eco development committees will be mobilized for protection and management of forest, VSS committees will be convened under		

	Ama Jungala Programme		
Build the capacity of the department staff in the field to tackle climate change related issues (FOR/KP-12)	Capacity building programmes on climate change action plan and sustainable forest and wildlife management in the context of climate change adaptation will be taken up for all levels of department staff in the state.		
Sector: Health			
Build the capacity of health sector personnel on issues relating to climate change. (H/KP-1)	Train staff on use of renewable sources like solar water heater, rain water harvesting and energy efficiency measures to reduce carbon footprints in the hospitals. Sensitize 1,749 medical staff, rapid respond teams and five-member quick action team from each village on issues of disaster response and climate change	1. Varity of heat wave diseases like heat stroke, heat syncope, heat cramps, heat exhaustion etc 2. Spreading of water and vector borne diseases through heavy rainfall 3. Spreading of malnutrition and psychosocial disorders through drought 4. Spreading of respiratory diseases through air pollution	Looking at the vulnerabilities of the sector, a few more activities may be added here to fight against climate change impacts on human health like (1) promoting production and consumption of organic food grains especially millets, maize, spinach etc (2) Mass awareness programme to arrest contamination of water sources, especially in the mining areas
Integrate climate change concerns into the state health policy. (H/KP-2)	Review state health policy in climate stressed areas in the state		
Strengthen approaches to managing vector-borne diseases that worsen because of	Disease surveillance, entomological study, vector control measures and		

climate change (H/KP-3)	environmental engineering		
Strengthen approaches to dealing with heat wave conditions in the state. (H/KP-4)	Sensitize control room staff on treatment protocols from March to June to deal with heat stress, provide drugs and consumables.		
Undertake measures to manage waterborne diseases that have worsened because of climate change impacts (H/KP-5)	Strengthen disease surveillance unit for early detection and control of water borne diseases. Periodic monitoring of water quality. Separate ward provision for treatment of communicable diseases. IEC activities will be taken up on diseases aggravated by climate change.		
Sector: Industry			
Devise a mechanism for green belt development and maintenance for industrial clusters (IND/KP-1)	Development and maintenance of green belt in all industrial clusters of the state.	1. Water scarcity for industrial operation 2. Industrial production gets affected due to water shortage 3. Industrial production and infrastructure get affected due to flood and cyclone	Looking at the vulnerabilities of the sector, the priority areas and activities planned seem to be logically inter- related and also adequate to fight against climate change impacts
Study the feasibility of establishing and operating a bio-methanation process	Feasibility study of establishing and operating a bio methanation process		

for a food processing cluster in public-private partnership (PPP) mode. (IND/KP-2)	for a food processing cluster in public-private partnership (PPP) mode.		
Install a centralised solar heating system in a food processing cluster for supplying hot water (IND/KP-3)	Use solar energy for supplying hot water to the food processing sector		
Prepare regional environmental management plans for major industrial clusters. (IND/KP-4)	Prepare regional environmental management plans in order to identify the priority environmental actions needed in each of the industrial clusters.		
Prepare a GHG profile of major industrial clusters and introduce a system of GHG auditing for these sectors (IND/KP-5)	Carbon footprint study will be conducted in order to categorize industries based on which actions on emission education can be undertaken.		
Undertake a heat island study of the Angul-Talcher and Jharsuguda-Ib valley areas. (IND/KP-6)	Study will be undertaken to manage the heat islands in the state		
Train officials in the Industries Department, Directorate of Industries, IPICOL, SPCB etc. on various aspects of climate change (IND/KP-7)	Awareness and capacity building actions will be undertaken on various aspects of climate change for officials of industry department, directorate of		

	industries, IPICOL, SPCB etc		
Devise a mechanism to implement a system of compensatory water harvesting (IND/KP-8)	Develop mechanism in order to encourage industrial clusters either single or collectively to plan and implement water harvesting structures		
Sector: Mining			
Prepare regional sustainable mining plans (MIN/KP-1)	Preparation of regional sustainable mining plans through estimating the carrying capacity and sustainable extraction on minerals from the region; along with proper mine closure plans.	1. Mining operation and production are affected due to heavy rainfall 2. Rise in temperature slows down mining production and increases mining accidents during summer 3. Heavy rainfall contaminates water sources and thereby drinking water scarcity is found in the mining area	Looking at the vulnerabilities of the sector, the priority areas and action plans look to be adequate to fight against the climate change. One action plan may be added here i.e. carry out large scale plantations in the periphery of mines.
Devise a mechanism for green belt development and maintenance in mining clusters (MIN/KP-2)	No activity is found		
Create an environmental restoration fund supported by contributions from mining companies (MIN/KP-3)	In order to mitigate several environmental issues, an environmental restoration fund will be created with the support of mining companies.		

Prepare an action plan for reclamation and rehabilitation of old abandoned mines. (MIN/KP-4)	Development of action plan for reclamation and rehabilitation of old abandoned mines		
Construct rest shelters with plantations in mining areas to provide shelter during heat wave conditions (MIN/KP-5)	To protect the workers from heat waves, construction of shelters in the mining areas will be done from CSR fund		
Supply drinking water in the vicinity of mining clusters (MIN/KP-6)	Mining companies and government will jointly provide clean drinking water to all areas in close vicinity of a mining cluster		
Sector: Transport			
Enact policy changes for phasing out old vehicles in order to reduce emissions (C & T/KP-1)	No concrete action points are emerging	1. Rise in temperature and heat wave damage roads and pavements 2. Urban temperature increases due to excess use of air conditioners in the vehicles 3. Flood and cyclone affect road infrastructures and avenue plantations 4. Extreme weather condition affects rail network in the coastal area through floods and cyclones	Looking at the vulnerabilities, action plans and priority areas of the sector, it is observed that two priority areas like policy changes for phasing out old vehicles and strengthening the enforcement and emission check up systems have not been equipped with proper planning to achieve the ultimate objectives of combating climate change. However, action like reducing use of private vehicles may be a significant
Ensure fuel efficiency through driver training (C &T/KP-2)	Training to 1,00,000 drivers on better management of vehicle control and road and traffic signage		
Strengthen the enforcement and emission check-up system (C& T/KP-3)	No concrete action points are emerging		
Use liquefied petroleum gas (LPG) (C & T/KP-4)	Develop LPG infrastructure in order to promote the use of LPG in the state		
Use electric rickshaws	Provision of subsidy and loan facility for		

(erickshaws) (C & T/KP-5)	promoting electric rickshaw in the state		step to reduce climate change impacts in the state.
Sector: Urban Development			
Introduce municipal solid waste composting and conversion of waste to energy (HUD/KP-1)	Development of effective solid waste management system for Cuttack and Bhubaneswar cities. This waste management system will be linked to Government of India programme for generating energy by using waste products.	1. Urban population, mainly people living in the slum areas, are more vulnerable to natural calamities like heat wave, urban flood, cyclone, earthquake etc. 2. Heavy rainfall increases possibility of water and vector borne diseases to people living in urban slums	Many priority areas of the sector however are seen to be lacking a systematic plan of action in order to achieve the goals. The vulnerabilities mapped here are still continuing their relevance in the major cities of the state. In this regard one major plan of action may be added here i.e. to check the area of urban slum and its population especially in cities like Cuttack and Bhubaneswar. With the control of urban slums, the impacts of climate change in urban areas can be reduced.
Introduce BRTS and MRTS (HUD/KP-2)	Preparation of detailed project report on Mass Rapid Transit System (MRTS) and Bus Rapid Transport System (BRTS) in order to reduce congestion and discourage private motorized transport through PPP mode		
Revise the guidelines for preparation of a master plan, community design plan (CDP) etc. incorporating climate change concerns. (HUD/KP-3)	Key areas of climate change concerns have been identified in order to revise the guidelines for preparation of master plan and community design plan		
Rejuvenate water bodies (HUD/KP-4)	Rejuvenate ponds around temples		
Promote urban storm water and drainage	Based on the learning from the Cuttack-		

management for urban flood control (HUD/KP-5)	Bhubaneswar drainage and water management system, strategies will be developed to control urban flooding by including other areas		
Sector: Water Resources			
Increase water use efficiency in the irrigation sector (WR/KP-1)	Operation and maintenance of pani panchayats with incentive for pani panchayats and water user associations, lining canals and installing bore well, community lift irrigation project, micro river lifts, shallow tube wells and mega lift schemes will enhance water use efficiency in the irrigation sector	1. Reduced per capita water availability in the state 2. Sporadic rainfall negatively affects water reservoirs 3. Rivers dry up, affecting aquatic animals and ground water level 4. Irrigation potential gets adversely affected due to shortage of rainfall 5. Flood damages property and lives	Reflecting upon the priority areas, planned activities and vulnerabilities of the sector, the state government should efficiently use rainwater and water resources through less water-intensive crops and irrigation methods. The impacts of flood can be drastically slowed down by flood-water management, leading to minimal damage of crops and property in the state.
Conserve water resources (WR/KP-2)	Completion of 14 major and minor reservoirs, construction of check dams, de-silting 192 minor irrigation tanks under Odisha Community Tank Management Project, rooftop rain water harvesting and artificial recharge of ground water		
Improve flood control and drainage (WR/KP-3)	Raising and strengthening of river and saline		

	embankment, embankments construction and renovation, construction of spurs / launching aprons, extension of flood forecasting network, preparation of basin flood control master plan etc.		
Assess the impact of climate change on the state's water resources. (WR/KP-4)	Reassessment of basin water situation, review of network of hydrological observation stations, establishment of additional stations, development of a state water resources information system, implementation of advance technology for collection and analysis of data		
Sector: Waste Management			
Awareness generation for management of various kinds of waste (WS/KP-1)	Massive awareness at the household level on waste segregation, waste segregation awareness in the urban areas will be created through school, slum and housing societies.	1. Improper waste management helps water contamination through heavy rainfall 2. Methane gas through improper waste management affects human health negatively	The activities planned against the priorities seem to be adequate. Action should be taken up firmly against the use of polythene in the state which seems to be lacking as a separate item in the priority list. It is now seen that the use of polythene is contributing in a big
Waste to energy projects in PPP mode (WS/KP-2)	Establish waste to energy project in the state through PPP mode		

Management of Municipal Solid Waste (WS/KP-3)	The ULBs will identify landfill sites and sign concession agreements with the private sector for solid waste management		way to pollution in the state, with a connection to climate change.
Fly Ash Utilization (WS/KP-4)	Manage fly ash with the support of OSPCB.		

Source: SAPCC 2015-20

Key Observations:

It has been stated earlier that Odisha was one of the first states in the country which prepared a systematic action plan to deal with climate change. The Odisha climate change action plan not only provided the base to the state government to act upon these issues but also became the base for other state governments to prepare their climate change action plans. In this context, a brief reflection on the SAPCC 2015-20 may be helpful to add values in the preparation of next SAPCC in the state.

- It is observed in many cases that the activities planned against the priorities in the SAPCC documents are presented with numerical targets. At the same time, many other activities have no numerical targets. Such targets should be added to the activity descriptions for easier M&E.

- It is observed from the 2010-15 SAPCC that actions have been taken to meet the priorities of different sectors. But there are some key priority areas where no action is found to be taken. The 2015-20 SAPCC document also leaves out a few priority areas and does not provide any plan of action for them.

- The SAPCC gives all descriptions for a period of five years. No annual segregated plans and targets are there. Non-availability of segregated data may not be helpful for smooth and timely implementation of planned activities.

- In order to modify the annual plan of actions for climate change, publishing annual progress reports should be emphasized.

- While preparing the action plan, the opinions of subject specialists are given more weightage. But, there is no formal platform to consult with citizens, who may have rich experiences on climate change factors as well as their impacts. Formal platforms of

citizens' consultation on climate change may be set up at various levels of the governance system in the state.

- Mere government initiatives and actions may not be sufficient to bring the desired changes in the climatic conditions of the state. Public support is essential. But, it is observed in majority of sectors of the SAPCC that PPP mode of intervention is less emphasized. Areas of climate action where PPP mode of intervention can be ensured should be explored.

- The sectors identified in the SAPCC document to fight against climate change in the state may not be adequate. Many other factors related to socio-economic and cultural aspects also affect the climatic conditions of the state significantly. These aspects may be taken into consideration while preparing the SAPCC document.

4. Review of Budget and Flagship Programmes

4.1. Review of Budget Allocation and Expenditure Pattern for SAPCC, Odisha

4.1.1. Budget for SAPCC

Implementation of any policy/programme largely depends upon the financial allocation made by the state budget for that policy/programme. State Action Plan for Climate Change (SAPCC) is a cross sectoral plan and the activities are distributed among different administrative departments of the state government. Although the Department of Forest and Environment is the nodal department for implementation and monitoring of SAPCC, there is no mechanism in the state budget for directly allocating resource for climate actions. Budget for activities related to climate change are allocated under different sectors and administrative departments.

Along with the planned activities, SAPCC 2015-20 has depicted the achievements of the previous SAPCC (2010-15). Financial allocation and expenditure for SAPCC are also mentioned in the document. In it, there are 121 high priority climate change activities across 11 sectors. The activities/components are defined descriptively and are grouped into six major activities such as Capacity Building, Investment, Pilot/Demo, Policy Action, Pre-Investment and Research study etc. The activities are again grouped under two broad sections such as mitigation-related actions, and adaptation-related actions.

4.1.2. Government accounting system and SAPCC budget

Budget allocation by the state government for any activities is recorded in the "demand for grants" document and placed before the legislative assembly. For transparency and accountability, budget for detailed activities of each administrative departments are reported in this document. Each broad activity, sub-activity and detail activity are arranged in a six-layer budgeting structure such as major, sub-major, minor, sub-minor, object and detail head. All budget heads clearly speak about the objective/purpose of the allocation or spending.

In the SAPCC documents the detailed activities are clearly defined. However, these activities are not visible within the budget documents. Segregating the climate action budget from different activities within an administrative department is up to the officials. Climate change actions mentioned in the SAPCC are not linked with the respective budget heads in the government accounting structure. So, there is no scope for analysing the budget for SAPCC from the budget documents and rechecking the amount reported in the SAPCC document

Other than the state budget, sources for climate change action budget are the state Public Sector Undertaking (PSU) budget, Central sector schemes and centrally sponsored schemes and external agencies such as DFID and The World Bank. Detail budget for these schemes are not reported in budget documents. So, climate change actions under these sponsored schemes are placed in the

project report/action plan of the concerned scheme. For example, budget for RKVY is reported in the budget document but detailed activity wise budgets are not reported.

4.1.3. Review of SAPCC budget 2010-15

As mentioned in the previous section, currently there is no scope to find the SAPCC budget from the budget document. So, the current budget analysis is based on the secondary source of data in the SAPCC 2010-15, SAPCC 2015-20 and Progress report on SAPCC 2015. Three years of detail budget for the first SAPCC period and forecast for second SAPCC period is available for analysis.

Table-2: Budget for Climate change action during 2012-13, 2013-14 & 2014-15

	2014-15 (INR in Cr.)	2013-14 (INR in Cr.)	2012-13 (INR in Cr.)
Agriculture	556.28	631.44	218.46
Coastal zones and disasters	319.46	208	36.15
Energy	509.4	367.48	274.33
Fishery and animal resources	28.33	27.69	15.41
Forestry and environment	554.59	310.05	246.39
Health and family welfare	36.1	30.03	0
Housing and urban Development	502.12	0	0
Industry	70.5	0.175	0
Steel & Mines	0	0	0
Transport	0	4.22	1.16
Water resource	630.47	605.27	908.27
Total	**3207.26**	**2184.35**	**1700.17**

Source: Progress Report on SAPCC 2015

It is very clear from the above data is that agriculture and allied sectors which includes agriculture, fisheries and animal resource and irrigation projects under water resource department is the major area for spending for climate change actions. Sectors such as transport, industry and steel and mines are smaller financial contributors for climate change actions. In Odisha the extractive industries are the major contributors towards climate change. The abundant iron and manganese ores and coal in the state have attracted many corporates to set up industries in the state.

Table-3: Target Vs Achievement in SAPCC 2010-15

	Target in the SAPCC 2010-15 (INR in Cr.)	Expenditure During 2012-13 to 2014-15 (INR in Cr.)	Achievement in %
Agriculture	1500	1406.19	93.75
Coastal zones and disasters	1300	563.61	43.35
Energy	6500	1150.81	17.70
Fishery and animal resources	217	71.43	32.92
Forestry and environment	4650	1111.03	23.89

	Target in the SAPCC 2010-15 (INR in Cr.)	Expenditure During 2012-13 to 2014-15 (INR in Cr.)	Achievement in %
Health and family welfare	500	66.13	13.23
Housing and urban Development	1200	475.12	39.59
Industry	322	70.67	21.95
Steel & Mines	55	0	0
Transport	60	11.38	18.97
Water resource	725	2117.01	292.00
Total	**17049**	**7043.38**	41.31

For SAPCC 2010-15 each sector had set both financial and physical target for the plan period. During preparation of the plan, nodal departments for different sectors had segregated the activities as well as budget for climate change within the department. To measure the financial realization of the targeted amount in the SAPCC 2010-15, only three years of budget data are available. It was found that during these three years that the agriculture sector was able to leverage 93.75 per cent of the targeted amount and water resource department was able to leverage 292 per cent of the targeted amount. However, the other nine sectors have not performed well in terms of allocation towards climate change actions. None of the other sectors had been able to spend as per the budgeted amount. Even forest and environment department as a nodal department was able to spend only 24% of the targeted mount. This reflects that the departments are not serious about the targets set in the SAPCC.

Table- 4: Priority as per Type of Action

	2014-15 (INR in Cr.)			**2013-14 (INR in Cr.)**			**2012-13 (INR in Cr.)**		
	Adaptation	Mitigation	Both	Adaptation	Mitigation	Both	Adaptation	Mitigation	Both
Agriculture	36.6	519.69	0	5.81	425.63	200	2.97	18.51	196.98
Coastal zones and Disasters	319.46	0	0	208	0	0	36.15	0	0
Energy	0	509	0	0	367.48	0	0	274.33	0
Fishery and Animal Resources	28.33	0	0	27.69	0	0	15.41	0	0
Forestry and Environment	60	254.59	240	6.29	1.03	302.73	21.67	1.89	222.83
Health and Family Welfare	36.1	0	0	30.03	0	0	0	0	0

Housing and Urban Development	160.64	314.48	0	0	0	0	0	0	0
Industry	56.5	14	0	0.1	0	0.07	0	0	0
Steel & Mines	0	0	0	0	0	0	0	0	0
Transport	0	0	0	0.93	3.29	0	0.39	6.77	0
Water Resource	603.47	0	0	220.19	385.08	0	291.85	616.42	0
Total	**1301.1**	**1611.76**	**240**	**499.04**	**1182.51**	**502.8**	**368.44**	**917.92**	**419.81**

While segregating the budget within different sectors for adaptation and mitigation activities it was found that expenditure for activities related to mitigation was higher over the period. Out of the 11 sectors four sectors such as Agriculture, Energy, Forest and Housing & Urban Development spend more for mitigation, whereas the rest emphasize on adaptation activities.

Table-5 Priority as per nature of Activities within different Sector in SAPCC2010-15

(INR in Cr.)	**Capacity Building**	**Investment**	**Pilot/Demo**	**Policy Action**	**Pre-investment**	**Research Study**
Agriculture	7.9	1321.32	48.72	0	0	28.25
Coast and Disaster Management	35	523.9	0	0	0	4.71
Energy	5.83	1139.1	82.2	0.3	0.01	0
Fishery and Animal Resources	5.46	26.71	0	6.24	0	33.02
Forestry	3	1065.18	19.85	0	20	3
Health	60	3.1	0.03	0	0	3
Housing and Urban Development	4.35	319.95	0	12	165.82	0
Industry	34.57	0	0	30	4	2.1
Mining	0	0	0	0	0	0
Transport	0	1.32	0	0.77	2.08	1.21
Water	2.33	2141.25	0.43	0	0	0
Total	**158.44**	**6541.83**	**151.23**	**49.31**	**191.91**	**75.29**

Source: Progress report on SAPCC 2015

The activities/components for climate change actions are grouped into six groups such as Capacity Building, Investment, Pilot/Demo, Policy Action, Pre-Investment and Research study.

During 2012-15, more emphasis (6,541.83 Cr.) is given to "investment" for climate change actions; whereas less emphasis (Only 49.31 Cr) is given to "policy actions". Six sectors have not allocated any budget for policy actions. Similarly, due emphasis is not given to research within the sector/department.

4.1.4. Budget for SAPCC 2015-20

Subsequent to the first SAPCC, the state has prepared the second SAPCC from 2015 to 2020. While preparing the second SAPCC, review of the first plan has been done and accordingly the target for the second plan is prepared. In SAPCC 2015-20, a new sector – waste management – is introduced so the number of sectors is increased to 12. However, the number of activities has decreased to 115 from 121 in the first SAPCC.

SAPCC 2015-20 has got an increased budgetary target than the previous SAPCC. In the first SAPCC the budgetary target was Rs. 17,049 Crore, which has increased to Rs 31,663.58 Crore in second SAPCC. However, for most of the sectors the target has been reduced. Out of the 12 sectors, only Housing and Urban Development and Water Resource Department have higher budgetary targets.

Table-6: Comparison of Targets in SAPCC 2010-15 and SAPCC 2015-20

	Target in the SAPCC 2010-15 (In Cr)	Target in the SAPCC 2015-20 (In Cr)
Agriculture	1500	1,633.60
Coastal Zones and Disasters	1320	773.15
Energy	6500	749.46
Fishery and Animal Resources	217	396.59
Forestry and Environment	4650	3,646.20
Health and Family Welfare	500	142
Housing and Urban Development	1200	5
Industry	322	27.5
Steel & Mines	55	21
Transport	60	1,475.00
Waste Management	-	80
Water Resource	725	22714.08
Total	**17049**	**31633.58**

4.2. Review of the flagship programmes (SBA, SSA, ICDS, and NHM)

The flagship programmes and climate change are closely related and inter dependent. Many times, flagship programmes serve as basis to bring significant changes in the impacts of climate change. In this context, this chapter tries to explore the relationship between the specified flagship programmes and the status of climate change in the state. In the process of mapping the relationship between climate change and flagship programmes, review of actions has been undertaken for programmes like Swachh Bharat Abhiyan (SBA) Sarva Shiksha Abhiyan (SSA), Integrated Child Development Services (ICDS) and National Health Mission (NHM).

Odisha is first state which formulated climate change action plan in the country during 2010-11. Twelve sectors have been incorporated in the action plan. These sectors are Agriculture, Coastal and Disaster Management, Energy, Fishery and ARD, Forest and Environment, Health and Family Welfare, Housing and Urban Development, Industry, Steel and Mines, Transport and Water Resources.

4.2.1 Swachh Bharat Abhiyan (SBA)

Swachh Bharat Mission is a massive mass movement that seeks to create a Clean India by 2019. The father of our nation Mahatma Gandhi always put emphasis on swachhta as swachhta leads to healthy and prosperous life. Keeping this in mind, the Indian government decided to launch the Swachh Bharat mission on October 2, 2014. The aim of the mission is to cover all the rural and urban areas of the country and to present this country as an ideal country before the world. The mission has targeted aims like eliminating open defecation, converting insanitary toilets into pour flush toilets, eradicating manual scavenging, complete disposal and reuse of solid and liquid wastes, bringing behavioural changes to people and motivate healthy practices, spreading cleanliness awareness among people, strengthening the cleanliness systems in urban and rural areas as well as creating user friendly environment for all private sectors interested in investing in India for cleanliness maintenance.

The urban component of the mission is being implemented by the Ministry of Urban Development, and the rural component by the Ministry of Panchayati Raj & Drinking Water, Government of Odisha.

Programme Intervention

Incentive was provided under the Mission for the construction of Individual Household Latrines (IHHL) to all Below Poverty Line (BPL) Households and Above Poverty Line (APL) households restricted to SCs/STs, small and marginal farmers, landless labourers with homestead, physically handicapped and women headed households.

The Incentive amount provided under SBM(G) to Below Poverty Line (BPL) /identified APLs households shall be up to Rs. 12,000 for construction of one unit of IHHL and provide for water

availability, including for storing for hand-washing and cleaning of the toilet. Central share of this incentive for IHHLs shall be Rs. 9,000/- (75%) from Swachh Bharat Mission (Gramin). The State share will be Rs. 3,000/- (25%). The total assistance available for construction of an individual toilet in urban areas is Rs 4,000/- from the Central Government and at least Rs 1333/- from the State Government.

Status of Odisha: SBA

Odisha lags far behind the national averages as regards access to toilet facilities. As per 2011 population census out of total 96.6 lakh households in the state 78.0 per cent do not have any latrine within their premises and 76.6 per cent are still in habit of open defecation. This is more acute in rural areas. The state wide base line survey conducted by Odisha revealed that 76,56,231 HHs are eligible to receive incentive under SBM (G). During the year 2015-16, the state has targeted to construct 12 lakh individual HH toilets, 181 Community Sanitary Complexes (CSC) and 100 solid and liquid waste management projects. Till October 2015, 4,21,442 IHHL sand CSCs have been completed under SBM. Government of Odisha plans to achieve the goal of "Swachha Bharat Mission" by the end of 2019. To achieve the goal, Odisha has adopted the Community Led Total Sanitation (CLTS) approach with focus on collective behaviour change through awareness generation on positive hygiene practice. For timely achievement of the goal, 1,485 CLTS motivators have been trained with the support of UNICEF and DFID who will help to make communities Open Defecation Free.

GAP Analysis: SBA and SAPCC

The central government has emphasized synergy between climate change policy and Swachha Bharat Abhiyan (SBA). In this backdrop, the government of Odisha has identified areas of vulnerability for different sectors in the state action plan policy for climate change. In the process of identifying the areas of vulnerability, sanitation is found to be one of the major grey areas in the health sector where most of the women and children are suffering a lot. The State Water and Sanitation Mission under the Department of Rural Development is implementing various sanitation programmes in the state. But it is found that the department itself has not been involved in the SAPCC. In this context, it looks like the SBA is somehow neglected in the SAPCC programmes.

The Urban Development Department, Government of Odisha being a part of SAPCC has focused on waste management during 2015-20. The sanitation initiatives available under the SBA programme are ignored in the SAPCC.

Suggestions:

- Construction of climate friendly individual household latrines, community latrines and school toilets

4.2.2 Sarva Shiksha Abhiyan (SSA)

Sarva Shiksha Abhiyan (SSA) is the Government of India's (GOI) flagship elementary education programme. Launched in 2001, it aims to provide universal primary education to children between the ages of six and 14 years. SSA is now the primary vehicle for implementing the Right to Free and Compulsory Education Act (RTE). The overall goals of the programme include universal access and retention, bridging of gender and social category gaps in education and enhancement of learning levels of children.

National Education Mission under Department of School Education & Literacy under Ministry of Human Resources Development (MHRD) Government of India is the nodal agency of the programme. In Odisha, Odisha Primary Education Programme Authority (OPEPA) as a registered society under the School & Mass Education (S&ME) Department, Government of Odisha is the nodal agency to implement the scheme.

Provisions in the Schemes:

SSA provides for a variety of interventions, including opening of new schools and alternate schooling facilities, construction of schools and additional classrooms, toilets and drinking water, provisioning for teachers, periodic teacher training and academic resource support, textbooks and support for learning achievement. These provisions need to be aligned with the legally mandated norms and standards and free entitlements mandated by the RTE Act.

Status in Odisha:

SSA is a centrally sponsored scheme. The budget allocation is shared between the centre and the state. From FY 2010-11 to 2014-15, GOI contributed 65% of total SSA funds of Odisha and remaining 35% was borne by the Odisha government. But from October 2015, cost share (ratio) has changed from 65:35 to 60:40.

GAP Analysis: SSA and SAPCC

It is found from different studies that children are the most vulnerable to climate change impacts. Children are usually found to be the worst affected in most disasters. Due to disasters, they suffer physically, psychologically and socially. Education of children is also hampered. The School and Mass Education Department as the nodal agency has been implementing schemes and programmes for the wellbeing of children in the state. Due to disasters most of the school buildings in the state are damaged. The status of drinking water and toilets are also found to be precarious. SSA is

mandated to take care of the construction of additional classrooms, toilets and drinking water facilities in schools. But, the department of S&ME does not feature in the SAPCC. Therefore, the issues related to child protection, disaster management and risk reduction, child survival and rehabilitation has not been properly focused in the SAPCC.

Suggestions

- Teacher training on climate change
- Strengthening school cabinet on climate change
- Strengthening School Management Committees to prepare School Development Plans incorporating climate change action and monitor the same

4.2.3 Integrated Child Development Services (ICDS)

Launched on 2nd October 1975, the Integrated Child Development Services (ICDS) Scheme is one of the world's largest programmes for early childhood care and development. It is the foremost symbol of the country's commitment to its children and nursing mothers, as a response to the challenge of providing pre-school non-formal education on one hand and breaking the vicious cycle of malnutrition, morbidity, reduced learning capacity and mortality on the other. The beneficiaries under the scheme are children in the age group of 0-6 years, pregnant women and lactating mothers. The objectives of the scheme include:

- To improve the nutritional and health status of children in the age-group 0-6 years
- To lay the foundation for proper psychological, physical and social development of the child
- To reduce the incidence of mortality, morbidity, malnutrition and school dropout
- To achieve effective coordination of policy and implementation amongst the various departments to promote child development
- To enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education.

The ICDS Scheme offers a package of six services:

- Supplementary nutrition
- Pre-school non-formal education
- Nutrition and health education
- Immunization
- Health check-up and
- Referral services

ICDS Status in Odisha

The Women and Child Development Department is committed to strengthen the initiatives of the State Government for holistic development of women and children, which constitutes 49.46% and 14.1% respectively of Odisha's population. This is the nodal Department for formulating plans and programmes for development of women and children in the State. The department has evolved a comprehensive multi-level and multitool system of monitoring and evaluation for the implementation of its programmes. The salient features are:

Under the ICDS, there are Integrated Child Development Projects headed by a Child Development Project Officer (CDPO). There are 338 ICDS Projects including 20 Urban Projects. Each ICDS Project is divided into 5-6 sectors. Each sector is headed by a supervisor, who oversees the work of 20-25 Anganwadi Centres (AWC) functioning at the village level. Each Anganwadi Centre covers a population of about 400-800 in the non-tribal areas and 300-800 in the tribal areas and is run by an Anganwadi Worker (AWW) assisted by an Anganwadi Helper (AWH). The ICDS Scheme is now in operation in all 338 Projects including 20 Projects in Urban Areas of the State.

This is a CSS Scheme having the cost sharing of 90:10 of Government of India and Government of Odisha respectively except SNP up to the year 2014-15. From the year 2015-16 the sharing pattern has been changed from 90:10 to 60:40, except SNP which remained unchanged at 50:50.

GAP Analysis: SAPCC and ICDS

It is observed that the state action plans for climate change 2010-15 and 2015-20 have ignored the ICDS scheme. Due to climate change impacts children and women of the state are suffering a lot. Under the ICDS schemes, there are provisions to meet the vulnerabilities of children and women due to climate change impacts. The Women and Child Development Department as a nodal agency has not been involved in the SAPCC. It shows there is lack of integration between the nodal department and SAPCC.

Suggestions:

- Construction of climate resilient Anganwadi centre
- Create crèche facilities

4.2.4 National Health Mission (NHM)

The National Health Mission (NHM) encompasses two Sub-Missions, the National Rural Health Mission (NRHM) and the National Urban Health Mission (NUHM). NRHM was launched in 2005, while the National Health Mission (combination of rural and urban health mission) was approved by the cabinet in May 2013. The NHM envisages universal access to equitable, affordable and quality healthcare services that are accountable and responsive to peoples' needs. The main programmatic components include health system strengthening in rural and urban areas,

reproductive- maternal- newborn child and adolescent health (RMNCH+A) and control of communicable and non-communicable diseases.

National Rural Health Mission (NRHM): NRHM seeks to provide accessible, affordable and quality health care to the rural population, especially the vulnerable groups. The thrust of the mission is on establishing a fully functional, community owned, decentralized health delivery system with inter-sectoral convergence at all levels, to ensure simultaneous action on a wide range of determinants of health such as water, sanitation, education, nutrition, social and gender equality.

National Urban Health Mission (NUHM): NUHM seeks to improve the health status of the urban population particularly urban poor and other vulnerable sections by facilitating their access to quality primary health care. NUHM covers all state capitals, district headquarters and other cities/towns with a population of 50,000 and above (as per census 2011) in a phased manner.

Key schemes under NHM

Janani Suraksha Yojana (JSY) aims to reduce maternal mortality among pregnant women by encouraging them to deliver in government health facilities. Under the scheme, cash assistance is provided to eligible pregnant women for giving birth in a government health facility. Rate of cash incentive for institutional delivery: ₹ 1,400/- for rural and ₹ 1,000/- for urban area.

Janani Shishu Suraksha Karyakarm (JSSK) Launched on 1st June 2011, JSSK entitles all pregnant women delivering in public health institutions to free delivery, including caesarean section. This marks a shift to an entitlement-based approach. The entitlements include free drugs and consumables, free diagnostics, free diet during stay in the health institutions, free provision of blood, free transport from home to health institution, between health institutions in case of referrals and drop back home and exemption from all kinds of user charges. Similar entitlements are available for all sick infants (up to one year of age) accessing public health institutions.

Rashtriya Bal Swasthya Karyakram (RBSK) was launched to provide comprehensive health care and improve the quality of life of children through early detection of birth defects, diseases, deficiencies, and development delays including disability.

Rashtriya Kishor Swasthya Karyakram (RKSK) was launched to comprehensively address the health needs of the 253 million adolescents, who account for over 21% of the country's population, by bringing in several new dimensions like mental health, nutrition, substance misuse, injuries and violence and non-communicable diseases.

NHM status in Odisha

Department of Health and Family Welfare, Government of Odisha, is the nodal agency in the state. The fund sharing pattern between centre and state used to vary from component to component within the scheme. However, however from 2015-16 the fund sharing pattern is 60:40 between centre and state for all components.

GAP Analysis: SAPCC and NHM

The Department of Health and Family Welfare, Government of Odisha is one of the key departments involved in the SAPCC. The department report shows that due to frequent floods in the state there is wide scale prevalence of water-borne and vector-borne diseases. Looking at this situation, the major initiatives prescribed by the department in the SAPCC are building the capacity of health sector personnel on issues relating to climate change, integrate climate change concerns into the state health policy, and strengthen approaches to manage vector-borne diseases, strengthen approaches to dealing with heat wave conditions in the state and to manage water-borne diseases.

Meanwhile, under the Health and Family Welfare Department, NHM is running as a key flagship programme which emphasizes women and child health care. In order to ensure this, a lot of programmes are being implemented by the NHM, including Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakarm (JSSK), Rashtriya Bal Swasthya Karyakram (RBSK) and Rashtriya Kishor Swasthya Karyakram (RKSK).

However, it was found that in spite of several women and children centric welfare programmes under various departments, there has been no integration of NHM programmes with other parts of the SAPCC.

Suggestions

- School health programme
- School Wash programme behavioural practice (behaviour change communication)
- Construction of climate friendly labour room at climate affected village

5 Recommendations and Conclusion

Recommendations

- Odisha does not have a policy on climate change. With clear vision and mission, a comprehensive policy on climate change is needed for the state, based on which SAPCC documents may be designed.
- The present form of climate change planning in Odisha does not follow bottom up approach. All planning for climate change actions are being prepared at the state level by taking the opinion of thematic experts and departmental functionaries. The Gram Panchayat (GP)- being the lowest tier of the governance system, has no role in the planning and execution of state action plan for climate change. The state's climate change action plan does not provide space to GP to participate in the process, that is why it reduces the effectiveness of the policy and holds very little hope to bring desired changes. Thus, in order to make the state's climate change action plan effective, a bottom-up approach should be followed at each level of the governance system while preparing the plan.
- Climate change impacts are now found in every sector of the country. Each department of the government has significance to address the climate change vulnerability of the state. Reflecting upon the state climate change action plan, it covers only 11 to 12 departments. Departments like Women & Child Development, School & Mass Education, ST & SC Development, Panchayat Raj & Drinking Water which are found out from the process while framing the SAPCC document. Therefore, building convergence among all departments may be thought of in order to make the climate change policy more inclusive and result oriented.
- Women and children are comparatively more vulnerable to climate change impacts. However, while framing the SAPCC document for Odisha, no emphasis has been placed to address the vulnerabilities of women and children on their needs. However, during the implementation of SAPCC 2015-2020 , this aspect may be taken care of.
- Sanitation is an important factor linked to climate change impacts. After 70 years of independence, more than 85.9 per cent of rural households in Odisha don't have toilet facilities, forcing people to defecate at outside. While framing the SAPCC document, this aspect seems to have been under emphasized. Thus, this aspect may be taken up while framing the SAPCC document.
- Some of the activities planned under the SAPCC have numerical targets, while many others are not showing the targets (e.g. Agriculture, Coast & Disaster, Energy, Waste Management, Industry, Mining, Forest etc.). Therefore, all activities in the SAPCC documents may be presented with targets for easy monitoring and evaluation.
- All plans under the SAPCC are for a period of five years. There are no annual segregated plans or target. This seems to be affecting timely and smooth implementation of planned activities. Annual plans and targets may be fixed for effective monitoring.
- While preparing the action plan, the opinions of subject specialists are given importance. But, there is no formal platform to consult with the citizens who may have rich experiences

on climate change factors as well as the impacts. Thus, in order to incorporate the views of citizens from different groups / sectors in the SAPCC document, a formal platform of citizens' consultation on climate change should be set up at various levels of the governance system in the state.

- Mere government initiatives and actions may not be sufficient to bring the desired changes in the climatic conditions of the state. Public support is essential to bring desired changes. In majority of sectors of the SAPCC document, PPP mode of intervention is little emphasized. It is important to explore areas where PPP mode of intervention can be ensured.
- The sectors identified in the SAPCC document to fight against the climate change in the state may not be adequate. Many other factors related to socio-economic and cultural aspects of human being also affect the climatic conditions of the state significantly. Thus, while preparing the SAPCC document, these aspects may be taken into consideration.
- The Climate Change Action Plan Cell (CCAPC) comprising of only three members may be expanded by involving more experts from different fields in order to make the CCAPC more effective and competent in the development, monitoring and evaluation of SAPCC provisions and coordinating all agencies.
- Similar to the CCAPC at the state level, climate action plan cells may be set up at the district and block levels in order to ensure the proper implementation, monitoring and evaluation of the SAPCC provisions in their respective jurisdictions.
- In order to make people aware on climate change vulnerability, publication of knowledge products may be taken up by the CCAPC. Women and children are usually more vulnerable to the impacts of climate change. In order to ensure women and children are able to add their contribution in restricting the climate change impacts, actions may be taken up to build awareness on climate change issues to teachers, school children and women farmers.
- During disasters, schools and AWCs buildings are found to be severely affected, due to which teaching and nutritional programmes for children get disturbed. Besides, during disasters, the community also uses these buildings as shelter. Actions may be taken to make school and AWC buildings disaster resilient, with facilities of green energy provision, toilets, water supply, labour room and kitchen shed.
- As per 2011 census 32 per cent of the Odisha's working population is female of which 71 per cent women are engaged in the agriculture sector. Out of all women engaged in the agriculture sector, 83 per cent are working as agricultural labourer. With climate change impacts, these women often lose their income source. Therefore, adopting climate resilient cropping patterns with the use of women friendly agricultural techniques as per the provisions of State Agriculture Policy 2013 may be thought of.
- Promoting organic farming has not been a priority agenda for the agriculture sector. The present practice of farming relies heavily on use of chemical fertilizers and pesticides which is a major cause of reducing soil health and spreading of fatal diseases. Therefore,

organic farming through traditional approach may be prioritized in the agriculture sector of SAPCC.

- There are many flagship programmes which are designed to promote infrastructure facilities and improving the behavioural practices of women and children. Promotion of infrastructure facilities and improving behavioural practices have close link to meet the climate change vulnerability both in the form of mitigation and adaptation measures. However, while framing the SAPCC, there has been no reflection on the objectives of flagship programmes like ICDS, NHM, SSA, SBA, MGNREGA etc. Therefore, actions may be taken up to include these programmes and their respective departments in the SAPCC framework.
- The SAPCC document seems to have wide gap between detailing out the action plan and their respective budgetary allocations. Due to this gap, budget monitoring against the climate change action plan becomes tedious. Therefore, while framing the SAPCC document, each action should be linked with budget allocation and its source, mentioning the departmental budget head.
- With regard to budgetary planning for climate change actions, seven sectors in 2015-20 SAPCC despite of their importance have negative growth of budget allocation in compare to the earlier one (e.g. Coast & Disaster, Energy, Forest & Environment, Health & Family Welfare, Housing & Urban Development, Industry, Steel & Mines). On the other hand, some sectors have unexpected growth of budgetary allocation in 2015-20 (e.g. Transport and Water Resource) as compared to the previous SAPCC. Allocation of budget to different sectors should be rational.
- Budget allocation for climate change actions in Odisha is increasing. In the first SAPCC, the budget was Rs 17,049 Crore, which has increased to Rs 31,663.58 Crore in the second SAPCC. However, it was found that key sectors / departments like Industry, Steel & Mines and Transport have not performed well in terms of resource allocation for climate change actions in both the plan periods. At the same time, few sectors have underestimated the budgetary target for the period 2015-20. These lacunae need to be addressed.
- Looking at the budget size for different activities within the sectors, it is observed that emphasis has not been given to those activities which should get priority in resource allocation. For example, within energy sector "Reduce transmission and distribution losses" has got high priority in resource allocation whereas there is no clear activity plan or higher resource allocation for renewable energy / clean energy interventions. This needs to be corrected.
- Activities related to agriculture and allied activities (Agriculture, Horticulture, Fisheries & Animal Husbandry and Irrigation) hold larger share of the total SAPCC budget. Departments like Industry, Steel and Mines and Transport have very small provisions for climate change actions, although they are major contributors to climate change. This needs to be corrected.

- A separate budget statement as per government accounting structure needs to be prepared by the nodal agency for stringent monitoring. The statement may be reported into two parts like expenditure made by state budget and expenditure by other sources.
- There needs to be a robust mechanism to review the implementation of SAPCC. At the intra-department level, the review may be conducted on quarterly basis under the chairpersonship of the Chief Secretary. In addition, review may also be taken up at the ministerial level on half-yearly basis under the chairpersonship of the Chief Minister.

Conclusion

Odisha is a state rich in natural resources. Despite that, it is counted as one of the backward states in the country. Amongst various reasons of backwardness, climate change is one of prominent factors. Every year the state has been suffering from number of calamities like flood, drought, cyclone, heat wave etc., all of which are made more frequent and more severe by climate change. Human activities are the major cause of climate change – huge deforestation, industrialization, extracting of mineral ores, destroying traditional social values, culture and beliefs, population growth, commercial cultivation etc. Two successive climate change action plans during the year 2010-15 and 2015-20 prepared by the government of Odisha are no doubt a bold step to fight against the menace of natural calamities. Though these documents are comprehensive, still many areas are there which need improvement. The major weaknesses of these documents are lack of annual planning, budgeting and targets. Due to these flaws, the effectiveness of the SAPCC is in question. The implementation, monitoring and evaluation mechanisms of the SAPCC need to be strengthened up through adding more experts at district and state levels. Citizens should be made sufficiently aware on the causes and consequences of climate change in their localities. Civil society organizations working in different parts of the state should take climate change issue as one of their focus agenda.

Besides this, the lowest tier of the governance system has tremendous role to ensure the success of the SAPCC. The Panchayati Raj system has extraordinary impact on people to make any change. Therefore, the panchayats, blocks, districts and the state should make their plan on climate change action with detailed budgetary allocations in each financial year. Unless the panchayats and local people are involved in the climate change action plan, the success of SAPCC will be confined to documents only.

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