NATIONAL LAW UNIVERSITY, ASSAM

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ACADEMIC REVIEW
ON
THE ASSAM STATE ACTION PLAN ON CLIMATE CHANGE

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1. INTRODUCTION

The climate is a common good, belonging to all and meant for all.

- Pope Francis

We all owe a responsibility to protect and preserve this common good. Climate Change is the greatest threat we face today. Affecting all spheres of our life, it calls for immediate effective measures. In the light of the recently concluded Paris Conference, the Assam State Action Plan on Climate Change (2015-2020) (ASAPCC) is a baby step, drafted with the aim "connect between evolving climate science, policies and practices" so as "to set up a common but shared agenda for climate change mitigation and adaptation".

This Review Report makes a humble attempt to examine the adaptation strategies to climate change under the following heads :–

1) Water Resources;
2) Agriculture;
3) Forests and Biodiversity;
4) Energy;
5) Vulnerability; and
6) Forests.

The plan of this report is as follows :–

a) It proposes certain ideas that the aforesaid action plan should take into consideration given the dynamic as well as vulnerable quality of nature;
b) It highlights certain obsolete references made with regard to the framing of the policies; and
c) It tries to draw a comparative study with other State Action Plans as well as policies / legislative practices of other countries that may serve as a guiding tool while framing and implementing the various adaptation strategies.

All the suggestions are supported with extracts taken from the literature surveyed. However, it is pertinent to note that, this review has not taken into consideration, the hardcore scientific technicalities. The review is purely law / policy oriented. The action plan has been reviewed by a team of faculty / student researchers under the guidance of Vice Chancellor and Centre Head of Centre for Environmental Law, Advocacy & Research (CELAR), National Law University, Assam.

"*The unique physiography, climate and location of Assam in the North Himalayas with mighty Brahmaputra flowing through, is endowed with ample water resources and rich floral and faunal biodiversity*." This is the opening line of Assam's State Action Plan on Climate

Change (ASAPCC).[1] The first segment of this legislative analysis highlight the salient features of ASAPCC, the second segment, its legal dimension and final segment along with concluding remarks portrays a crucial comparative evaluation of ASAPCC with other State Action Plans on Climate Change (SAPCC).

The Assam's State Action Plan on Climate Change is guided by following principles ensuring:-

- Sustainability of water resources;
- Sustainability of agricultural systems;
- Protection and conservation of forest and biodiversity;
- Making habitats climate resilient;
- Energy efficiency and sufficiency; and
- Solutions for anticipated extreme events.

The principles highlighted in the action plan appear very promising. However, it should have reflected the values of sustainable development- based on the notion of an ecologically viable and economically sound management of resources; adoption of preventive and precautionary measures to combat disaster and waste; equity and public trust doctrine. With respect to Northeast, there is no doubt that she needs, special attention from central for its unique geophysical features. From theoretical perspective of environmental jurisprudence, these principles sound very assuring but real challenge lies in the pragmatism of the same.

2. WATER RESOURCES

2.1. Strategies for meeting the water demand

Considering the effects of environmental change as far as changes in rainfall and temperature and taking both the hilly and plain regions of Assam into account, the following techniques in the territories (could / might) lead to water security in the setting of environmental change[2] :

- Undertaking rain water harvesting along the hill slopes, especially in the recharge zones, to increase the percolation of rain water and thus result in the recharge of ground water. This can be achieved through digging up of staggered trenches with hedge row. Actions would also include identification of natural aquifers in the region.

1 Department of Environment and Forest, Government of Assam, Assam State Action Plan on Climate Change (2015-2020) launched in the month of September 2015.

2 Kathpalia. G.N and R. Kapoor, Water Policy & Action Plan for India 2020: An Alternative (November 2002) p. 12 available at <http://planningcommission.nic.in/reports/genrep/bkpap2020/10_bg2020.pdf> (last accessed on February 28, 2016).

- Exchange of water from Surplus Basin to Deficit Basin in this region (involving main stream Brahmaputra and its tributaries).
- Construct check dams, wherever, doable for the production of water supplies for harnessing surface water.
- Increase water storage capacity by building household, community and village based reservoirs and also repairing, remodeling and restoring of existing water bodies.

Possible steps with respect to **Strategies 1, 3** and **5** of the Action Plan :-

- Modernize the Irrigation system using Drip, Sprinklers systems;
- Pricing and Regulation: Piped water usage for domestic and drinking water can be subjected to metering and thereby restricting unnecessary wastage of water can be avoided;
- Undertake periodical census of minor irrigation projects to check sustainability and also to detect dis-functionalities and to implement remedial measures;
- Variable Irrigation Water Tax on surface water use and ground water use might be levied, depending on the land holding size, to minimise use of ground water for irrigation and also to reduce wastage of the water obtained through surface resources. This may also encourage small and medium farmers to have their own water storage structure to irrigate their fields; and
- Extend compulsory rain water harvesting regulation in individual houses in all towns.

Other plausible steps (if seems legit) :-

- Increase the reservoir storage potential of existing major irrigation projects in the region;
- The waste water generated in the thermal power plants and other large industrial units may be recycled, so that partial demand of water of the plants is met through this process;
- Facilitation should be provided for recharge of ground water in its recharge zone through rainwater infiltration. The water from this source will be only transferred when the demand is high, and is not met through the conventional major irrigation systems or in areas where surface water is not available;
- In addition rain water can be harvested by construction of water harvesting tanks and ponds, and expanding the capacity of present ponds which are under direct command of the farmers and can be utilized in the water stress period; and

- For abatement of floods in this region, a rethink and hence revamping of the existing infrastructure and making new infrastructure that help water pass through and drain out may be needed. Also incorporation of early warning systems may need to be put in place, with installation of rain gauges at higher spatial resolution and installation of LIDARS (Light Detection and Ranging).

3. AGRICULTURE

3.1. *Jhum* Cultivation

Agriculture is the most important means of livelihood in the State of Assam, for it is an agrarian state. Building the capacity and enhancing the potential of decision makers and stakeholders is a must in this sector so as to strengthen it as an efficient source of livelihood. But, there are certain hiccups, which requires a thorough analysis. One such indigenous practice is *Jhum* cultivation. The dependence of this form of cultivation since time immemorial has been under the radar of climatologist and agricultural scientist up lately.

As per the Mizoram's State Climate Change Action Plan :-

> S*hifting Cultivation (current) forms the main chunk of wasteland and abandoned Jhum land. Due to deforestation and uncertainty in rainfall, there is a direct impact on the growth of palatable grass species… As a consequence, there is shortage in quantity of livestock fodder. This will also affect livelihoods of local people…. In this regards Government of Mizoram wants to reclaim wasteland and develop some fodders for livestock….*

The Assam State Action Plan on Climate Change should embrace such a measure, keeping in mind the expediency of the same.

3.2. Crops

More than half of the land in Assam is covered under cropping area. The cropping season in Assam is predominantly *Kharif* season, a season sensitive to the rainfall patterns. Thus, any climatic change, if not mitigated, will adversely affect the cropping pattern in Assam.

The Action Plan illustrates low productivity as the main threat, according the following causes to it :-

1. The seed replacement rates and variety replacement rates are inefficient;
2. The nutrient value of soil and its fertility and the ground-water health is deteriorating; and
3. The storage and processing measures are inefficient and disastrous.

The distribution of agricultural development across districts is uneven owing to fragmentation of land holdings and hesitant adoption of modern technology and machinery. According to the Action Plan, the rise in temperature, reduction in ground water levels,

degrading soil quality and persistent extreme calamities like draught and floods are the challenges that need tackling. For the said challenges, a sum total of six strategies have been named under the heads, "*Development District-wise Smart Climate Adaption Action Plan*", "*Develop, Disseminate and Practice Climate Smart Packages at Pilot Scale*", "*Research", "Knowledge Management, Training and Skill Development*", "*Strengthen Accessibility to Markets*" and "*Protect Irrigation Schemes from Siltation due to Soil Erosion*" with a sum total of 318.74 Crores. The Department of Agriculture, Department of Irrigation, Assam State Disaster Management Authority and National Bank for Agriculture and Rural Development (NABARD) are the concerned Agencies monitoring and facilitating the implementation the strategies.

The Action Plan in its strategizing is quite vague and doesn't provide for a solid plan or structure to act upon. It assigns the Department of Agriculture with the entire burden of developing an adaptation plan, assessing its impact, assimilating traditional knowledge, generating awareness and training the resource persons. The Action Plan, put simply, is a vague extension of the functions of the Department of Agriculture to include Action on Climate Change.

The Action Plan projects high hopes of coming up with an integrated adaptation approach with climate-smart adaption strategies and packages across twenty-seven districts, sensitize the stakeholders through participatory rural appraisal, train the farmers on climate-smart packages and integrated disease management and yet does not emphasize on the research and development. Out of the 318.74 Crores, only 0.05 Crore has been allocated to the Research Strategy which covers a narrow area of development of water and stress tolerant C4 Rice variant.

The only matter taken into consideration in case of irrigation-related problems is siltation. The issues related to a proactive disaster management and mitigation is not taken into account. Given the fact that the rainfall pattern of Assam has changed drastically leading the state to be affected by both droughts and floods at the same time, emphasis needs to be given in strategizing effective drought and flood management methods.

Another biggest drawback in the strategizing of the Plan is inadequate emphasis in developing new technology or techniques to improve seed quality, irrigation facilities and other methods in tandem with the changing climate.

3.3. Assam Tea

In India, Assam is the largest producer of tea in (about 53 per cent of total production). Its share in the region is about 96.8 per cent of area and 98 per cent of production. The

productivity of tea is about 1850 kilograms per ha.[3] It is one of the most important tea-producing regions of the world that manufactures high-end graded tea and contributing around 17 per cent of the world tea production.[4] Thus, the impact of climate change is largely felt by this region of the country. The tea industry plays a vital role in the country's as well as state's economy. So, any disruption in the tea industry will affect the overall economy of the country's GDP. The industry has seen several highs and lows in the past decade. While there was a steady decline in the years 2007-2010, thereafter, there was an increase in the production due to small holders' area in the tea plantation thereby increasing the number of tea gardens from 825 in 2007 to 78856 in 2012.[5] Livelihoods of around 2 million labourers in Assam are dependent upon high tea yields, both in quality and quantity.[6] It is pertinent to note that tea is a rain-fed perennial crop which is largely dependent on the climatic conditions of the area in which it is grown. Therefore, sudden and long term climate change will impact the physiological and developmental processes resulting in the degradation in the quality and quantity of the yield of tea. According to the reports of the Tea Research Association in Assam, the minimum temperature of the region has increased by two degrees Celsius with reduction of rainfall by around two hundred millimetres in the last ninety years.[7]

As per the Assam State Action Plan on Climate Change, the following strategies are proposed to be adopted by the State and accordingly budgets have been allocated by the government :-

- Real time remote sensing based soil moisture mapping to help in crop planning along with validation at field level. Coverage - all tea growing areas;
- Assessing soil carbon to all tea Stations;
- Identifying, procuring and broadcasting thermal and water stress resistant tea varieties;
- Dissemination of water efficient technologies - sprinkler and drop irrigation. Coverage: small holders in one-fourth of area under small holders;
- Creating water harvesting structures for small holders; and
- Developing pest and disease forecasting systems for tea related pests and planters.

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3 Baruah, S. et al., 'Plantation crops in North Eastern India: Constraints and Strategies', <http://www.ncap.res.in/upload_files/workshop/wsp10/html/chapter8.htm> (last accessed on November 18, 2015).

4 Vide Assam State Action Plan on Climate change 2015-2020, p. 59.

5 *Ibid*, p. 60.

6 "Growing Tea in Assam" (Tea and Climate) < http://teaclimate.com/growing-tea-in-assam/> (last accessed on November 18, 2015).

7 Anjana Pasricha, 'Climate Change Impacts India's Tea-Growing Region', *Voice of America* (January 3, 2011) <http://www.voanews.com/content/climate-change-impacts-indias-tea-growing-region-112860129/133081.html> (last accessed on November 18, 2015).

One of the major issues in this regard is the lack of empirical data. The aforementioned strategies can only be successful, if effective means are used collection of data and the analysis of the same. Private research organisations can be of greater help in such regards because of their extensive research in this sector. Thus, there is a need to identify such organisations.

The total allocated for the adaptation strategies for sustainability of tea in a 'changing climatic scenario' is Rs.30.50/- Crores where the sources of the funding include ISRO, Tea Board, Tea Cess and Tea Research Station. While the State Government, at the outset, has planned a strategy for combating the affect of climate change in the Assam tea, there is no such step taken by the Centre. The National Action Plan on Climate Change doesn't provide any policy with respect to tea. The National Mission for Sustainable Agriculture, one of the eight missions which concentrate on the adaptation of tactics to prevent the adverse effect of climate change on agriculture also ignores this revenue producing department. Surprisingly, the "Intended Nationally Determined Contributions (INDCs)" submitted by India to the United Nations Framework Convention on Climate Change (UNFCCC) also has no mention of tea in the document. The word doesn't appear in the document even once. Admittedly, tea falls under the wide sector of agriculture and government has adopted policies for the same.[8] However, tea being an important export and given its importance to the revenue generation, there is a need for independent and separate strategies for the sustainability of tea.

While the comparing the strategies to be adopted by Assam and West Bengal for the sustainability of tea, it can be deduced that both the States have taken similar steps for minimising the affect of climatic changes on tea, both in terms of quantity and quality. Assam and West Bengal are the two world leaders when it comes to tea exports. While Assam prides itself for the distinguished Assam Tea, West Bengal is famous for the unique flavour and scent of the Darjeeling tea.

Some of the strategies proposed to be adopted by the Government of West Bengal in its action plan are as follows :-

- Identification of farming practices that will facilitate the growth and production of cultivars;
- To create shade over the plantations that will minimize the effect of rising temperature;

8 The National Policy for Farmers focuses on sustainable development of agriculture... The National Mission on Sustainable Agriculture (NMSA) aims at enhancing food security and protection of resources such as land, water, biodiversity and genetics. The mission focuses on new technologies and practices in cultivation, genotypes of crops that have enhanced CO2 fixation potential, which are less water consuming and more climate. Vide India's Intended Nationally Determined Contribution: Working Towards Climate Justice, available at <http://www4.unfccc.int/submissions/INDC/Published%20Documents /India/1/INDIA%20INDC%20TO%20UNFCCC.pdf> (last accessed on February 24, 2016).

- Developing drought resistant varieties of Darjeeling tea;
- To create additional water reservoirs to store water for irrigation;
- Undertake research for developing water stress tolerant cultivars; and
- To create structures to reduce speed of water along the contour lines – wooden barriers, bench terraces and contour bunding for combating excessive soil erosion.[9]

While ASAPCC broadly discusses the above, but it is necessary to analyse the tactics so that while the implementation of these strategies, none of the tactics are missed out. The Plan also fails to discuss the necessity of the public-private partnership for achieving the goal of reducing the affect of climate change in tea. Private research groups and other organisations are of great importance. For instance, at Tea Research Association's Tocklai Experimental Station in Jorhat (Assam), a team of scientists have created chambers in which they are studying the reaction around two hundred varieties of tea found in the country under different climatic models.[10] The report by the *New Indian Express* also stated that "... by artificially varying the temperature and carbon levels in atmosphere inside the chamber, they are experimenting how the plant would perform in future climatic conditions. They are hopeful of coming out with the results by next year...".[11]

In reference to Adaptive management of landscape, *Project Tea and Climate*[12] has stated as follows :-

> *Climate-smartening the tea plantation landscapes would deliver multiple simultaneous benefits to livelihoods and the environment whilst developing resilience to uncertain and negative climate change impacts...*

While the Action Plan provides for certain measures for the sustainability of tea in the changing climatic conditions, the loose ends mentioned above needs to be tied in order to achieve a comprehensive methodology for the combating climate change.

3.4. Horticulture

Assam's unique and diverse agro-climatic condition makes it traditionally rich for the production of a range of horticultural crops like various fruits, vegetables, flowers, spices, nuts, tubers and medicinal and aromatic plants. 15 % of the state's gross cultivated area is occupied

9 Government of West Bengal, West Bengal State Action Plan on Climate Change, pp. 200-201, available at <http://www.moef.nic.in/sites/default/files/sapcc/West-Bengal.pdf.> (last accessed on November 20, 2016.

10 Namrata, *Scientists Search for Tea Variety That Can Withstand Climate Change*, The New Indian Express (30 August 2015), available at < http://www.newindianexpress.com/lifestyle/food/Scientists-Search-for-Tea-Variety-That-Can-Withstand-Climate-Change/2015/08/30/article3001338.ece> (last accessed on November 20, 2015).

11 *Ibid*.

12 *Climate-Smart Landscapes*, Tea and Climate, available at < http://teaclimate.com/climate-smart-landscapes/> (last accessed on November 20, 2015).

by horticultural crops whereby the annual production of various such crops is approximately 70 lakh tons. While horticulture has an immense potential for employment and income generation through commercial exploitation; however, there are certain inherent shortcomings which inhibits the growth of this sector. These shortcomings include but are not limited to inadequate extension of scientific horticulture technologies, accessibility to packages of input mixes, road communication, marketing, processing and cold storage facilities. The aforementioned barriers along with the problems caused because of the changing climatic conditions like rising ambient temperature, heavier precipitation events and floods, erratic rains, long dry spells etc. are shunting the progress of the already difficult production of horticultural crops.

The State Government of Assam in its Action Plan has proposed a budget of Rs.21,766,57/- crores for strategising the sustainability of horticulture in the changing climatic scenario in the State. Policies like sustainable horticulture in hilly areas (with a major ocus on *Jhum* cultivation), promotion of water efficient techniques through construction of water harvesting structures, promotion of drip and sprinkler irrigation, managing pest and disease management, developing disease prevalence maps and tracking the same across the years in the entire State along with disease forecasting systems and disseminating the same to the farmers, treating micro water sheds for soil and water conservation (16 thousand ha) in hilly Jhum areas and developing and propagating weather indexed crop insurance has been given a very high priority in the Plan. The other strategies to be adopted by the Government are :-

- Popularisation of indigenous thermal and water stress resistant varieties – black Jamun (Polnial), Sapida (Leteku), Jackfruit, Hog plum (Amara) etc. Coverage : 1000 ha.;
- Growing vegetables in protected condition through Crop diversification and thus facilitating off season production; and
- Ensuring soil health – promotion of integrated nutrient management in hilly areas prone to soil erosion: Coverage: 2500 ha.

Thus, it can be observed that most of the strategies are scientific in nature which requires a lot of scientific research and development. However, the fund allocation for the strategies is a little inconsistent. For instance, weather indexed crop insurance is very important scheme for safeguarding the interest of the farmers. However, the funding proposed is only 0.50 Crores which is insufficient given the number of people involved in the farming process.

Another drawback which can be seen is that the inherent problems previously mentioned have not been given due importance. But, until and unless these latent problems are fixed and solutions for these problems are sought, all the other strategies will be a failure.

A study has revealed that "... none of the 22 districts of Assam fall under the 'very high productivity' category except one. Therefore, under such circumstances, there is a need for careful deliberation with respect to proper crop selection based on agro-climatic suitability and levels of consumption of inputs like fertilizers, pesticides and irrigation water. Land reforms and land tenure systems also have an impact on agricultural productivity. The soil resource maps prepared by the National Bureau of Soil Survey and Land Use Planning (NBSSLUP), Nagpur and GIS data are not of much use at the ground level."[13] Thus, data collection at the grass-root level is an immense necessity. Institutional reforms such as strengthening of market, credit and pricing, accelerated goal-oriented research and technology transfer for horticultural development need greater focus.[14]

4. BIODIVERSITY

4.1. Indigenous People / Local Communities

The ASAPCC has focused on preservation of bio-diversity in order to tackle climate change. The ASAPCC includes an area where the focus is on "*Building Climate Resilience of Forest Based Livelihoods*". The Government has proposed various plans under. However, on a general note, one of the crucial stakeholders, who have not been dealt in greater detail in this action plan, are the indigenous people (or local communities). Albeit, the documentation of indigenous knowledge and community based flood management strategy have been dealt up to certain extent but wider amplitude of attention was necessary as regards the same. Especially in reference to biodiversity, no focus has been laid upon the development of **Bio-Diversity Tourism** in which the local communities can be involved to a great extent. This step can tremendously boost the revenue generation of the state and help in the sustenance of the local and forest dependent communities. At the same time this will ensure preservation and protection of bio-diversity while actively involving the local communities in the process.

4.2. Traditional Knowledge and Practices

The involvement of the local communities in the entire process is very necessary and has been taken care of to an extent in the plan. However, incorporating or bringing into effect

13 S. P. Ghosh, "Carrying Capacity of Indian horticulture", CURRENT SCIENCE, Vol. 102, No. 6, p.891, available at <http://indiaenvironmentportal.org.in/files/file/horticulture_1.pdf> (last accessed on December 25, 2015).

14 *Ibid*, p. 893.

and encouraging **traditional knowledge and practices** of such communities which are environmentally friendly and help in tackling climate change has not been included in the part specified for "bio-diversity". This can probably be included as it can create a connection between the preservation of bio-diversity and the local communities by which they can identify themselves to the entire process of preservation and protection of bio-diversity and play an active part in it.

4.3. Monitoring of Micro-Plans

The ASCCAP further focuses on linking up micro-plans with working plans. This is a very necessary and essential step in the entire process of dealing with climate change. To strengthen it further, it is necessary that an authority be designated with the function of keeping a check on such link ups and coordinating and monitoring of it. Further, as the plan focuses on a wide range of areas, it is necessary that the coordination of all such micro-plans and working plans take place efficiently and effectively.

5. ENERGY

5.1. Renewable Energy

The ASAPCC merely lays greater emphasis on quantitative aspect of power generation. The Action plan lays down the list of project for augmenting energy production. It merely mentions hydel, solar and biomass as alternative sources of energy. It neither delves in sketching an extensive strategy for promotion of renewable energy nor not knits any solutions for the hurdles in promotion of the same.

Reflecting on the statistics in the state action plan, renewable sources of energy (including biomass as a source) constitute only 6%. For a sustainable living, it is of dire need that this contribution is enhanced. *Renewable energy will create more jobs than other sources of energy - most of these will be created in the struggling manufacturing sector, which will pioneer the new energy future by investment that allows manufacturers to retool and adopt new technologies and methods*.[15] The ASAPCC can draw inspirations both at international as well as national level.

5.1.1. International

The initiatives of the European Community are an inspiration in this regard. The European Community (EC) in its resolution of June 21, 1989 on greenhouse effect and community recognized the threat of burning fossil and fuels and thus, came up with the Action

15 Jay Inslee, 23rd Governor of Washington, available at <http://www.foresightfordevelopment.org/talk-tive/renewable-energy> (last accessed on February 25, 2016).

Programme (Decision 89/364). This initiative of EC was towards humanizing the efficiency of electronic appliances. In almost every facets of International Law, European Union played an astounding role for bringing a guiding principle for all other nations throughout the globe. EC came up with policy in 1995. "The Action Programme for improving the efficiency of electricity use" in itself included several alternative means of reducing Green House Gases (GHGs) emissions by application of Solar, Photovoltaic, Geothermal and Nuclear energy.

The ASAPCC should make an effort to venture into the alternative forms of energy. However, in the landscape of Assam, the potential hurdles in encouraging renewable energy cannot be over-looked :-

- Socio-economic conditions;
- Topography; and
- Climatic Conditions.

Given the fact that, "*For North, the energy is comfort factor but for South is a basic necessity*".[16] Energy creation from renewable sources for the state of Assam will be a costly affair. Furthermore, the climatic and geographical knitting of the state is of such nature that, it facilitates way for solar energy (limited), biomass and hydropower. The state action plan should venture into feasibility of bio-fuels and the possibilities of exploiting nuclear energy (Meghalaya has good deposits of uranium which if exploited in a feasible manner might address concerns of quality, quantity and cost concerns of energy production in the state).

5.1.2. National

Given the fact that, the state is of agrarian nature; encouraging bio-fuels might serve a sweetener to address the concerns of both these sectors. The state action plan should venture into feasibility of bio-fuels as well. Given the fact that, the state is of agrarian nature; encouraging bio-fuels might serve a sweetener to address the concerns of both these sectors.

The State Action Plan on Climate Change of Kerala[17] can be a guiding light in this aspect. Though the state harnesses 71.29 per cent of its power from hydel sources and the remaining from thermal, the action plan lays a strong emphasis on the exploitation of other sources of

16 As said in the paradigm of International Human Rights Law. North herein makes a reference to the developed countries and South means the underdeveloped/ developing countries. Vide Basak, Chiradeep, "The Analysis of Climate Change from two-fold view of the Efficient Energy optics: A succinct glance into the International and National Paradigms", Essay (Unpublished 2012), National Law University, Delhi, p. 05.

17 Department of Environment and Climate Change, Government of Kerala, "Response to Climate Change: Strategy and Action - State Action Plan on Climate Change, Kerala" available at <http://www.indiaenvironmentportal.org.in/files /file/kerala%20state%20action%20plan%20on%20climate%20change.pdf> (last accessed on February 25, 2016).

energy. It prposes that blending of biofuels can be blended with conventional fuels up to 10-20 per cent without any change in the existing engine technologies. It proposes promotion of non-edible oil bearing species from forests or agro forestry resources which can serve as a double edged sword – provide biofuels and promote agro forestry. It also pilots popularisation of biomass for domestic use as well as power generation.

The Kerala State Action Plan for Climate Change also tries to address the concerns associated to hydro power projects, something which should be taken into strong consideration:-

> *Though most clean in carbon economics terms, the green nature of the hydel power is contested for the forest submergence involved in generation projects.* ***Technologies and scales need to be leveraged for improving hydel opportunities of the state on a sustainable basis. This may include improving the capacity utilization of the existing projects, avoiding submergenc by rationalizing the size and strong environmental protection components in the future proposals***.[18]

Furthermore, it emphatically mentions empowermnent of the people as a step towards energy efficiency. This is a noteworthy step in ensuring promotion of renewable sources of energy.

> *The Energy Management Centre in the state has been spearheading the National Mission on Energy Efficiency. Agency for Nonconventional Energy Resources and Technology has been working for the National Mission on Solar Energy. A Total Energy Security Mission has been working at Local Self Government level. A coordinated approach for all these activities will be taken for* ***capacity building of communities on energy conservation and generation and use of available opportunities for non-conventional energy***.[19]

While promoting Renewable Energy, one of the principal concern of that the ASAPCC should take into consideration is the *market competition.*

> *Renewable energy technologies have difficulty competing in a restructured competitive environment, where fossil fuel generators enjoy many advantages and subsidies. For example, arrangements for the transmission of electricity do not allocate the full costs of transmission according to the location of generators and users. Co-generators are disadvantaged when transmission losses, incurred as a result of long-distance transmission, are averaged to the advantage of remote generators and consumers. This approach prevents the market from signaling that electricity generators should be located near their consumers, thereby reducing the cost of generation and reducing greenhouse gas emissions. Remote users also do not get the message that they should value more efficient use, or switch from grid supply to renewable remote area power supply systems*.[20]

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18 *Ibid*, p.18.

19 *Id*., p.19.

20 Rosemary, Lyster and Bradbrook Adrian, ENERGY LAW AND THE ENVIRONMENT (Cambridge University Press, 2006), p.115.

Market regulation in the light of the Competition Act 2002 should be given a due place in the state action plan so as to encourage investors to invest in Renewable Energy sector. China stands as a noteworthy example to this. Studies show that, China with its combination of high load growth, environmental concern, and difficulty in attracting capital have made all efforts to incorporate energy efficiency as an essential part of any strategy for minimizing the future costs of the Chinese electricity system. The legal framework should be of such nature that it conveys the necessary powers and duties, as well as providing for an adequate budget and separation from political and corporate influence. The enforcement regime must be sufficient to deter illegal or anticompetitive conduct. The officials must be competent and dedicated, and training must be available to professional staff. [21]

5.2. Re-evaluating Electricity Act 2003

The ASAPCC makes an obsolete reference to **the Electricity Act 2001** for power generation, transmission and distribution. It is pertinent to note that, the legislation under action in **the Electricity Act 2003.**

Section 8 (2) of the aforesaid Act is with regard to Hydro Electric Power Generation :–

The Authority shall, before concurring in any scheme submitted to it under sub-section (1) have particular regard to, whether or not in its opinion, -

(a) The proposed river-works will prejudice the prospects for the best ultimate development of the river or its tributaries for power generation, consistent with the requirements of drinking water, irrigation, navigation, flood-control, or other public purposes, and for this purpose the Authority shall satisfy itself, after consultation with the State Government, the Central Government, or such other agencies as it may deem appropriate, that an adequate study has been made of the optimum location of dams and other river- works; and

(b) The proposed scheme meets the norms regarding dam design and safety.

The provision does not make an emphatic mention of Environment Impact Assessment (EIA). Under the schedule of EIA Notification 2006,[22] River Valley Projects fall under both Category-A and Category-B as follows :-

CATEGORY - A	*CATEGORY - B*
(i) ≥ 50 MW hydroelectric power generation; *(ii) ≥ 10,000 ha. of culturable command area*	*(i) < 50 MW ≥ 25 MW hydroelectric power generation;* *(ii) < 10,000 ha. of culturable command area*

21 Bradford, Peter A., "Some Environmental Lessons from Electricity Restructuring", THE LAW OF ENERGY FOR SUSTAINABLE DEVELOPMENT (IUCN Academy of International Law) (Cambridge University Press, 2005), pp. 412-413.

22 Under sub-rule (3) of Rule 5 of the Environment (Protection) Rules 1986.

It is suggested that, a firm mention of EIA should be made in the aforesaid provision. Ambiguous usage of phrases such as "adequate study" leaves scope for misuse. The "adequateness" should be clearly and emphatically elaborated upon by making a clear reference to EIA.

5.3. Informed Decision Making

Energy has to be understood in the sense in a approach which address these requirements in togetherness :-

i. Generation and sustainability;
ii. Availability and conservation

As mentioned in the plan itself the transmission and distribution loss in the year 2013-14 was 26.3 per cent, which was lower on comparing with loss suffered in the years 2011-2012, which was around 30 per cent. The essential thing here to point is that action plan has elaborately discussed about future course of government in the field of production of energy, however it nowhere discussed the possibility or even the minutest initiative to **conserve the existing available** energy. For instance the above mentioned stats unravels potential area to invest in the manner that the transmission and distribution of loss can be reduced energy can be conserved further directed in productive use.

The market is consumer driven. Scholars have concluded that :-

> *Consumers who lack access to information about the market are not likely to focus on environmental problems, like global warming, which may not manifest themselves for decades. The real cost of purchasing electricity is probably ignored in making current purchases in a competitive environment. It almost certainly goes without saying that the greatest risk associated with an electricity market focused on the cheap price of power is that demand will increase, therefore increasing generation and greenhouse gas emissions. Where demand increases, generators will also evaluate the relative costs of rehabilitating and using older, more polluting generating facilities, compared with constructing new, more sustainable, capacity*.[23]

The ASAPCC should also lay a focus on ensuring that consumer is encouraged to take an informed decision.

6. VULNERABILITY

6.1. Indigenous People

The Indigenous communities of Northeast India are in several ways victims of the certain policies, lacking a significant, sovereign voice within the domestic political structure. One cannot deny the significance of rampant mining and deforestation in this region of India. The

23 *Supra* n. 20.

massive deforestation of such lands has led to the indiscriminate destruction and ejection of indigenous communities from their lands, as well as episodes of violence reminiscent of what happened in India. We learn from our past experiences. Therefore, indigenous peoples should get special attention as one of the vulnerabilities of this action plan.

This contention is on the basis of the following notions :-

- Indigenous people around the world are at the risk of adverse impacts from global climate change;[24]
- According to International Declaration of Indigenous Peoples on Climate Change, the cultures of the indigenous peoples, their territories under their stewardship, are now the last ecological mechanisms remaining in the struggle against climate devastation; [25] and
- There is no doubt that all peoples of this planet owes a debt to Indigenous peoples for the beneficial role their traditional subsistence economies play in the maintenance of the planet's ecology.[26]

At the outset, it sounds quite compassionate and benevolent but the major challenge is in application of the same. These are some of the proposals for the safeguard of these vulnerable groups :-

- The state machinery should not be shortsighted in policy framing. The state of Assam should effectively adopt Mineral Foundation Framework as per Mines and Minerals (Development and Regulation) Amendment Act 2015. Despite the questions over the significance of this new framework law, its implications on invocation, investment and best practices, the distinctiveness of District Mineral Foundation cannot be disregarded;
- The state needs to identify the existing regulatory loopholes in the environmental sector by close monitoring mechanisms. The proposed mechanism of royalty under District Mineral Foundation (DMF) should not discard the concept of equity;
- Direct and full participation of indigenous peoples without any form of discrimination, in the development of the state. In order to ensure the same, the action plan should have emphasized on the protection and promotion of a wide range of indigenous peoples' rights, *viz*., land rights, rights of the laborers, socio-

24 International Declaration of Indigenous Peoples on Climate Change 2000.
25 *Ibid*.
26 *Id*.

economic as well as cultural rights, self-governance, and political representation; and

- There should be a well-designed consolidation of land for advancement of natural resources based employment generation for the indigenous communities in the State of Assam.

6.2. Habitat / Natural Resources

Going with the definition of vulnerability, as cited by ASAPCC, encompasses variety of concepts including sensitivity and susceptibility to harm and lack of capacity of cope and adapt. The assimilative capacity of the natural resources is something, which has been under the radar of climatologist and scientist for quite a long time.

For example, the present condition of *Deepor Beel* is very grim. This Ramsar site is one of its kinds in Northeast India. Last year, National Green Tribunal directed the state to submit a status report as regards the current situation of this wetland. A natural heritage, which turned into a solid municipal solid waste dumping ground, doesn't reflect a virtuous picture of the state. This is to keep in mind that all these natural resources, commons; heritage sites are belonging to none. As commons, it is state, which should act as a public trustee and ensure the protection of these resources from degradation and exploitation.[27]

7. FORESTS

The state of Assam has a substantial forest cover of 37.1 per cent of the total geographical area, which is a little over the national goal of 33 per cent. The state has an elaborate network of protected areas such as national parks, sanctuaries and biosphere reserves, which includes the only thriving population of the one horned Asiatic rhino. However, a substantial percentage of the population is dependent on the forests for their livelihood and daily needs, which is leading to rapid deforestation, with only 5 per cent of dense forests remaining in the state. The hilly areas are facing the problem of dense rainfall which results in extreme soil erosion, whereas the plains are experiencing longer dry spells. This coupled with the pressure that has been put on the ecological system due to archaic agricultural practices like *Jhum* cultivation, points towards the need for immediate steps to reserve this trend of environmental degradation.

The ASAPCC focuses on tackling the problem of forest reduction in the following ways:-

i. Reducing degradation and deforestation

- Closure of areas with promising regeneration of root stock of natural species;

27 *M C Mehta v. Kamal Nath* (1997) 1 SCC 388 : (1996) Supp. 10 SCR 12.

- Regeneration of 5000 Ha Open forests with fencing and 5000 Ha of moderately dense forests;
- Safeguard against encroachment in highly sensitive areas; and
- Procurement of areas surrounding Protected Areas.

ii. Improving Carbon sequestering capacity of forests

- Promoting alternate sources of energy through Solar energy plants; and
- Creation of Biogas plants.

iii. Compensation to affected communities.

It has been observed from the document that the responsibility for implementation of the varied and numerous programs have all been allotted to the Department of Forests. However, the range of plans that need to be implemented are of a highly diverse nature, and allotting all responsibilities to the Department of Forests may lead to overburdening of the department, as they already have numerous functional responsibilities. The "*Seuji Assam Achoni*" plan, as implemented by the government of Assam in the year 2007-08, should be reinforced under the Green India Mission prioritising habitat building and afforestation.

The major burden on the forest resources stem from the use of Forest produces as fuel. However, it has been observed from the plan that the allocation of funds for promoting alternate sources of energy in Forest Village communities is minimal. We suggest that the allocation of funds for this purpose be increased substantially.

Assam faces a problem of environmental degradation in the state border areas due to archaic agricultural practices like Jhum cultivation. We suggest that the **Sustainable Land and Ecosystem Management in Shifting Cultivation areas of Nagaland for Ecological and Livelihood Security** as formulated by the United Nations Development Programme (UNDP) should be taken as a reference point to devise and implement a similar plan targeted towards the State of Assam.

We suggest that the state comes up with a comprehensive design for implementing the process of Carbon Sequestration as mentioned in the plan, as there has been no mention of any specific in regards to the same.

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