

AN EVALUATION OF INDIA'S NATIONAL ACTION PLAN ON CLIMATE CHANGE

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Abstract

This project develops a broad-stroke analysis of the *design* of India's climate missions of the National Action Plan on Climate Change. The study is based on interviews of experts in particular domains who also understand climate change. The broad crosscutting issues relating to these missions as well as their individual strengths, challenges and weaknesses, as evaluated by the experts, are presented in this report. Detailed qualitative assessment cards have been developed separately for the individual missions and are included in the annex. The study aims to provide policy makers, academics and researchers, civil society groups and others a snapshot of the climate missions as perceived by the experts in the country at this time. It is hoped that the outputs will inform the government so that appropriate mid-stream corrections may be made. The results of the study will also be useful to hone the country's strategic thinking on long-term economic development in the context of climate change.

Acknowledgements

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Introduction

Project Description and Goals

This project evaluates the design of the eight missions of the National Action Plan on Climate Change (NAPCC). Similar criteria have been used to study all the missions, a strategy that enables a reader to review them individually and across the board for any single criterion. By and large, the scope of the project has been limited by the principles laid out in the Prime Minister's Council document that was published in 2008.

The purpose of this exercise has been to produce an overall assessment of the design of India's climate missions based on interviews of experts in particular domains who also understand climate change and/or specific aspects of the missions. The study aims to provide policy makers, academics and researchers, civil society groups and others a snapshot of the missions as perceived by the experts in India at this time.

The authors hope that the outputs would enable the government to make appropriate corrections when they undertake mid-stream reviews. The results of the study would also be useful to the future design of climate policy, relating to mitigation as well as adaptation, in specific

areas in India. The challenge of climate change is here to stay with us for decades, if not longer, and for many generations to come. India and the rest of the global community will have to continue to develop climate-friendly policies to reduce emissions and address development concerns and simultaneously adapt to living in a world whose climate will be distinctly different from that of the last century. The authors believe that this document provides some constructive insights into the country's initial attempts at setting climate policy and expect these observations to be useful inputs for putting in place a long-term strategy for sustainable economic development for India. Some broad criteria to evaluate the implementation of these policies have also been developed, although it is still too early to carry out this exercise.

The findings that are reported in this study are consolidated summaries of expert interviews as interpreted by the authors, with some guidance from an Advisory Committee. The methodology is explained in the next section of the report. Details on the experts and Advisory Committee members are given in Annexes 1 and 2.

Context

India has been under pressure to develop a robust climate policy that addresses its rising greenhouse gas emissions that are likely to accompany its impressive economic growth. The way the world sees it, as development benefits reach a large number of the country's poor, they too will potentially add to rising global emissions as a result of their improved energy services and lifestyles. At the same time, climate change is expected to affect India's agricultural sector, the pattern and intensity of rainfall, and the availability of freshwater, mostly all in adverse ways. These changes and others would lead to a number of effects that could include erosion of the long coastline and have damaging impact on forests, health and livelihoods.

A guiding national strategy that addresses India's development concerns and mitigation and adaptation challenges is therefore important and this was the framework that was laid out in the *National Action Plan on Climate Change, Prime Minister's Council for Climate Change, Government of India (2008)*. The approach as described in this document has been widely expected to lead to a directional shift in India's development pathway. Thus India's climate strat-

egy would promote the country's development objectives and, at the same time, yield co-benefits that address climate change. The NAPCC states that it is guided by the following principles:

- To protect the poor and vulnerable sections of society through an inclusive sustainable development strategy that takes climate change into account;
- To achieve national growth objectives with a distinct change in direction that enhances ecological sustainability, while reducing greenhouse gas emissions;
- To devise efficient and cost-effective strategies for end use demand side management;
- To deploy appropriate technologies for adaptation and mitigation of greenhouse gas emissions;
- To engineer new and innovative forms of market, regulatory and voluntary mechanisms to promote sustainable development;
- To implement programmes through unique linkages as required with civil society, local governments and through public-private-partnership; and
- To welcome international cooperation for research, development, sharing and transfer of technologies supported by additional funding and a global Intellectual Property Rights regime that facilitates technology transfer to developing countries.

The eight missions listed below are therefore expected to advance India's development and define its approach to climate mitigation and adaptation while satisfying the above stated principles:

1. National Mission for Sustainable Agriculture (NMSA);
2. National Mission for Enhanced Energy Efficiency (NMEEE);
3. National Mission for a Green India (GIM);
4. National Mission on Sustainable Habitat (NMSH);
5. National Mission for Sustaining the Himalayan Ecosystem (NMSHE);
6. National Mission on Strategic Knowledge for Climate Change (NMSKCC).
7. National Solar Mission (NSM); and
8. National Water Mission (NWM).

Individual ministries and agencies have developed the mission documents, which have subsequently been placed on their respective websites.

Methodology

A set of criteria for the evaluation of the design of the missions was initially defined. Since there are no global benchmarks for climate policy, we adopted a process of expert interviews with an approach that can be described as a modified Delphi method. The team, comprising the authors and the Advisory Committee, identified at least four, and generally up to six, experts in each of the domains. These were individuals proficient in their respective fields with a good understanding of the climate mission. One or more members of the research team spoke to each expert at length, generally in face-to-face meetings, except in a few cases where such meetings could not be easily arranged, when they were interviewed over the phone. While most comments presented in the assessment cards remain focussed on the mission, some of them are comments on gaps in the domain as they relate to the particular climate mission. An alphabetical listing of experts is provided in Annex 2.

The criteria used for evaluating the design are described below. In the course of the interviews there were also some general comments on the missions by the experts and when these were relevant they were included in the results.

1. **Goals and Targets:** Has the mission been defined ambitiously bearing in mind the challenges and the complexity of the domain? Comments were also in-

vited on sustainability, co-benefits, targets, timelines, process, low-carbon pathway, and realistic possibility of achieving goals. (Delete were also invited)

2. **Mission ambition and consistency with NAPCC principles:** The experts were asked to comment on the mission's design in relationship with the seven principles laid out by the PM's Council.
3. **Technology Features:** Appropriateness, cost-effectiveness, and other aspects were examined.
4. **Institutional Mechanisms:** New policies, regulations, management, organisational arrangements, capacity, synergy with other missions were examined.
5. **Financial Instruments:** Clarity was sought on amounts, purpose, route of funding, sufficiency, cost effectiveness and capacity to absorb funds.
6. **Collaborations and Partnerships:** Experts were asked to comment on the extent to which the mission would be able to identify and promote opportunities for leveraging funds internationally, promoting partnerships for knowledge and its ability to respond to policy shifts resulting from international climate negotiations.
7. **Challenges to Implementation:** Given the structure of the mission and the domain, and the prevailing and proposed institutional arrangements, experts were asked to assess the likely challenges to implementation.

Interview results were written up and then analysed for the points they made. Following some editing, checking for veracity and contacting experts again in some cases for clarity, assessment cards were developed. A serious attempt was made to keep comments constructive and focussed on the issue at hand.

A small Advisory Committee, whose members are listed in Annex 2, guided the process. On 7 June 2012, a roundtable discussion on the Draft Report was organised at the Economic Advisory Council (PMEAC) of the Prime Minister by Dr. K.P. Krishnan, Member Secretary, PMEAC, and chaired by Dr. C Rangarajan, Chairman, PMEAC. Government officials from each of the missions were present at the roundtable and offered some comments. These comments were later integrated into the final report.

Key observations and tensions that run through the policy

Several of the experts we interviewed voiced certain broad thematic observations about all the missions. In their view, the context, pressures and challenges in developing the national climate policy have resulted in certain tensions that run through the missions.

The authors and the experts interviewed recognise and hope that the mission designs will be dynamic and will be revised with the learning that comes from implementing the programs. Our study concentrates on the design of the mission; while the implementation methodology has been developed it is still too early to evaluate the implementation of the climate missions.

- *Broad goals or focussed?* Will the mission encompass a broad domain or will it be focussed? Water, Green India and Agriculture are large areas that are embedded in existing development debates. As a result, missions in these domains would call for dealing with long-standing difficulties and the setting of priorities among different needs. Perhaps strategic choices could have been made using the principles laid out at the outset by the PM's Council as a guide. These missions do not, however, demonstrate such a prioritisation, which could then lead to a striking directional shift in the development pathway. The Solar and Energy Efficiency missions, on the other hand, are sharp, clear and relatively focussed. In the Green India and Water missions, where there have been problems for decades, we cannot expect to solve all the problems through a climate mission. Yet again, the Himalayan and Strategic Knowledge missions are broad (cross-sectoral) while attempting to respond to singular goals. This raises the question: Would it not have been better to have smaller and more focussed missions? For example: a mission to improve efficiency of urban water use, or a mission to replicate some successful models of sustainable agricultural practices in a particular agro-climatic zone, or a mission to expand non-motorised transport in 5 pilot cities.
- *International or domestic aspirations?* Are the missions designed to fulfil international or domestic aspirations or both? The answer to this varies from one mission to another. For instance, the National Solar Mission is a relatively new area and one where it appears that the country would like to make a mark internationally and demonstrate its commitment to addressing climate change.
- Do the missions primarily concentrate on *principles* or do they establish clear strategies and specific modalities for implementation? While there is some tension here, it varies among missions and sometimes in different parts of the same mission document. Green India Mission is a good example of the former and the Mission on Enhanced Energy Efficiency an example of the latter.
- *The current or the future?* The country needed to take action to relieve international pressure, but this was not mandatory since India is a non-Annex 1 country. At the same time, if something is already part of the NAPCC we cannot receive credit for it. One expert refers to this as the “*tension between the current and the future*”. How should one draw a line between climate policies and development actions that have a climate benefit? The policies recommended will lead to avoided emissions, but there are no clear emissions reduction targets in the missions. Generally, there is therefore no mention of the level of mitigation or abatement expected in describing the climate action plans. Since the missions are expected to describe development strategies with climate as a co-benefit, it would have been helpful to clearly identify activities for which a climate benefit is accrued.
- *What is the co-benefit?* The emphasis of India's overall climate policy is expected to be sustainable development with a reduction in greenhouse gas emissions, or mitigation, as a co-benefit. But one of the main criticisms by experts is that sustainable development goals

and targets have not been specified clearly or even prioritised in all cases. Thus for example, off-grid solar is not the focal point of the Solar Mission, which would have provided lighting for those that have poor connectivity or no grid connection; the Sustainable Agriculture Mission does not make low-chemical practices its leitmotif, which would be needed for sustainable development and at the same time reduce greenhouse gases among other gains. The development targets of the eight missions are not prioritised with clear sustainable development-focussed approaches and outcomes if these are indeed the focus of the NAPCC.

- *What is the big picture?* The development of a climate agenda for India requires long-term step-wise planning that would go over many Five Year Plans. One good starting place might have been a long-term big picture from which medium-term goals and plans and then missions could have been derived. The current process and the design of the missions do not suggest that there is a long-term plan in place. Even integration among the missions was thought to be missing by most experts. For instance, one persistent question regarding the missions was: Where will all the land come from for expanding agriculture, Green India and Habitat?
- *Listing everything or strategies and focus?* Many of the mission documents read like a wish-list from which little has been left out. While this results in material that appears to please everyone, taking such a course sacrifices focus and clear strategies. Such an approach would make it difficult to point fingers at gaps, but would it lead to getting things done or will it be business as usual? Several experts raised this question.
- *Planning document or mission?* Much of the structural unevenness described in the previous points has led to some predictable problems. In large domain areas, little or no attempt has been made to take on seriously some of the deeply embedded challenges, for example, removing environmentally destructive subsidies for chemical fertilisers. As a result, the mission document is no different from the usual planning document with a few points on climate thrown in. Experts referred to this as reflecting a business-as-usual mind-set and suggested that narrower, clearer priorities and strategies would have helped in such cases.

- *In silos or cross-cutting?* The fact that these missions were placed in eight separate bins has in itself led to viewing the problems and solutions with sector-specific lenses. This has raised concerns about the ability of different missions and even different divisions within some ministries to implement the policies. Another outcome is that there is little synergy among the missions, which are still being viewed in terms of portfolios of ministries operating in different domains. There is mention of the need for working across missions in various places, but with few insights about how this would actually be accomplished.

A cross-cutting approach is far more desirable, but would likely have posed implementation challenges within existing ministries. In contrast with India, some other countries are addressing climate policies by setting up independent councils with authority to oversee the work and combining this approach with the establishment of new institutional structures and mechanisms that cut through existing ministerial structures.

The multi-dimensionality of climate impacts makes it vital that India adopts a completely new approach that is interdisciplinary in its character, breaks traditional ministerial boundaries, and learns rapidly from successes and failures. Unless the country is able to do these things, our goals and aspirations for ‘climate-proof’ development will not be attained.

Implementation

Initially, this study was expected to include an evaluation of implementation. But given that implementation has not really proceeded at the expected pace, the Advisory Committee and the research team were of the opinion that such an evaluation of implementation should probably be initiated only after 2014.

The broad criteria for evaluating the implementation were identified. The further conclusion was that implementation would need to be evaluated at the central, state and local levels. It would have to involve central, state and local government bodies including civil society groups and communities as necessary for each mission. The evaluation at these various levels would have to proceed based on what has been accomplished for each of the missions. Furthermore, details on the local-level agencies that should be included would become clearer as the implementation process moves forward.

Main strengths, challenges and weaknesses of the missions

In this section some of the main strengths, challenges and weaknesses for each of the missions, have been listed. This is not a comprehensive inventory and the Assessment Cards in Annex 3 and this list should together provide a full picture.

Agriculture

Strengths:

There is some recognition of the problems the country faces and understanding of how these will be exacerbated by climate change.

Potential Challenges:

- Weak agricultural extension services and insufficient credit and insurance availability to poor farmers, already a big challenge, will worsen if not attended to as warming intensifies;
- New regulatory frameworks to address climate change are missing, and capacity is lacking in key positions and in institutions responsible for implementing agricultural policy.

Weaknesses:

- The mission on sustainable agriculture does not address the needs and challenges of marginal and poor farmers;
- Identifying and scaling up successful sustainable farming practices in different agro-climatic zones is vital to address food security and for tackling climate change—these elements are missing in the mission design;
- The mission fails to address fuel and fertiliser shortages in farming;
- The entire approach appears to be similar to past policies without recognition of the urgency of the problems in the agricultural sector, which will only be exacerbated by climate change.

Enhanced Energy Efficiency

Strengths:

- Innovative mechanisms have been introduced, such as Perform, Achieve and Trade (PAT), which set targets for reduction of specific energy consumption of Designated Consumers (large-scale industries), and the Super-Efficient Equipment Programme (SEEP) under Market Transformation for Energy Efficiency (MTEE);
- The promotion of Energy Service Companies (ESCOs) through the provision of dedicated Energy Efficiency Financing Platform (EEFP) is an important element;
- A fair amount of progress on PAT has already been achieved, together with the establishment of the Partial Risk Guarantee Fund (PRGF) and Venture Capital Fund for Energy Efficiency (VCFEE) under the Framework for Energy Efficient Economic Development (FEEED).

Potential Challenges:

- It may be difficult to achieve substantial improvements in energy efficiency in a situation where there are no targets either at the national or state levels;
- There is a serious lack of capacity in research (both public and private) and difficulty in obtaining finance for promoting energy efficiency across various sectors;
- Several infrastructural bottlenecks need to be addressed, even as complex technologies are deployed in various industries in order to achieve significant energy efficiency improvements.

Weaknesses:

- The energy sector has been on a low carbon pathway for the past 20-30 years, and this mission brings little novelty to the sector;
- The mission's is too narrowly focussed on end-use energy efficiency in particular sub-sectors, rather than on improving efficiency across the energy system as a whole, including high grid losses, thereby missing an opportunity to be ambitious;
- PAT currently targets only large scale manufacturing industries, while smaller scale industries which may be more polluting are not directly affected by the scheme.

Green India

Strengths:

- There were several consultations that led to the final design of the mission;

- The mission describes a 'reform agenda', which if implemented, could bring institutional and regulatory reform in local community institutions;
- The mention of landscape-level institutions and the introduction of learning sites are good developments in this mission.

Potential Challenges:

- The mission should not be reduced to a plantation programme when implemented;
- Issues of land availability and land ownership need to be resolved through fair means in order to achieve the goals;
- The experience and learning on forest regeneration by local people should be properly utilised;
- Decentralisation and implementing the reform agenda in a reasonable and timely manner could prove difficult.

Weaknesses:

- The mission does not address the ongoing and contentious issue of reducing the rate of forest diversion.

Sustainable Habitat

Strengths:

- The mission attempts to understand how future land use changes can take place along a low carbon pathway;
- There are good linkages with existing schemes such as Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and city sanitation plans, without creating separate bureaucracies.

Potential Challenges:

- Protecting the transport and housing needs of the vulnerable and poor will be an increasing challenge given the growing strength of vested interests;
- Integrating bus systems and metro projects with urban housing, urban population needs, infrastructure planning and design are complex and path-dependent;
- There is insufficient capacity among officials involved in the implementation of the mission;
- Working in conjunction with other projects of the Ministry of Urban Development (MoUD) will be challenging, as will coordination with various other ministries, especially the Ministry of Power (MoP) and Ministry of Housing and Urban Poverty Alleviation (MoHUPA), both of which are important for achieving the mission goals;
- Designing incentives (fiscal and non-fiscal) and rules for implementation of the mission.

Weaknesses:

- There is no attention paid to the poor and vulnerable in the two important sections of the document on urban transport and planning;
- Demand-side planning should have been emphasised, e.g., in the context of energy efficient buildings, water use and accessibility.

Sustaining the Himalayan Ecosystem

Strengths:

- The mission recognises the importance of the Himalayas in sustaining the a large number of people and serves as an opportunity to promote a mountain-driven rather than plains-driven approach;
- The establishment of a database on existing research outputs on the Himalayas will be valuable.

Potential Challenges:

- It could be difficult to implement uniform laws, regulations and policies across the entire Himalayan landscape;
- It may be difficult to ensure that there are coherent policies with other countries that share the Himalayan ranges.

Weaknesses:

- There is inadequate attention to establishing research programmes on the unique and vastly diverse ecosystems and matrix of microclimates of the Himalayas;
- There is a lack of focus on issues which affect the vulnerable and the poor directly, such as forest degradation, the impact of dams and natural resource depletion;
- There is not enough emphasis on promoting indigenous and community-led management of natural resources.

Strategic Knowledge

Strengths:

- The mission invests in people and research for the long-term and addresses the dearth of open-ended research;
- Initiatives to make data accessible to government and non-government organisations are being undertaken.

Challenges:

- The Department of Science and Technology is not geared towards interdisciplinary research, which is essential to address climate change.

Weaknesses:

- Other missions discuss their strategic knowledge requirements, without linking them to the Strategic Knowledge Mission which in turn has an architecture that does not clearly connect it to the other missions;
- Due to the multidimensional impacts of climate change, knowledge gaps exist in many domains including in an understanding of climate vulnerability, social and economic impacts and appropriate ways to build resilience, but the mission concentrates on science and technology.

Solar

Strengths:

- The mission has raised the ambition of solar for individual states and the country as a whole;
- Renewable Purchase Obligations (RPOs) and use of reverse auction to allocate projects has brought in a fair degree of transparency and accountability to the process;
- A substantial amount of work on the mission has already been achieved in Phase – I (bidding on projects, setting up of industry and research advisory councils, commissioning of solar projects).

Potential Challenges:

- Competition from China in the area of solar manufacture will likely be a challenge, particularly due to the lack of an enabling policy within India (e.g., no duties for importing cells and modules, but manufacturing them locally attracts the same);
- Research capacity needs to be substantially enhanced in order to make India a global leader in solar energy;
- There need to be sufficient safeguards to prevent the proliferation of spurious suppliers and low quality products.

Weaknesses:

- There is not enough emphasis on targeting off-grid potential which could have served the poor and vulnerable, thereby achieving development benefits;
- There is a failure to incorporate learning from successful schemes of the past, such as the solar water heater financing scheme of the Ministry of Non-Conventional and Renewable Energy, which led to a boom in the sector in Karnataka and Maharashtra in the 1990s.

Water

Strength:

- A major strength is the goal of the mission, which affirms the need to build a comprehensive water database in the public domain.

Potential Challenges:

- To be successful, the mission should be led by interdisciplinary experts, which is not how the ministry is currently set up;
- There is need for coordination among the various institutional structures such as the Central Water Commission, Central Ground Water Board and National Rainfed Areas Authority and these should be systematically integrated with the work plan of the Ministry of Water Resources;
- Large-scale capacity building and distributed authority between the Centre and states is needed to successfully implement the mission.

Weaknesses:

- There is negligible integration with climate change and development concerns in the water sector;
- Demand management of water has not been prioritised;
- A systematic effort is needed to align the mission with the guiding principles of the NAPCC.

Annex 1: List of experts consulted

1. Chetan Agarwal, Independent Researcher, New Delhi
2. N. Balasubramanian, Center for Study of Science, Technology and Policy (CSTEP), Bengaluru
3. Jayanta Bandyopadhyay, Indian Institute of Management Calcutta, Kolkata
4. Saroj Barik, North-Eastern Hill University, Shillong
5. Anshu Bharadwaj, Center for Study of Science, Technology and Policy (CSTEP), Bengaluru
6. Ardendu Chatterjee, Development Research Communication and Services Centre, Kolkata
7. Ravi Chopra, People's Science Institute, Dehradun
8. Navroz K. Dubash, Centre for Policy Research, New Delhi
9. Sanjeev Ghotge, Centre for Climate and Sustainability Policy, World Institute of Sustainable Energy, Pune
10. Harish Hande, SELCO-India, Bengaluru
11. Ramaswamy Iyer, Centre for Policy Research, New Delhi (written comments)
12. Ashish Kothari, Kalpavriksh Environment Action Group, Pune
13. Pramod Krishnan (IFS), United Nations Development Programme, New Delhi
14. Anil Kulkarni, Indian Institute of Science (IISc), Bengaluru
15. Himanshu Kulkarni, Advanced Center for Water Resources Development and Management, Pune
16. Emani Kumar, ICLEI - South Asia, New Delhi
17. Sunita Narain, Centre for Science and Environment, New Delhi
18. Arabinda Mishra, The Energy Resources Institute (TERI), New Delhi
19. Anand Patwardhan, Indian Institute of Technology Bombay, Mumbai
20. V.K. Phatak, Mumbai Metropolitan Region Development Authority (MMRDA), Mumbai
21. D. Raghunandan, Society for Economic & Social Studies, Centre for Technology and Development, New Delhi
22. Usha Raghupathi, National Institute of Urban Affairs (NIUA), New Delhi
23. G.V. Ramanjaneyulu, Centre for Sustainable Agriculture, Secunderabad.
24. N.H. Ravindranath, Indian Institute of Science (IISc), Bengaluru
25. Aromar Revi, Indian Institute for Human Settlements (IIHS), Bengaluru
26. Dunu Roy, Hazards Centre, New Delhi
27. Ambuj Sagar, Indian Institute of Technology Delhi, New Delhi
28. Suman Sahai, Gene Campaign, New Delhi
29. Girish Sant, Prayas, Pune (expired in February 2012)
30. Girish Sethi, The Energy Resources Institute (TERI), New Delhi
31. Surya Sethi, Lee Kuan Yew School of Public Policy, Singapore
32. Devinder Sharma, Food Policy Analyst, New Delhi and Chandigarh
33. Eklabya Sharma, International Centre for Integrated Mountain Development (ICIMOD), Nepal
34. Daljit Singh, Prayas, Pune
35. S.P. Singh, HNB Garhwal University (Retd.), Dehradun
36. N. Sridharan, School of Planning and Architecture, New Delhi
37. K. Subramanya, Tata BP Solar India Limited, Bengaluru
38. M.S. Swaminathan, M S Swaminathan Research Foundation, Chennai
39. Rajesh Thadani, Centre for Ecology Development and Research (CEDAR), Dehradun
40. Himanshu Thakkar, South Asia Network on Dams, Rivers & People (SANDRP), New Delhi
41. Geetam Tiwari, Indian Institute of Technology Delhi, New Delhi
42. Juzer Vasi, Indian Institute of Technology Bombay, Mumbai
43. Shiraz Wajih, Gorakhpur Environmental Action Group, Gorakhpur
44. Sejal Worah, World Wide Fund for Nature, New Delhi

Annex 2: Advisory Committee Members

1. Ravi Chopra (People's Science Institute)
2. Navroz Dubash (Centre for Policy Research)
3. Usha Raghupathi (National Institute of Urban Affairs)
4. Ambuj Sagar (Indian Institute of Technology Delhi)
5. Girish Sant (Prayas; expired in February 2012)
6. Surendra P Singh (Retired, Garhwal University)
7. Shiraj Wajih (Gorakhpur Environmental Action Group)
8. Sejal Worah (World Wide Fund for Nature)

Annex 3: Assessment cards for the climate missions

1. National Mission on Sustainable Agriculture (MSA)
2. National Mission on Enhanced Energy Efficiency (NMEE)
3. National Mission for a Green India (GIM)
4. National Mission on Sustainable Habitat (NMSH)
5. National Mission on Sustaining the Himalayan Ecosystem (NMSHE)
6. National Mission on Strategic Knowledge for Climate Change (NMSKCC)
7. Jawaharlal Nehru National Solar Mission (JNNSM)
8. National Water Mission (NWM)

National Mission on Sustainable Agriculture (NMSA): Design Assessment Card

Goals and Targets
The goals are skewed towards big farmers and are technology-focused. The mission has numerous shortcomings: farmers were not involved in the design process; important issues such as crop diversity, non-farm incomes, ways to address fuel and fertiliser shortage, women and their rights have received inadequate attention. It is a business-as-usual document, with some language on climate change. The mission will not take us on a low-carbon development pathway since dependence on chemical fertilisers has not been reduced. The entire process should have instead identified effects as a result of warming for specific scenarios in each agro-climatic zone and then developed responses in a step-wise manner.
Consistency with NAPCC Principles
There is insufficient consideration of practices to promote sustainable agriculture. Resilience to specific effects of global warming such as floods and drought is ignored. Innovation is defined using a narrow market-driven lens and pockets of success in local farming, which are valuable in adaptation, have not been highlighted.
Technology Features
The mission is technology-driven, but questions remain on who will control these technologies and whether they will be affordable. There is little analysis of the appropriateness of the technologies and a lack of emphasis on farmer-to-farmer learning. The technologies recommended are likely to intensify the use of chemicals and increase greenhouse gas emissions.
R&D
Farm communities and their practical knowledge and needs have not been included in the R&D plans. The lab-to-land approach of the mission will benefit only large farmers at the cost of small farmers. There is a need to ensure that substantial research on the following topics is carried out: water-saving practices, water harvesting, biological diversity, soil characteristics, and practical knowledge-based innovations and strategies. Agricultural research and academic institutions need a sense of mission and entrepreneurship, but this is lacking in the mission design.
Institutional Arrangements
The need for new regulatory frameworks is not acknowledged or discussed: e.g., we need regulation of fertilisers and irrigation to reduce GHG emissions and an improved framework to regulate new genetically modified plants. Management and organisational arrangements are not discussed in detail; non-professionalism in key positions is a problem. Furthermore, practitioners are not included, the failings of state agricultural universities are ignored, and a business-as-usual discussion is presented with no explicit mechanisms for synergy with other missions.
Financial Instruments
The routing of funds is not clear. Funding will mainly go to technology products and practices. It could have been more cost-effective if successful farming models were studied for replication and scaling up.

Collaborations & Partnerships

The mission does not make it clear if leveraging funds would be possible. Net return to farmers through agriculture has been going down, yet knowledge sharing in general is not discussed, even though among South Asian countries such sharing is critical. What is needed is more transfer of knowledge and experiential learning from farmers to the laboratory. Although there is a platform mentioned for knowledge sharing between farmers and scientists, it is primarily through computer technologies. Trade and economic policies are and will likely be in conflict with agricultural policies and thus could lead to an increase in emissions.

Potential Barriers to Implementation

Major stumbling blocks to mission implementation are the absence of priorities, clear strategies, mechanisms for synergy and collaboration, and human resource capacity at various levels of implementation.

National Mission on Sustainable Agriculture (NMSA): Status Report on Implementation

Implementation

The NMSA is designed to be made operational by mainstreaming adaptation and mitigation strategies in on-going research and development programmes and in flagship schemes including the Rashtriya Krishi Vikas Yojana (RKVY), National Horticulture Mission (NHM), National Food Security Mission (NFSM) and National Agricultural Insurance Scheme (NIAS). As the NMSA is not a stand-alone mission, the Department of Agriculture and Cooperation does not feel the need to set up a Mission Directorate, at least for the time being.¹ Some flagship schemes have been recommended for expansion taking the NMSA into consideration. For instance, the Modified National Agricultural Insurance Scheme (MNIAIS) has been approved and takes into account some recommendations provided by the NMSA, such as the calculation of threshold yield.^{2,3} The Indian Council of Agricultural Research is undertaking the National Initiative on Climate Resilient Agriculture (NICRA) which seeks to scale up outputs both through Krishi Vigyan Kendras and the NMSA for wider adoption by farmers. Components of the NICRA scheme include strategic research on adaptation and mitigation for which institutions and research areas have been identified, and technology demonstration to cope with current climate variability in 100 vulnerable districts. A sum of Rs. 350 crores has been allocated for NICRA.⁴

¹ Personal Communication: Mr. Subrata Nath, Director, NRM/RFS National Resource Management & Rain-fed Farming System, Department of Agriculture and Cooperation, Government of India

² Crop Insurance Programme of GOI: Perspective of MNIAIS, presentation by Rajendra Kumar Tiwari, Jt. Secretary, Department of Agriculture and Cooperation, Government of India, www.syngentafoundation.org/db/1/935.ppt, accessed on 23rd May, 2012

³ Modified National Agricultural Insurance Scheme (MNIAIS) approved, Public Information Bureau, Government of India, 16th September 2012, <http://piib.nic.in/newsite/erelease.aspx?relid=65799>, accessed on 18th April, 2012

⁴ <http://www.nicra-icar.in/nicrarevised/>, accessed on 18th April, 2012

National Mission on Enhanced Energy Efficiency (NMEEE): Design Assessment Card

Goals and Targets
The mission goals are clear, but not sufficiently ambitious. Targets are more aligned with the Perform, Achieve and Trade (PAT) scheme. Complexities in the development and deployment of infrastructure and technologies are not considered. PAT could have been used to target peak power reduction, but it has been designed only to defray the cost of setting up a power plant. The Bureau of Energy Efficiency (BEE) and Ministry of Power (MoP) have been working on certain energy efficiency aspects even before NMEEE came into being. The mission could have specified state-level targets particularly to reduce their high grid losses.
Consistency with NAPCC Principles
PAT is designed for industry and the mission is not explicit about inclusivity. There is potential to reduce greenhouse gas emissions through implementation. Schemes developed under this mission include PAT for large industrial consumers and Super-Efficient Equipment Programme (SEEP), which is an innovative voluntary mechanism under Market Transformation for Energy Efficiency (MTEE).
Technology Features
Technology is embedded in facets of the mission, but the NMEEE is not directly technology-focussed. PAT and the Standards and Labelling programme are both market-based mechanisms and are expected to be cost-effective.
R&D
The mission focuses on energy efficiency and not on research. Research is, however, required to increase efficiency in many areas such as supercritical boilers and appliances. The government's role is to provide incentives and tighten benchmarks thereby encouraging private players to enhance their R&D.
Institutional Arrangements
New institutions such as Energy Efficiency Services Limited (EESL) have been set up. Organisational arrangements have been resolved to some extent, e.g., EESL was created to regulate Energy Service Companies (ESCOs), which is appropriate but not adequate. Two initiatives of the NMEEE have been introduced through ESCOs. Institutional arrangements are constrained by subsidies and other regulations. While the mission document per se does not specify synergy with other missions, some efforts are being initiated with the National Mission on Sustainable Habitat, especially on improving energy efficiency of buildings through building codes such as Energy Conservation Building Code (ECBC) and other mechanisms.
Financial Instruments
Funds are specified, but their routing is not entirely clear. One expert felt that better prioritisation would have improved decisions on funding and cost-effectiveness.
Collaborations & Partnerships
Opportunities to leverage funds are built into the design. Two funds have been set up and private funds are also accessed. Most of the schemes like PAT are market-based and involve private financing, but there are opportunities for leveraging additional finance through bilateral and multilateral programmes. PAT benchmarks are driven endogenously and are not meant to respond to international regimes.

Potential Barriers to Implementation

The biggest constraints are in capacity, leading to delays. NMEEE creates a massive mandate at the central level but has no real capacity for implementation. State-level designated agencies need to be effective counterparts to the BEE. State-level involvement is crucial, especially for appliances. PAT targets only large industries and there is a need to bring the smaller industries within its ambit; the states may be in a better position to do this.

National Mission on Enhanced Energy Efficiency (NMEEE): Status Report on Implementation

Implementation

The Partial Risk Guarantee Fund (PRGF) and the Venture Capital Fund for Energy Efficiency (VCFEE) are almost set up.¹ The PAT scheme has been notified² though it has been delayed. Under PAT, Specific Energy Consumption (SEC) targets have been set for 478 Designated Consumers (DCs) across 8 sectors, with the targets to be achieved by 2014-15.³ It has a built-in verification process. With regard to institutional arrangements there has been progress on some aspects such as the Renewable Energy Certificate (REC) scheme and financial instruments with private investors.⁴ Energy Efficiency Services Ltd. (EESL), a joint venture of four CPSUs⁵ (NTPC⁶, PGCIL⁷, PFC⁸ and REC⁹), was incorporated as a business entity on 11th February 2010 to facilitate implementation of energy efficiency projects.¹⁰ Under the Market Transformation for Energy Efficiency (MTEE), Bureau of Energy Efficiency (BEE) has completed consultation with fan manufacturers and other stakeholders and framed standards and a verification-based incentive structure to create super-efficient fans.

¹ VCFEE- PRGFEE, Presentation by Saurabh Diddi, BEE, MoP, Govt. of India, http://220.156.189.23/schemes/documents/nmeee/17_Feb_2012/Venture%20Capital%20Fund%20for%20Energy%20Efficiency.pptx, accessed on 12th April, 2012

² Indian Government notifies PAT scheme on energy efficiency, *Energy Next*, 7th April, 2012, <http://www.energynext.in/indian-government-notifies-pat-scheme-on-energy-efficiency/>, accessed on 20th April, 2012

³ Notification – PAT, Ministry of Power (dated: 30th March 2012), http://www.beeindia.in/schemes/documents/nmeee/pat/PAT_Notification_English.pdf, accessed on 15th May 2012

⁴ National Mission on Enhanced Energy Efficiency (NMEEE), Presentation by BEE, MoP, Govt. of India, http://220.156.189.23/schemes/documents/nmeee/17_Feb_2012/NMEEE%20-%20Pranav%20Bhargava.pptx, accessed on 12th April, 2012

⁵ Central Public Sector Undertakings

⁶ National Thermal Power Corporation Ltd.

⁷ Power Grid Corporation of India Ltd.

⁸ Power Finance Corporation Ltd.

⁹ Rural Electrification Corporation Ltd.

¹⁰ Energy Efficiency Services Limited – About us, <http://www.eesl.co.in/website/about.aspx>, accessed on 15th May, 2012

National Mission for a Green India (GIM): Design Assessment Card

Goals and Targets

The mission focuses on increasing forest cover per se and ignores the importance of services from other ecosystems such as wetlands and grasslands. Biodiversity, livelihoods and conservation cannot be replaced by afforestation. Even so, the goal of increasing green cover by 10 million hectares is not ambitious enough. While this document is better than the National Forest Action Plan of a decade ago, contradictions are glossed over, for instance, questions such as where the additional land will come from.

The reform agenda, a prerequisite identified in the mission, if implemented, would improve governance. The mission places too much emphasis on mitigation and not enough on adaptation. Although there are references to decentralisation, the mission governance is highly centralised. The document is a framework with insufficient details on implementation. Ecosystem-based approaches and reducing the vulnerability of people should have been prioritised, but these are missing. Reducing the rate of deforestation is a prerequisite for a “Green India” but this is not highlighted. Some experts were of the view that we should have approached the mission from the angle of biodiversity, livelihoods and ecological functions of the forest rather than carbon sequestration, which should be viewed as a co-benefit.

Consistency with NAPCC Principles

At least in principle, local communities will be involved in decision-making and implementation; thus the poor and vulnerable can be protected. The mission can lead to a reduction in greenhouse gas emissions if implemented well, but it does not address carbon losses through forest diversion. With regard to new and innovative markets, a REDD+¹ cell is to be instituted.

Technology Features

The mission makes provisions for the use of remote sensing and geographical information systems. Local capacity for technology needs to be enhanced and made more participatory. The provision of learning sites is a positive development. Other aspects such as monitoring of ecosystem services would require extensive technology deployment, such as measuring groundwater, stream flow, and soil moisture.

R&D

Research is required on site-specific strategies through institutions that can combine traditional and modern scientific knowledge. Local knowledge is not emphasised in the R&D aspects of the mission. Rigorous assessment of tenure systems is much needed. Collation of knowledge is also quite important since plenty of primary and secondary data are available.

Institutional Arrangements

The mission mentions landscape-level institutions, which is an important advance. At the local level, however, some experts felt that the division of power among Gram Sabhas, Joint Forest Management Committees and Forest Development Agencies may lead to operational challenges. There should have been greater synergy with other missions, especially with the mission on sustainable agriculture.

¹ Reducing Emissions from Deforestation and Forest Degradation

Financial Instruments
It is unclear how numbers were arrived at for the financial estimates. Funding seems to be under-budgeted for livelihoods and does not reflect the long experience of successful work in this sector; emphasis should have been placed on scaling up successful measures.
Collaborations & Partnerships
Funds will be sought from private, bilateral and multilateral agencies. The REDD+ cell may provide additional funds. There is plenty of knowledge on the ground that needs to be better documented.
Potential Barriers to Implementation
The current model of development forces deforestation. There is considerable mistrust and tension between the Forest Department and communities that depend upon forests, as well as a lack of meaningful decentralisation at the inter-departmental level. The flow of funds is not clear and allocated resources are often not spent. There is an inability to look at different knowledge systems, and land availability remains a challenge. Delays in issuing guidelines and procedures are also impediments to the implementation.

National Mission for a Green India (GIM): Status Report on Implementation

Implementation
<p>The preparatory stage for implementation is currently underway. Workshops were held to prepare and discuss guidelines at the national and landscape levels.¹ The guidelines are a precursor to the final operational guidelines/manual for the GIM. The guidelines, issued in the form of three advisories between November 2011 and January 2012, are on (a) selecting landscapes and operational units, (b) operations to be undertaken after short-listing landscapes/ sub-units and (c) funding of the Green India Mission. The advisories create the scope for pilot implementation including capacity building, baseline studies and institutional revamping or strengthening. Based on these advisories, states are expected to have submitted a Bridge Plan by the end of 2011 and the Perspective Plan for the next five or ten years is to be presented by the end of February 2012. State governments are to identify land for pilot projects and proactively seek funding. A total of Rs. 4,500 crores per year has been earmarked for the GIM, and gaps in requirement, if any, will have to be met from external funding. For the Bridge Plan, the Ministry of Finance has allocated Rs. 500 crores from the National Clean Energy Fund towards the activities of the GIM. However, a fund allocation of Rs. 200 crores from the National Clean Energy Fund was announced in the Union Budget 2011-12 to begin its implementation.² REDD+ Cell is undertaking a carbon assessment of India's forests. Indian Institute of Science, Bengaluru, is identifying areas for GIM intervention through a mapping exercise.³</p>

¹ <http://naeb.nic.in/GIMission.html>, accessed on 12th April, 2012

² Budget of 2011-2012, Speech of Pranab Mukherjee, Ministry of Finance, <http://indiabudget.nic.in/budget2011-2012/ub2011-12/bs/bs.pdf>, accessed on 12th April, 2012

³ Kohli, K. and Menon, M. 2011, 'Banking on Forests: Assets for a Climate Cure?', Kalpavriksh and Heinrich Böll Foundation, New Delhi

National Mission on Sustainable Habitat (NMSH): Design Assessment Card

Goals and Targets

While the goals and strategies of this mission are ambitious the objectives and approaches need to be more clearly specified. These should have been developed from scenarios, which themselves require the development of baseline information. Specific targets are not set for different sectors, for instance transport. Various ministries, including Ministry of Power (MoP), Ministry of Urban Development (MoUD), Ministry of Environment and Forests (MoEF) and the Ministry of New and Renewable Energy (MNRE), should have worked together and identified sustainability indicators and targets in an integrated manner. The document tries to understand how future land use changes in a city can take place along a low-carbon pathway but falls short with respect to transport. Yet, on the whole, the mission can achieve a low-carbon pathway if implemented well. One expert felt that city-level targets would have been useful, particularly for energy efficiency.

Consistency with NAPCC Principles

Urban vulnerability needs to be understood in its multiple dimensions and the co-benefits of interventions should be reviewed in the context of the informal economy. The poor and vulnerable are ignored in two important sections of the mission: urban transport and planning. The intention to serve them requires further attention for which the mission could work with the Ministry of Housing & Urban Poverty Alleviation.

Technology Features

The MoUD does not view the mission as a separate entity, but wants to link it to existing schemes such as JNNURM¹ Phase I. Broad technical recommendations for specific interventions have been provided. Demand-side management should have been emphasised, e.g., in the context of energy-efficient buildings, water use or accessibility. The mission does not recognise prevailing local systems and does not promote or integrate local technologies into the mission; for example, ropeways, which are appropriate in hilly areas where big buses are impractical and the numerous traditional water systems of Rajasthan.

R&D

The R&D aspects of the mission lack details. There is little capacity for the required research. Industry does not spend enough to promote sustainable habitat research and government-run research institutions do not have partnerships with industry, leading to a gulf between research and application. Substantial interdisciplinary research needs to be carried out, involving architects, engineers, geographers and planners.

Institutional Arrangements

The institutional arrangements are similar to JNNURM where funds are made available for specific reforms by the central government, but are in practice, used by state governments and urban local bodies as per their own priorities, or may be driven by electricity boards, water utilities, public transport companies and so on. Policies regarding taxation on public transport vehicles need to be reviewed. With regard to urban transport, regulations for setting up systems to integrate different modes, such as non-motorised vehicles (NMV) and bus or NMV, bus and metro, should have been included. Bus systems have traditionally been viewed as bus-purchase projects, with no relationship to infrastructure planning and design. Similarly, metro projects are also traditionally proposed and as stand-alone projects without any integration with other public transport systems. The mission does not pay attention to decentralisation. Different ministries need to work together; senior government officials should have formed a committee and put together a combined roadmap for the next five years. Synergies and conflicts with other missions need to be explicitly stated along with strategies to deal with them.

¹ Jawaharlal Nehru National Urban Renewal Mission

Financial Instruments
Funds are not significant and the mission therefore needs to be implemented in conjunction with other projects of the MoUD. Further work is needed on proposals and mechanisms for funds to be routed from the central government to the state government and to local authorities. Capacity to absorb funds by small towns may prove to be a challenge.
Collaborations & Partnerships
Opportunities for leveraging external funds are not built into the mission. Mechanisms for knowledge generation and knowledge sharing are meagre. It is also unclear if the mission can be responsive to international climate negotiations.
Potential Barriers to Implementation
The capacity of commissioners and other officials involved in implementation needs to be enhanced to help them draw links between climate change and water supply, transport, solid waste management and related issues. This would increase awareness and help attain the mission goals. Further, land acquisition, lack of partnerships for the coordination of projects and lack of synergy across missions could be significant barriers.

National Mission on Sustainable Habitat (NMSH): Status Report on Implementation

Implementation
Demonstration/pilot projects for sustainable waste management have been drawn up although approval from the Expenditure Finance Committee/Cabinet is pending. Proposals are being developed to support pilot/demonstration projects for promoting sustainable habitat to the extent of about 10% of the capital cost, for best practices related to energy efficiency. ¹ Sub-committees ^{2,3} for setting NMSH standards/benchmarks for urban local bodies on Municipal Solid Waste Management, Urban Storm Water Management, Urban Water Supply and Sewerage, Urban Planning and Urban Transport were formed. Each sub-committee has submitted an individual report. Provision of Rs. 26,000 crores has been made for urban local bodies under the 13 th Finance Commission. ⁴

¹ Sections 6.3 and 6.4, Note on the position emerging from the review meetings chaired by Shri T.K.A. Nair, Advisor to PM, held on 21st to 23rd of November 2011

² <http://urbanindia.nic.in/programme/uwss/nmsh.htm>, accessed on 18th April, 2012

³ Parameters for the National Mission on Sustainable Habitat (NMSH) – Report of the Sub-Committee on Urban Transport, www.urbanindia.nic.in/programme/ut/NMSH_parameters_v4.1.pdf, accessed on 18th April, 2012

⁴ Section 2, Summary record of discussions at the meeting chaired by the Principal Secretary to PM on 22.3.2010 to discuss the draft Mission Document for the National Mission on Sustainable Habitat

National Mission on Sustaining the Himalayan Ecosystem (NMSHE): Design Assessment Card

Goals and Targets
The mission recognises that ecosystem goods and services from the Himalayas support a vast number of people and provides food and water security. It acknowledges the importance of participatory approaches and community-based management. While the mission acknowledges that the Himalayas are not homogenous, substantial micro-level issues are not given due attention; for example, the mission does not look at controlling the practice of shifting cultivation in the North-East, which would be important in reducing emissions. Details are also not provided for important issues such as the Himalayan forests and rivers.
Consistency with NAPCC Principles
The mission could have paid more attention to dam structures, which are an increasing threat to the vulnerable and poor. Black carbon issues, of special importance in the Himalayas, and the problem of degraded Himalayan forests receive scant attention. New and innovative market and voluntary mechanisms, including carbon credits and carbon markets are largely absent.
Technology Features
The development of appropriate renewable energy strategies for the Himalayas, such as providing solar cookers and subsidising LPG ¹ for local use should have been included. Sustainable hydropower development based on optimisation of water use should also have been promoted. A systematic approach to combine traditional practices with modern technology is needed to promote sustainable development in the region and such an emphasis is missing. In Nepal for example, sustainable hydropower through micro-hydro plants has promoted an industry of skilled blacksmiths and ironsmiths who build and maintain these plants.
R&D
A centre of excellence for glacier research is a good idea and capacity can be built over time. Setting up a database on existing research outputs on the Himalayas is also very useful. The mission could have included setting up automated climate towers across the Himalayas, which although expensive, would have generated good data. The primary focus is on glaciology with insufficient attention to research on other ecosystems, many of them quite unique to the Himalayas. Research in other areas covering precipitation, meteorology and hydrology would have been a valuable addition. Micro-climates are also not well documented at present and meteorological modelling on weather patterns in the Eastern Himalayas would have been a critical addition to the mission. The research discussed is limited to government institutions and should have included individuals, CSOs ² and others with local knowledge and understanding. It is imperative that existing universities in the Himalayan region are revitalised and the quality of research and teaching improved.
Institutional Arrangements
Successful local institutions such as <i>Van panchayats</i> and the <i>Jhumsa</i> system find no mention in the mission. Areas of synergy with other missions have been identified, but mountain-specific solutions need to be developed. One expert commented that regional bodies under an apex organisation may be able to address problems specific to each geographical area in the Himalayas better than the proposed institutional arrangement.

¹ *Liquified Petroleum Gas*

² *Civil Society Organisations*

Financial Instruments
Funding towards sustainability in the Himalayas will be an investment in the future security of water, food and industrial growth, and should not be viewed simply as a contribution to address climate change. The funds set aside seem adequate for the initial 5 years of research and strategy development, but may fall short for implementation. Furthermore, allocation among the 12 Himalayan states is not very clear.
Collaborations & Partnerships
Opportunities for leveraging funds are not provided, but will be essential. The Indian economy is highly dependent on water from the Himalayas, and the issue should be taken up for international funding as well. The Himalayas are a shared mountain range, and this would have been a good opportunity for India, with its good economy and scientific establishments, to help its neighbours by playing a key role. There is no mention of collaboration on issues such as migration, which will become paramount as warming impacts intensify. A solid database could potentially contribute to better preparedness for international opportunities such as REDD+ ¹ .
Potential Barriers to Implementation
States have a high level of knowledge but low involvement, so while climate change may be a national priority, it may not be a major issue for states. Fragmented authority may come in the way of a good monitoring and accountability system. Issues of departmental fiefdom and challenges to community ownership and management of ecosystems will need to be resolved.

National Mission on Sustaining the Himalayan Ecosystem (NMSHE): Status Report on Implementation

Implementation
The Expert Committee set up for the preparation of a Detailed Project Report (DPR) on the proposed National Centre for Himalayan Glaciology has submitted its report. ² A Kailash landscape protection project has been initiated by the Ministry of Environment and Forests (MoEF) in collaboration with China, Nepal, International Centre for Integrated Mountain Development (ICIMOD) and United Nations Development Programme (UNDP) on 9 th April 2010. ³ A document titled ‘Governance for Sustaining Himalayan Ecosystem: Guidelines and Best Practices (G-SHE)’ was released in September 2009. ⁴

¹ *United Nations Collaborative Programme on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries*

² Pg. 224-225, *Annual Report (2010-11)*, Department of Science & Technology, Government of India

³ ‘Mount Kailash Sacred Landscape Conservation Initiative: Developing a Transboundary Framework for Conservation and Sustainable Development in the Greater Mt. Kailash Region of Nepal, India and China’, <http://moef.nic.in/downloads/public-information/Trans-bound-Mt-Kailash.pdf>, accessed on 12th April, 2012

⁴ ‘India Releases Guidelines for Sustaining the Himalayan Ecosystem: “G-SHE” Highlights The Pivotal Role Being Played By Women In Preserving The Himalayan Eco-System’, Press Information Bureau, Government of India, 29 September, 2002 <http://www.pib.nic.in/newsite/erelease.aspx?relid=52879>, accessed on 12th April, 2012

National Mission on Strategic Knowledge for Climate Change (NMSKCC): Design Assessment Card

Goals and Targets
The goals and targets are fairly clear, but not sufficiently ambitious. A vital function and strength of the mission is that it builds capacity of institutions and human resources for long-term research and knowledge generation. The mission emphasises scientific activity based on measurements, observations, modelling and satellite readings. But the local effects of warming and the resultant vulnerability, which need to be understood to improve our capacity for adaptation, are not emphasised. There is also little effort to build interdisciplinary knowledge on the impact of climate change, which would be vital to policy formulation. In addition, the mission fails to focus on the kind of knowledge generation required for climate-proofing development activities which may require new strategies and approaches.
Consistency with NAPCC Principles
N.A.
Technology Features
N.A.
R&D
The mission does make provisions to attain a critical mass of knowledge and expertise in specific scientific domains. However, although the need for interdisciplinary research is recognised, the mission design does not strengthen or promote such research. The Department of Science and Technology typically supports natural sciences, but economics, social sciences and a host of other disciplines will also be important for developing strategic knowledge and action plans for climate change, which will require multi-institutional collaborative research. Seamless sharing of information is required not only within the research community, but also with policy makers, teaching professionals and others, where such research would prove useful. The lateral movement of researchers and faculty, staff and student exchange among scientific and higher educational institutions could have been promoted. Mandating collaborative research proposals from multiple organisations to promote interdisciplinary research would have been one way to accomplish this.
Institutional Arrangements
Relying on existing institutions to implement the NMSKCC does have some advantages. Even so the mission misses out on building the new knowledge and fresh thinking that are required to cope with climate change. The mission should have been designed using participatory approaches to identify knowledge gaps as this would have resulted in identifying local needs and would have built in a level of equity in the approach. The other missions discuss their strategic knowledge requirements without necessarily linking them to the NMSKCC. Instead, the Strategic Knowledge Mission could have provided a broad framework under which other missions' knowledge gaps could have been identified and filled. An overarching coordinating structure across the various missions for strategic knowledge is missing. There should also have been a procedure for review and assessment of knowledge generated under the mission.
Financial Instruments
The bulk of the Department of Science and Technology's own funds are likely to go towards this mission and will be directed towards climate change activities. However, a conflict of interest may arise with funding interdisciplinary research and this could have been avoided had the mission been allocated an exclusive budget. A financing plan is required to support long-term institutional and human capacity. For instance, funding could go towards

centres of excellence and institutions and organisations at the state and district levels. Similarly, long-term support for chairs and specific departments and data generation and monitoring programmes would be essential.

Collaborations & Partnerships

Opportunities for knowledge sharing and collaboration are built into the projects being undertaken under the mission. Measures to enable local-level institutions to raise research questions should have been considered. The Indian Network for Climate Change Assessment (INCCA) is a step forward, but there is scope for improvement. The mission refers to international partnerships, but these need to be supported with guidelines to identify and structure them, ensuring they are demand-driven and not opportunistic.

Potential Barriers to Implementation

Provisions for students and researchers to take advantage of facilities outside their parent institutes are limited, creating constraints for the mobility of students, knowledge sharing among researchers and interdisciplinary research. The Department of Science and Technology may not be able to effectively channelise funds towards interdisciplinary research.

National Mission on Strategic Knowledge for Climate Change (NMSKCC): Status Report on Implementation

Implementation

‘Building Human and Institutional Capacities’, a focus of the mission, was launched with SCOPUS™ data providing a list of 100 institutes and 100 scientists, of which 30 institutes were invited to submit proposals for 15 topics in four broad categories: establishing and strengthening a Centre for Excellence (CfE), strengthening major programmes and building human capacity. Of the 29 proposals received from 19 institutions, 14 were selected (including proposals to set up 2 CfEs by the Indian Institute of Technology Bombay and the International Crops Research Institute for the Semi-Arid-Tropics (ICRISAT), which have been launched, while the rest have been initiated - funds and sanctions have been released till 31 March 2012. At least two thematic knowledge networks have been set up so far. A National Data Sharing and Access Policy (NDSAP) has also been launched. INCCA has released “Climate Change and India: A 4X4 assessment” to address concerns regarding the effects of climate change on natural resources and livelihoods.¹ The process of formulating Professor-Chairships for the next 5 years has been initiated.

¹ Indian Network for Climate Change Assessment (INCCA) to Release Second Assessment ‘Climate Change and India: A 4X4 Assessment’ based on Regional Climate Model, available at <http://pib.nic.in/newsite/erelease.aspx?relid=67020>, accessed on 24th April, 2012

Jawaharlal Nehru National Solar Mission (JNNSM): Design Assessment Card

Goals and Targets

The goals are clear and appear feasible. The design did not capture the complexities involved but this is an area with significant uncertainties. Some experts stressed that the mission should have placed equity at the centre and focussed on off-grid solar, which would benefit largely the poor. Instead, the target for off-grid power is only 2 GW against 20 GW for on-grid. Land and water supply required for large solar plants with grid connectivity are a major concern. Co-benefits have not been clearly captured but some of them are implicit in the mission.

Consistency with NAPCC Principles

The goals are appropriate to some of the stated goals of the NAPCC. Some experts were of the view that there should have been more explicit focus on meeting the needs of the vulnerable and the poor. The mission is likely to lead to a reduction of greenhouse gas (GHG) emissions if implemented, but it will also lead to increased water utilisation using technologies such as diesel-powered pumps, which increase emissions. The use of reverse auctions to allocate projects is an innovative market mechanism which has increased transparency, brought down the price of feed-in tariffs and brought in many new players into the industry.

Technology Features

The policy environment as it relates to technology is not conducive to promoting innovation. For example, if solar cells and modules are imported, there are no duties imposed, but if manufactured in India, companies have to pay duties. By restricting subsidies to 9 pre-approved models, the mission discourages innovation and restricts the choices of solar products available, particularly to the poorer segments of society.

R&D

While the R&D features are ambitious, more India-specific research is needed for long-term benefits: e.g., we need to maximise efficiency in terms of kWh/acre due to land constraints in India. Experts believe that India needs to build its research capacity to become a global leader. We need cheaper photovoltaics (PVs) for micro-grids to reduce up-front capital cost. The mission should pay attention to the lighting requirements of different categories of users and uses; for instance, the needs of a farmer would be different from those of a tailor or a street vendor. Questions related to research are important to policy; for instance, research on the appropriateness of crystalline modules or thin films for Indian conditions needs to be resolved.

Institutional Arrangements

The mission design has been somewhat dynamic and responsive to requirements and changes. Institutional arrangements and policies in the mission document are far from adequate, but several aspects, such as reverse auctions, which were not in the original design, have been set up. Synergies with other missions, such as Sustainable Habitat, have not been identified. Ministries such as Rural Development, Health, Education and Water Resources should integrate aspects of the mission into their agenda by introducing separate energy divisions to function within ministries. For example, the Ministry of Water Resources (MoWR) should combine the use of solar water pumps with water use efficiency techniques like drip irrigation to avoid unregulated water flow.

Financial Instruments

The mission document suggests that 4 GW will be built with internal funds and the remaining 16 GW through international financing and technology transfer, which seems to be a good approach. The bundling of grid-connected solar power with unallocated thermal power will help to reduce costs during the initial phases. At the same time, if solar home-lighting systems were installed in all homes without electricity and diesel pumps were replaced

with solar-powered sets, companies would benefit, and it could reduce the subsidies paid by every state and electricity board. In one year this could result in energy equity, displace carbon and bring in new companies and jobs to dovetail with the mission.

Collaborations & Partnerships

There are some opportunities for leveraging funds, but whether they will be utilised is not known. Funds could have been leveraged through local guarantee funds and working capital accounts for entrepreneurs and service providers. Knowledge sharing is likely to take place due to the centres of excellence. The mission design will enable it to be responsive to international climate negotiations.

Potential Barriers to Implementation

The main barriers will be: a lack of leadership in the mission, complications regarding access to subsidies, performance and financial accountability, constraints in flows of funds from the Centre to the States, and potential for conflicts between the Ministry of New and Renewable Energy and the Ministry of Power. Rural banks are not entirely comfortable with the refinancing schemes.

Jawaharlal Nehru National Solar Mission (JNNSM): Status Report on Implementation

Implementation

Solar Renewable Purchase Obligations (RPOs) have been mandated. NTPC Vidyut Vyapar Nigam (NVVN), an organisation working outside the government, is incorporated to oversee the mission. Limited progress has taken place in off-grid solar, but otherwise there has been good, if not robust, progress. Reverse auctioning has been completed for on-grid power for both solar thermal (470 MW) and solar PV (150 MW) in the first round¹ and the remaining 350 MW in the second.² In the Rooftop PV and Small Solar Power Generation Programme (RPSSGP), 64.55 MW (against a target of 98.05 MW) has been commissioned; 11 solar PV projects (totalling 48 MW capacity) and one solar thermal project (with 2.5 MW capacity) have come under the Migration Scheme.³ Furthermore, projects of 40 MW Solar PV capacity for localised off-grid applications were approved (against 32 MW target), 22 companies provide consumers the opportunity to purchase solar products at low costs through loans. Solar thermal collectors with an area of 5 million sq. mt. have been installed.⁴ 9 projects are under implementation for R&D.⁵ Solar Energy Research Advisory Council (SERAC) and Solar Energy Industry Advisory Council (SEIAC) have been set up.^{6,7} There is limited progress with co-benefits because they were not prioritised. Prices have dropped and constraints have been handled so far.

¹ *Annual Report (2010-11), Ministry of New & Renewable Energy, Government of India*

² *Indian Solar Sector – Shining or hiding behind the clouds?, India Carbon Outlook, 3rd February 2012, <http://india.carbon-outlook.com/content/indian-solar-sector-%E2%80%93-shining-or-hiding-behind-clouds>, accessed on 18th April, 2012*

³ *Commissioning Status of Solar PV Projects under Batch –I, Phase –I of JNNSM, Ministry of New and Renewable Energy, Government of India, 17th April, 2012, http://mnre.gov.in/file-manager/UserFiles/commissioning_status_spv_batch1_phase1.pdf, accessed on 19th April, 2012*

⁴ *Annual Report (2010-11), Ministry of New & Renewable Energy, Government of India*

⁵ *Annual Report (2010-11), Ministry of New & Renewable Energy, Government of India*

⁶ *Anand Mahindra To Head Solar Energy Industry Advisory Council, EAI, 14th January, 2012, <http://www.eai.in/360/news/pages/2966>, accessed on 18th April, 2012*

⁷ *Minutes of the Twenty Seventh meeting of Forum of Regulators (For), http://forumofregulators.gov.in/Data/Meetings/Minutes/Final_minute_of_the_27th_for_meeting_held_on_16_dec.pdf, accessed on 18th April, 2012*

National Water Mission (NWM): Design Assessment Card

Goals and Targets

Goals are clear and the targets for co-benefits are implicit but not stated. The complexity of the domain is not sufficiently captured and the relations among water, ecology and development are not adequately addressed. For instance, the mission underplays the role of forests, which have a symbiotic relationship with water, and limits itself to mountain watersheds and wetlands. Issues such as snow melt and change in precipitation are mentioned but not in the context of the dynamics of climate change. Demand management of water should have been a priority.

Consistency with NAPCC Principles

There should have been a more systematic effort to align the mission with the NAPCC principles. Water resource management in the mission primarily takes place through centralised bureaucracies and large centralised ‘water resource development’ projects, long-distance water transfers and canal irrigation, which have not been effective strategies in the past. Shifting the priority to local, decentralised, small-scale, community-led water management and conservation should have been considered. Water use in agriculture has largely been ignored. Inter-basin transfer should be regarded as rare and exceptional since it destroys the motivation for economical water use.

Technology Features

While there is some mention of demand management, this should have been emphasised. No effort is made to address inequitable access to water and loss in transit. Technologies that reduce water consumption in agriculture, such as SRI¹, should have been promoted.

R&D

The effect of warming on different aspects of the hydrological cycle in different climate scenarios should have been a priority research objective, with special focus on water budgeting under different scenarios. Not enough is said about R&D, thus leaving the interpretation of research goals somewhat open-ended. The mission also needs integration with the National Mission on Strategic Knowledge for Climate Change in order to improve understanding of water in ecosystems and to carry out integrated research on policy, planning and management of water resources.

Institutional Arrangements

The mission document is expected to dovetail with the revised National Water Policy. The mission should have identified separate strategies for different geographical regions of India, e.g., Himalayas, Indo-Gangetic basin and peninsular rivers. Emphasis should have been placed on providing greater responsibility to local authorities for management of water resources, to improve regeneration of the natural resource base. The Ministry needs to be expanded as its primary focus is on irrigation; affiliated organisations and other ministries must be linked to it. Further, the mission needs to be led by interdisciplinary experts in the sector and not just engineers.

Financial Instruments

Routing of funds is not clear and there is some confusion on what exactly funds would be used for. The stated funds may not be sufficient.

¹ *System of Rice Intensification*

Collaborations & Partnerships

There are opportunities to leverage and utilise funds efficiently within the country that are not being utilised. Large-scale capacity building needs to be a focus. Inter-departmental coordination on the mission needs strengthening. What is required is greater synergy and interactions among different organisations in the country that work on water.

Potential Barriers to Implementation

The fragmented authority in the sector between the centre and states is a challenge. Weak institutional structures and processes and inadequate human resources and capacity are also cause for concern. Mechanisms will be needed for R&D to be shared. Public agencies in charge of water-related decisions are in disarray. Supply-side solutions will not be practical for long and water engineers need to shift their approaches towards demand-side management.

National Water Mission (NWM): Status Report on Implementation

Implementation

Some effort is being made to integrate this mission into the 12th plan, but many of the changes would have happened even without the mission since there is a lot of dynamism in the sector. A 'Draft National Water Policy (2012)' was released.¹ A report titled 'Draft Guidelines for Development of Water Use Efficiency in Rural, Urban, Industrial and Irrigation Sector' has been released for inviting comments and suggestions.² A web-enabled 'Water Resources Information System of India' (India-WRIS) was launched by the Central Water Commission (CWC) and Indian Space Research Organisation (ISRO).³ A pilot project for comprehensive assessment of groundwater resources through aquifer mapping in 5 blocks has been initiated.⁴ The Ministry of Water Resources has released a two-volume document titled 'Restructuring of Central Water Commission' in May 2011^{5,6} and has invited public comments.⁷

¹ Draft National Water Policy (2012) Released for Comments, Press Information Bureau, Government of India, 31st January, 2012, <http://pib.nic.in/newsite/erelease.aspx?relid=79981>, accessed on 18th April, 2012

² http://cwc.gov.in/main/downloads/draftguideline_wateruse.pdf, accessed on 18th April, 2012

³ <http://www.india-wris.nrsc.gov.in/>, accessed on 18th April, 2012

⁴ Section 4.2, Note on the position emerging from the review meetings chaired by Shri T.K.A. Nair, Advisor to PM, held on 21st to 23rd of November 2011

⁵ Restructuring of Central Water Commission Volume – I, Ministry of Water Resources, http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Restructuring_of_Central_Water_Commission_MoWR_Vol-I_2011_0.pdf, accessed on 15th May, 2012

⁶ Restructuring of Central Water Commission Volume – II, Ministry of Water Resources, http://www.indiawaterportal.org/sites/indiawaterportal.org/files/Restructuring_of_Central_Water_Commission_MoWR_Vol-II_2011_0.pdf, accessed on 15th May, 2012

⁷ Restructuring of Central Water Commission – Ministry of Water Resources invites comments on its proposal till September 30, 2011, <http://www.indiawaterportal.org/post/19557>, accessed on 15th May, 2012



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