5th Edition JSW - THE TIMES OF INDIA
EARTH CARE AWARDS-2014
Awards For Excellence In Climate Change Mitigation & Adaptation

Coping with Climate Change

Case Studies and Experiences

Outreach Partner

Policy Centre TERRE

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CEE
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Acknowledgment

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Cover page:	Earth image – NASA GSFC – for more information see Fred Espenak's Eclipse Web Site: sunearth.gsfc.nasa.gov/eclipse/eclipse.html

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Content

About Earth Care Awards

The Earth Care Awards seeks to identify and foster actions across several sectors with special reference to mitigation and adaptation imperatives related to climate change. This is in response to the growing consciousness on climate impacts and need to identify and foster locally evolved responses.

ECA focuses on responses generated from South Asian region, primarily SAARC[1] region. This is in recognition to the reality of change and the nature of vulnerability and impact the region faces. The region shares common challenges with high levels of poverty, depleting natural resources and increasing uncertainty to monsoon and frequency of natural disasters along with stress and conflicts on resources availability. The awards reflect the need to recognize, strengthen and foster initiatives on mitigation and adaptation in the region.

The objective is to reduce emissions, adopt approaches to protect natural resources and promote innovations for reducing impacts, emphasizing appropriate environmental action. The ECA recognizes these initiatives and undertakes extensive networking with stakeholders, conducts due diligence, develops field assessment and strengthens capabilities through knowledge sharing.

Categories

Community based Mitigation and Adaptation to Climate Change: Water Resources, Land Use, Land Use Change and Forestry

Focus is on initiatives related to conservation of water and land resources reflecting mitigation and adaptation goals aimed at increasing resilience of communities, to tackle challenges arising out of climate change.

Innovations for Climate Protection

Focus is on development and use of innovative product or services which help reduce the greenhouse gas emissions.

GHG Emission Reduction in Industry: Large Enterprises and Small and Medium Enterprises

Focus is on industries across the large sector, who has demonstrated considerable leadership and willingness to reduce carbon intensity of their operations. Efforts should reflect reduction of all greenhouse gases (directly/indirectly) in particular and not limited to energy conservation & related emission reduction alone.

1 SAARC – South Asian Association for Regional Cooperation; Countries include – Afghanistan, Pakistan, India, Nepal, Bhutan, Bangladesh, Sri Lanka, Maldives.

Introduction

South Asia is home to one fifth of world population and represents a populous and densely populated geographical region. Countries in the region are constrained with high levels of poverty and are highly vulnerable to natural disasters and climatic stresses. The countries in the region have a high reliance on natural resources and shares similar developmental challenges. The challenges posed by climate change in the region needs to have response strategies suitable to the region climatic and socio-economic contexts.

The present compilation of case studies puts forward responses emanating from ground level on mitigation and adaptation requirement to climate change. This has been compiled through a process of application and field level due diligence. The awards process has been continually involved in exploring projects which reflect commitment and results integrating climate change considerations in their operations, development activities and innovations.

These case studies are aimed to bring out those who have put conscientious efforts to recognize and integrate climate concerns into their activities. The cases reflect how communities, industries and innovators are putting efforts and taking steps to minimize and adapt to climate change. The case studies highlight activities related to building institutional mechanism, strengthening local bodies for managing common property resource and ecosystem functions, identifying and developing synergy and partnerships, plan for maximizing resource efficiency and translate management commitment and prioritizing local needs for technology innovations.

Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased[1].

1 Summary for Policy Makers, IPCC- AR5

Traditional bio-fuel

Category

Community-based Mitigation and Adaptation to Climate Change: Water Resources, Land Use, Land Use Change & Forestry

Climate change is unequivocal. Geography coupled with high levels of poverty and population density has rendered South Asia especially vulnerable to the impacts of climate change. Adapting to the change is imperative and cannot be ignored any longer. In the South Asia region, recognized as one of the highly vulnerable regions, this needs to be accelerated, fostered and communicated to wider stakeholder groups.

Case Studies

- Lutheran World Service India Trust and ENDEV - Society for Environment and Development
- Aga Khan Rural Support Programme – India

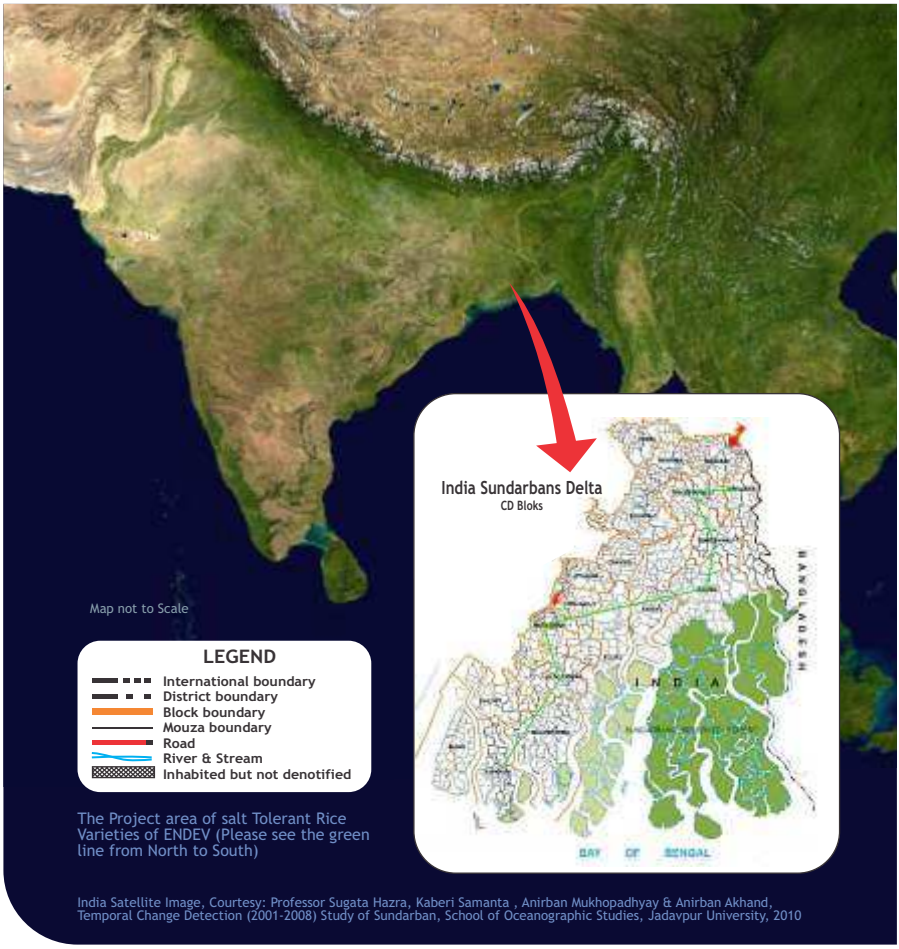
SAFE, East Kolkatta wetlands, ECA 2011

Category: *Community-based Mitigation and Adaptation to Climate Change*

Climate Adaptation: Partnership to evolve synergy and action at local level

Lutheran World Service India Trust and ENDEV- Society for Environment and Development

Location: 24, South Parganas, Sunderbans



India Satellite Image, Courtesy: Professor Sugata Hazra, Kaberi Samanta , Anirban Mukhopadhyay & Anirban Akhand, Temporal Change Detection (2001-2008) Study of Sundarban, School of Oceanographic Studies, Jadavpur University, 2010

Background

Sunderbans spread across India and Bangladesh is a fragile ecosystem. It is extremely vulnerable to climate change and due to lower human development index, this impact gets magnified[1]. About 65% of the people in Sunderbans depend upon agriculture[2]. Indian Sundarban is one of the densely populated areas in the state of West Bengal. The Sundarban Deltaic region is prone to extreme storm events which are frequent during the pre-monsoon period. Historical records indicate a high frequency of extreme weather events, such as severe storms and cyclones[3].

People of Sundarbans Deltaic Region (SDR) depend on rain fed agriculture majorly cultivation of paddy. 65% of population depends on agriculture in this region. Agriculture here is synonymous with paddy cultivation, in a region that is having mono-crop due to the shortage of fresh water.

Cyclone Aila in the year 2009 increased the salinity levels in the soil[4]. It affected the entire Sunderban Deltaic Region- crop, potable water, entire flora and fauna. In some regions, salinity has increased beyond safe threshold limits[5]. European Commission of Humanitarian Aid (ECHO) found that salinity had reached a depth of about 1.5 meter in most areas. This has hit paddy cultivation (winter crop) even two years after the cyclone. Salinity in soil affects rice crops particularly during germination. The study also predicts that sowing will now only be possible after the first spell of monsoon when the salinity gets diluted.

Synergy through Partnerships

ENDEV has been working in the Indian Sundarbans since 1999. Since 2009, Post-Aila disaster in the Sundarbans, it has been helping the farming communities by making available traditional salt tolerant rice varieties in salinised soil.

Lutheran World Service India (LWSI), the India program of the Lutheran World Federation, Department for World Service was established in 1974. In 2008, it got a new identity as Lutheran World Service India Trust (LWSIT). LWSIT works with the underprivileged rural and urban communities. It implements social transformation, economic empowerment and risk reduction projects in rural and urban communities.

ENDEV in partnership with LWSIT and other originations initiated collection of

1 http://www.cseindia.org/content/study-release-and-panel-discussion-climate-change-impacts-vulnerabilities-and-adaptation-ind as viewed on 16th April 2014

2 http://zeenews.india.com/myearth2011/sunderbans.aspx

3 Indian Sundarbans Delta: A Vision, March 2011

4 Living with Changing Climate, CSE report

5 For growing rice safe limit is 4 to 6 parts per thousand (PPT), SDR has salinity 8 to 20 PPT

traditional salt tolerant rice verities and developed seed banks. Both the organizations have evolved environmental policy for guiding their field based adaptation interventions in vulnerable areas of Sunderban Deltaic Region.

Project Interventions

Promoting and storing salt-tolerant rice varieties

42% of the people living in the seven blocks under the project belong to Below Poverty Line (BPL) category. They are highly dependent on cultivation of rice; which got severely impacted due to cyclone impacts.

Tracing and promotion of the traditional salt-tolerant verities, ENDEV supplied Matla, Nona bokra, Talmugur, Lal getu, Sada getu and Hamilton. This has increased the productivity of rice in these areas as post Aila salinity of soil increased and this helped the community to adapt to the post Aila stresses and build its resilience to similar disaster proneness. LWSIT also helped the communities in creation and promotion of community grain banks to ensure access to food grain and development of 54 seed banks to preserve these traditional varieties of seeds

Land development - 'Bhumi Samskar'

LWSIT is promoting land development using network of Community Based Organizations (CBO). To deal with problem of salinity and water availability, a pond of 50'x40'x5.5' in 0.33 acre of land is created. This helps in ensuring availability of water for irrigating as well reducing the salinity of the soil. This has helped in

increasing the productivity of rice and vegetables. Fishery has been developed in the ponds. This interventions is known as “Bhumi Samskar” in this region.

Mangrove plantation

Plantation of over 2,15,000 mangroves has been facilitated in the area of 87 ha of land, with survival rate of 70 to 80% in last 5 years. This was done by involving and training community based organizations of the villages. The mangroves will sequester approximately 990.93 tonnes CO_2/year.

Solar lighting

Through CBO network they promoted renewable energy by providing solar lamp to 185 girls and encouraging them for their continued education. In addition to this, solar home light and 185 solar lanterns were provided. 35 CBO members were trained on maintenance of Solar systems.

The institutions are being strengthened and empowered at various levels and stages through the support of organization. CBO's at village level have now formed an alliance which meets once in two months.

Benefits of the project include multiple cropping increased from 14% to 51%, reduction in migration, improvement in hygienic conditions, and access to safe water sources. 763 Self Help Groups have been formed which save regularly.

Conclusion

Action based Research institution like ENDEV and rural developmental sector organization like LWSIT are working to empower communities to deal with challenges posed by Climate Change. The synergistic effort through partnership and cooperation between ENDEV- Society for Environment & Development and Lutheran World Service India Trust in developing solutions and mainstreaming traditional knowledge through community participation reflect strategic response to climate change.

Climate Adaptation through Institutional Strengthening

Aga Khan Rural Support Programme - India

Location: Bharuch, Surat, Narmada District in Gujarat

Background

Gujarat is a state with semi-arid zones and a coastline of 1600 Km. Key vulnerability factors for Gujarat include large sections of population dependent upon the natural resource base and climate-sensitive sectors such as agriculture, water and forestry. Agriculture is dependent on rainfall since most of the crops are rain fed and this is increasingly getting affected due to erratic rainfall.

National Mission on Sustainable Agriculture, 2010 emphasises on Institutional support as an important feature for climate change adaptation. Missions highlight the use of natural resource conserving technologies, providing institutional support to farmers and capacity building of stakeholders.

About the Organization

Aga Khan Rural Support Programme (India) was established in 1984 with mission to enable the empowerment of rural communities and groups, especially the underprivileged and women, to take control over their lives and manage their environment and to create a better and equitable society

Predominantly tribals located in Gujarat and are highly vulnerable due to lower human development index. The organization identified Bharuch, Surat and Narmada in South Gujarat to work since the districts form a contiguous eastern belt of Gujarat. Kotawalia, Kathudia, Dhodia, Kokna, Bhil, Kunbi, Vasava, Chaudhari are Scheduled Tribes residing in this region.

Climatic vulnerabilities identified are erratic rainfall, livelihood insecurity and lack of systematic management of natural resource. Priority risk identified was drought in the region and unbalanced usage of water for irrigation. Non sustainable practices of natural resources management lead to livelihood insecurity and migration. The project has tried to address the climate vulnerabilities identified through strong institutional linkages and demonstrating sustainable natural resource management practices.

Sustainable Community-based Approaches for Livelihood Enhancement (SCALE) Project (2002-2012) was launched to contribute towards enhancing the livelihoods of disadvantaged rural populations including particularly vulnerable tribal groups in resource poor areas as well as rejuvenating the degraded land, water and forest.

Project Interventions

Village level institution was developed for promotion of livelihood security, land development interventions, soil water conservation measures and water harvesting structures. These interventions emphasised on expansion of area under irrigation for agriculture and available water resources to the tribal

farmers, formation of Joint Forest Management committee and promoting biogas plant. This has resulted in improvement of agricultural productivity, access to agriculture equipment, reducing risk through diversification and creating wage employment.

Participatory irrigation management – Ishar canal users group

A canal users group was formed to ensure equitable distribution of canal water. Canal water distribution is monitored by the group member based on available water resources, this influences crop selection process, ensures availability of water, helps in crop productivity as well as livelihood diversification

Participatory Irrigation Management was done by 54 Water user associations comprising of 10,975 farmers in 9,954 hectares through 12 Canal irrigation projects. An alternative livelihood options has been created for 21877 poor/landless households. This success led to formation of Gujarat Water Users' Participatory Irrigation Management Act, 2007[1].

Watershed management users group

Water user groups was initiated with 13 families and now it consists of 130 families from 5 villages. Activities of the group include contour bunding of the farm lands, land treatment, minor irrigation facilities, and adoption of improved and diversified cropping pattern.

These initiatives have led to decrease in distress migration, increase in number of crops taken up as soil moisture is conserved and increase in productivity due to longer availability of water. Marginal workers from landless people who indulge in animal husbandry are supported through the users group by providing them with fodder from the farms.

Joint Forest Management

The JFM activities of members led to regeneration of 110 ha of forest land. This has helped in protection of forest area through joint forest management, soil and water conservation, improved availability of fodder and conservation of biodiversity. 4432 Hectares of forest land is protected by 56 village level groups.

1 The Gujarat Government Gazette, Gujarat Water Users' Participatory Irrigation Management Act, 2007, Narmada, water resources, water supply and Kalpasar department Notification Sachivalaya, Gandhinagar, 18th November, 2010.

Biogas plants

Promotion and installation of biogas plants has lead to reduction on dependence on fuel wood. The biogas plant also provides organic fertilizer (slurry) which cuts dependence on chemical fertilizers by half. This intervention provides energy security, emission reduction and reduces fertilizer consumption relating to mitigation. Reduction in carbon and methane emission due to the bio gas plants in Netrang works out to be 92.88 kg methane per day and 5676 kg CO_2 e per year.

Women empowerment through institution development

Mahila Manch has been formed at block level to facilitate micro credit savings, conducting various surveys and activities eg. bio-gas plant potential, organizing cattle camps. 1472 women SHGs from 345 villages engaging 16253 women are formed.

Mahila Manch has helped in developing capacity of women for safeguarding common property resource.

Community outreach in local dialect

Around 220 Community Radio episodes are aired in local dialect on various subjects like introduction to relevant government schemes, sustainable agriculture and irrigation practices, health, tribal culture and tradition. Recoding of these radio episodes is done in Local dialects with the help of local community reporters.

Conclusion

Economic empowerment and institutional building has led to strengthening of the community to be more vigilant and aware about their rights. Institutional infrastructure or hard ware will help facilitate run climate change adaption soft-ware activities.

Category

GHGs Emission Reduction in Industry: Large Enterprises and Small and Medium Enterprises

Industry is vulnerable to the impacts of climate change, particularly to the impacts of extreme weather. Companies can adapt to these potential impacts by designing infrastructure that are resistant to projected changes in weather and climate, relocating plants to less vulnerable locations, and diversifying raw material sources, and making supply chain efficient. Industry is also vulnerable to the impacts of changes in consumer preference and government regulation in response to the threat of climate change. Companies can respond to these by mitigating their own emissions and developing lower-emission products.

Case Studies

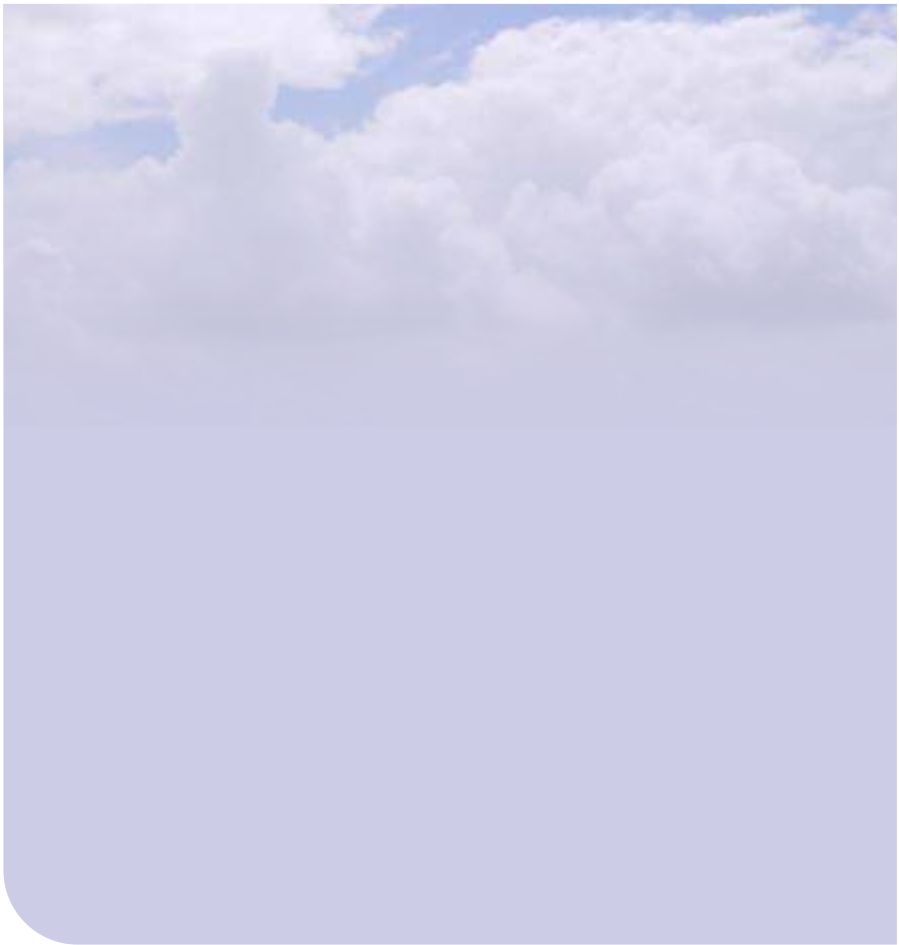
- Kymore Cement Works, ACC Limited
- Tata Consultancy Services

Category: *GHG Emission Reduction in Industry: Large Enterprises and Small and Medium Enterprises*

Meeting Benchmark and Promoting Excellence

Kymore Cement Works, ACC Limited

Location: Kymore, Madhya Pradesh



Sector Profile

CO_2 emissions from cement production currently represent about 5% of anthropogenic global CO_2 emissions[1]. The Indian cement industry is one of the most energy intensive industry[2] and is recognized as efficient in the world[3]. The inherent process and energy requirement in the cement sector is responsible for 137 million tonnes (Mt) of carbon dioxide (CO_2) in 2010 – approximately 7% of India's total man-made CO_2 emissions.

The Indian cement industry has made strong efforts to reduce its carbon footprint by adopting the best available technologies (BAT) and environmental practices. Through this, it has reduced total CO_2 emissions to an industrial average of 0.719 tonnes (t) of CO_2/t cement in 2010 from a substantially higher level of 1.12 tCO_2/t cement in 1996[4].

Applicant Profile

ACC cement is involved in manufacturing of PPC[5] and OPC Cement and has 16 cement plants with capacity of 27 million tonnes/annum. With its units across India, its one of leading producer of quality grade cement.

Kymore Cement Works (KCW), located in Katni district of Madhya Pradesh is one of the oldest cement manufacturing units of ACC, established in year 1923 with wet process technology. In 1995-96 KCW moved to dry process technology for cement manufacturing. Today, Kymore Cement Works is a state-of art unit with the best environmental practices and equipped with all pollution control equipment/facilities.

1 Cement Technology Roadmap 2009 - Carbon emissions reductions up to 2050, WBCSD and IEA
2 Technology compendium on energy saving opportunity – Cement sector; Shakti Sustainable Energy Foundation; 2013
3 IEA – Cement industry – best practices and technology
4 Technology Roadmap Low-Carbon Technology for the Indian Cement Industry
5 Portland Pozzolana Cement (PPC)

KCW consists of two kilns, Kiln-1 is operating with a capacity of 4590 TPD clinker and Kiln-2 is operating with a capacity of 4626 TPD clinker. The main raw material is Limestone with coal as primary source of energy. The production of cement is highly energy intensive and with average specific electrical energy consumption of 79.41 kWh/Ton of cement.

Project Activities

The KCW is certified with ISO: 50001-2011(EnMS System) from June-2012 reflecting its management commitment towards energy conservation for optimizing and reducing energy usage. Kymore Cement Works also having a Integrated Management System (IMS consisting of ISO:9001, ISO:14001, OHSAS:18001).

A large amount of energy consumed during cement production is at the calcinations process where raw material in kiln is used to produce clinker and grinding of clinker is done to produce cement. It has taken several efforts towards improving the energy efficiency in its cement plant through process related changes like replacement of old motors, reducing the frequency of TG, installation of energy efficient squirrel cage motor of cooler, modifying the firing line of kiln etc which has brought down energy consumption to several unit.

KCW has also implemented innovative process for energy saving. Some of them are as follow

- Dream runs – the unit set itself performance target both in terms of production and energy consumption by operating dream runs, which provides for best possible figures and undertakes measures to achieve those.
- Reduction of clinker factor - improve clinker strength

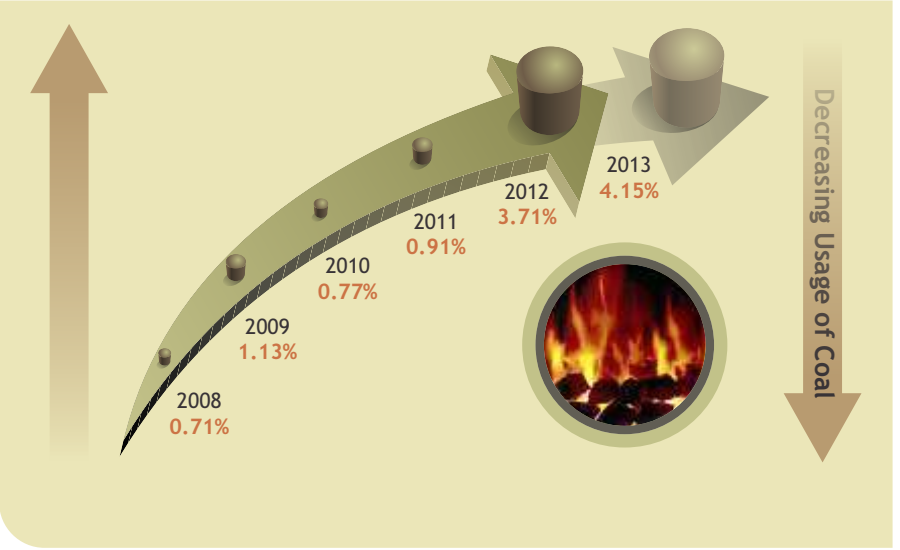
- Achieve average 34.5 percent flyash absorption in PPC[6]
- Clinker factor – clinker factor is 62.5 for year 2013 against BAT plant ratio of 0.65[7]

6 Flyash is a pozzolana and can therefore be used as a blending material for the manufacture of Portland Pozzolana Cement (PPC) in the proportion of 15 to 35 percent depending upon the quality of flyash and clinker – CPCB guidelines on Assessment of Utilization of Industrial Solid Wastes in Cement Manufacturing

7 IEA – Cement industry – best practices and technology

Alternative fuel resources

Biomass is a carbon neutral material and helps in mitigating CO_2 by saving 1.34 T of CO_2 per ton of biomass and helps in reduction of coal usage. To reap the benefits of biomass, Kymore Cement Works (KCW) utilized biomass (not used for domestic use and cattle feed) as a source of fuel and have progressively increase the TSR (thermal susbsitution rate) which resulted in annual coal saving of 25,000 MT (Rs. 25.5 Crs). ACC has an AFR policy which acts as a management commitment tool for utilization of biomass.



AFR Use at 4.15 against BAT of 5.0

Benchmark/Target

	Y'2010	Y'2011	Y'2012	National Benchmark	Global Benchmark
Sp. Electrical Energy consumption, kWh/T of Cement	81.54	81.85	82.76**	67.0	65.0
Sp. Thermal Energy consumption, kCal/kg of Clinker	731.37	724.74	723.26	667	66.0

Results

Energy efficiency

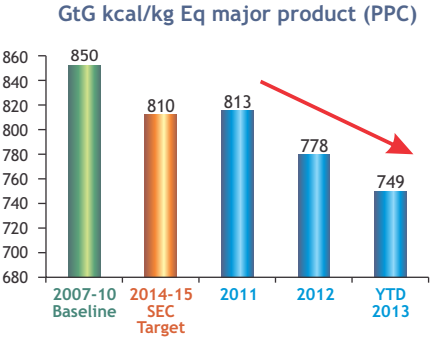
Year	Annual Energy Consumption					Cement Prod. in Million Tons	Specific Energy Consumption		kg CO_2/t Cement	TSR %
	Electrical		Thermal				Electrical kWh/ Ton of Cement	Thermal kCal/kg of Clinker		
	kWh Million	₹ Million	Type of Fuel	Tons	₹ Million					
2009	335.37	786.54	Coal	489403	14838.30	2.208	83.33	731.88	798	1.13
2010	312.04	894.06	Coal	480668	16750.57	2.170	81.54	731.37	786	0.77
2011	286.12	963.23	Coal	435306	1871.97	2.215	81.85	724.74	768	0.91
2012	301.65	1035.08	Coal	402724	1930.29	2.234	82.76**	723.26	766	3.71
2013	285.56	1150.53	Coal	395252	2118.20	2.203	79.41	723.50	756	4.15

Performance against PAT[8] target

As per national mission on enhances energy efficiency the energy intensity industries were given set of target to be achieved. Cement industry falls under the PAT scheme and so KCW has also has a target.

PAT target of 810 GtG kCal/Eq for year 2014-15

- achieved till date 749 GtG kCal/Eq.



Preventing Release of Ozone Depleting Substances through Co-processing at Cement Kilns

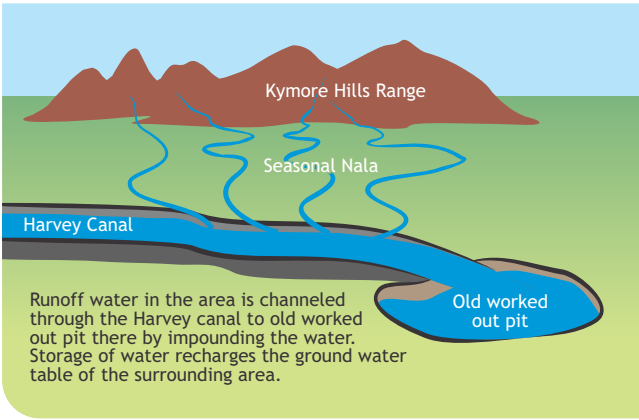
This was the first project in India conducted with technology knowhow of Holcim for setting up of a protocol for permitting system with Ozone Cell, MoEF -ODS as “Hazardous Substance

- 16.325 tons of ODS saved equivalent of 131,342 Ton of CO_2 emission in atmosphere.
- Compliance to 100 % destruction.

8 Perform Achieve and Trade scheme of Bureau of Energy Efficiency

Water Conservation

- Eliminated dependence on Mahanadi River for water availability – 100 percent sourcing of water through water harvesting in used mine pits.
- Use of mine discharge water for Irrigation and Groundwater recharge.
- Treated rain-water use in cement plant, power plant and colony.



- Discharge to village pond by dewatering pumps.
- Support to agriculture (Rabi crop) Post monsoon.
- Surplus for ground-water recharge.

Conclusion

ACC's approach focuses on realizing the potential across different technological development and management excellence. It has been able to demonstrate credible performance against three possible areas of interventions. The case provides insights into the responses which demonstrate management commitment and sustained actions towards mitigation to climate change.

Energy Efficiency in Data Centres

Tata Consultancy Services

Sector Profile

Information and Technology sector is classified in two main services – IT services and Business Process Outsourcing services. The demand for data center is primarily part of IT services sector. Between 2011 and 2012, power requirement of data center grew by 63% globally to 38 GW from 24 GW[1].

Data centers consume about 1.5 percent of the world's electricity and are responsible for about 0.5 percent of carbon emissions. By 2020 the carbon footprint of data center will exceed the airline industry[4].

Data center are one of the important component of IT industry, running continuously throughout the year and are highly energy intensive. The total datacenter capacity in India is growing at a rapid pace and is expected to exceed 5.1 million square feet by 2012, which translates to a compounded annual growth Rate of 25-30% in IT businesses[2]. While net consumption of Indian data center is yet to be quantified; the IT industry progress in the economy suggests that energy consumption of Indian data center will exceed the global average[3].

Applicant Profile

A part of the Tata group, India's largest industrial conglomerate, Tata Consultancy Services is an IT services, consulting and business solutions organization that delivers real results to global business. TCS offers a consulting-led, integrated portfolio of IT, BPO, infrastructure, engineering and assurance services.

Clause 8 of the TATA code of conduct, on health, safety and environment, emphasizes the group's commitment towards improving the quality of environment particularly with regards to GHG emission and offset the effect of climate change in all spheres of its activity.

This comment is reinforced through the TATA Climate Change Policy which mandates each of the group companies to monitor and mitigate their impact on climate and strive to make their operations environment friendly. Identifying climate change as a material issue to the organization, TCS' commitment to climate change mitigation is reflected in its Environmental Policy and Sustainability targets endorsed by the management reflecting the drive to engage in Climate Change mitigation from the top within the group and the organization.

1 http://www.computerweekly.com/news/2240164589/Datacentre-power-demand-grew-63-in-2012-Globaldatacentrecensus

2 Energy Efficiency Guidelines and Best Practices in Indian Datacenters, BEE - http://datacenters.lbl.gov/sites/all/files/datacentersindia.pdf

3 Dale Sartor,etal (2010),Benchmarking energy consumption in Indian data center- USAID India

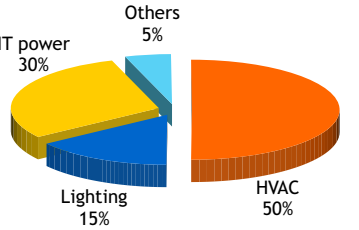
4 Data center tip sheet, Energy efficiency in building, version 2, 2009; USAID

Key features

- TCS has set the target to reduce its specific carbon footprint (Scope 1 + Scope 2 - per capita) by 50% over the baseline year of 2007-08 by 2020. This means an estimated reduction by 3,20,605 tCO2e in the target year 2020.
- All new TCS offices are designed at par with LEED standards for higher resource efficiency by design.
- TCS has commitment to reduce the data centre PUE across its key data centre to an average of 1.65 by 2016.
- TCS has set the target to procure approx 20% of total energy consumption from renewable source by 2020.

Project Activities

Energy requirement at data center



Typical to any service sector company, TCS' carbon footprint is largely from power consumption in its office operations. This makes energy a very relevant metric for it and a key lever for low carbon growth. On an average, the distribution of electricity consumption across the various elements in any TCS office building is shows that HVAC system consumes half of the total consumption followed by various IT process and application. Hence the energy management strategy at TCS is based on the following key enablers-

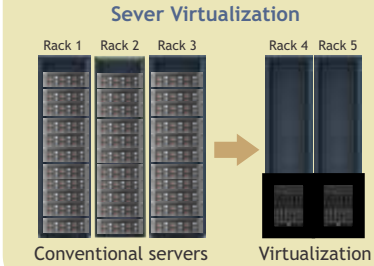
a. Green Building office infrastructure
b. Green IT
c. Operational energy efficiency
d. Procurement of renewable energy

All these enablers are estimated to help TCS achieve higher energy efficiency and meet its specific carbon emission reduction targets.

Green buildings

TCS carbon strategy is based on the approach that all new offices being built since 2007-08 are all designed as per LEED standards for higher resource efficiency and better energy performance. This helps reduce the specific carbon footprint from our operations. Green Buildings help to conserve key resources like energy and water. Some features which are an integral part of all TCS Green Buildings are maximum use of daylight and natural ventilation, high efficiency water cooled centrifugal chillers, use of thermotek tiles for roof insulation to reduce heat gain, roof-top solar photovoltaic cells, integrated building management system, VFDs in Air handling units, use of zero ODP refrigerant, low VOC paints, FSC certified woods, onsite waste treatment systems.

Green IT



TCS is in the business of IT and believes in delivering IT in the most sustainable and efficient manner. TCS has looked into IT systems and improved it across the various elements – from data centre energy efficiency to distributed IT energy efficiency. Some of the key IT initiatives include server virtualization and consolidation, use of internally developed tools for data centre power management in real time, maintaining optimum temperature levels in the data center, cooling optimization through hot aisle cold aisle alignment, in row cooling, rear door heat exchanger, green procurement policy for procuring 'green' IT equipments.

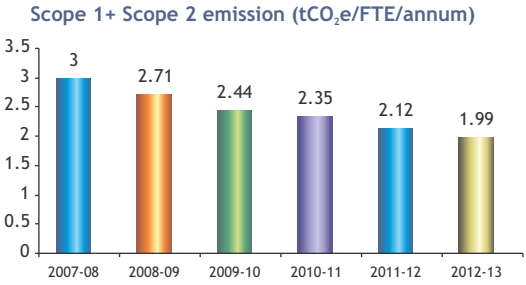
Benchmark

PUE (Power Usage Efficiency) is the benchmarking for IT sector. Lower PUE value reflects an efficient data center. Typically, for a conventional datacenters with operating PUE of 2.0, the minimum energy saving potential by adoption of latest technologies is between 25 to 30%.

- TCS has a target of reducing their PUE from 1.9 to 1.65 from 2012 to 2016.
- Current status – average of 5 data center 1.9 PUE achieved.

Achievements – Climate Change Performance

The initiatives undertaken has enabled TCS to achieve a reduction in the specific carbon footprint by 34% over 2007-08 and 26% over 2009 - equivalent to energy savings of 606,939 MWh and carbon avoidance of 485,006 tCO_2e over the years.



Conclusion

TCS demonstrates action on several scopes identified to reduce and optimize energy use and resource conservation not limited to energy. Increase in power use efficiency, reduction in carbon footprint goes along side with efforts on water neutrality, biodiversity conservation, e-waste management and supply chain sustainability. It reflects initiative aimed at decoupling business growth and ecological footprint.

Category

Innovation for Climate Protection

Climate change challenge poses opportunities to upscale technologies and leapfrog to cleaner technology regime. This calls for innovations at both end of technology development and its implementation. Innovations aimed at achieving energy efficiency and having potential to benefit large sections of society leads to increased mitigation opportunity. The purpose is to provide platform to climate friendly solutions.

Case Study

- Farmland Rainwater Harvesting Systems

Prakriti Biotech Farm, Jal Urja Pump,
Jharkhand, ECA 2010

Innovative Rainwater Harvesting Systems for Reviving Borewells

Farmland Rainwater Harvesting Systems

Background

India has the second largest population base at appx 16 per cent of the world's population and with only 2.4 % of its land area creating a heavy pressure on the natural resources including water. Millions of Indians lack access to basic water services and with increasing resource use, there is a decreasing trend in availability of water at various pockets across the country. The increased demand and reduced availability increases strain on water resources and its management.

One of the fastest depleting resources is ground water and the water level in aquifers reflects a decreasing trend. In the arid and semi arid regions, falling levels of ground water affects farming and agriculture pattern, as these are heavily dependent on ground water resources. Scientifically it has been proved that these aquifers can be recharged by rain water and other water sources. Unfortunately, due to indiscriminate digging of bore wells, ground water is being extracted at a rate faster than it can be replenished. Rain water harvesting and ground water recharge can act as a natural storage that can buffer against shortages of surface water, as in during times of drought and help combat climate threats.

With the changing trend in rainfall and its erratic behaviour has led to uncertainty and thus increased dependence on natural resources. The nature of challenges in terms of meeting the increasing demand of fresh water requires innovative thinking as well as finding solutions which meets the local context and requirements. Efficient management and modern technology can stretch even scarce rain water in meeting the present as well as future demands of water.

About the Organisation

Farmland Rain Water Harvesting Systems (FLRWHS),a partnership firm was established in 2002 and is exclusively working on developing solutions towards rain water harvesting. The firm's activities include research and development, plan and design, and technical consultancy, geomorphic mapping of soil strata, manufacturing, marketing, and installations of rainwater harvesting system.

Backed with over twelve years of field experience in both roof top and ground water recharge, incorporating the state of the art green technology, FLRWHS is renowned for its green initiative in conserving natural resources for a greener and brighter tomorrow and demonstrating the same by implementing their own in-house, indigenous cutting edge technologies with prime focus on water conservation, energy conservation and other environment friendly applications in implementing a comprehensive rain water capture and storage using a proven technology at the field level.

Project Objective

To develop a Point Source Artificial Groundwater Recharge which can recuperate dried bore wells within a very short time frame by higher rate of recharge capturing the surface run-off.

Project Intervention

V-Wire Injection Well Technology for runoff rain water harvesting and recharge

Innovation: Operational mechanism

FLRWHS has developed a new method of artificial point source ground water recharge, called 'V Wire injection well' technology. The system consists of a silt trap unit, a recharge pit (5 to 6 m with 20% filtration media consisting of crushed stone, gravel, coarse sand and activated charcoal and the rest for water storage) and a recharging bore (20 to 60 m) at the bottom of the recharge pit. The rain water is led through a water channel and first reaches the silt trap, which allows for silt to settle down in the chamber. The overflow water is led into the injection well through a horizontal connected pipe with V wire filter unit, which passes through multi layers of filtration media placed at the top of the injection well.

The water accumulates below the filtration media in a specially designed storage well, which creates water column. The percolator pipe attached to the non-clogging V-Wire screen is placed by boring through the permeable strata at higher depths of about 150 – 200 ft below the ground level. The water then passes through the permeable strata by gravity and reaches the dry joints, cracks, weathered zone, and recharges the ground water source/ aquifer. The water also gets filtered while passing through the permeable strata.

Project Benefits

Due to the installations of the V-wire Injection well in many of the severely drought prone areas of Karnataka has the water table significantly improved. The intervention through V-Wire injection well technology led to hundreds of bore wells having water table more than 1000 feet below ground level now being recharged to half their level (450 to 500 feet). Due to acute shortage of power during the peak summer season, a vast majority of the farmers resort to diesel generators to pump out water. The energy requirement to pump out the water is directly proportional to the static head and quantum of water discharged thereby significantly lowering the required pump capacity with increase in water table and thus reduction in carbon emission.

Some of the other benefits of this groundwater recharge technology are:

- Reduces loss of top soil, surface runoff, thereby avoids silting of ponds and lakes.
- Reduces hardness, salinity and dissolved solids contents in the groundwater source.
- Seawater ingression can be checked in costal areas.
- Reduces the dependency on water supply systems, the pumping of water from distant places, extraction of water from deeper depths and movement of water tanker.

Sustainability

FLRWHS is working closely with government agencies and other local bodies on rejuvenation of the severely depleted bore wells in drought prone rural areas. Till now it has done more than 5000 installations of this technology.

Many of these have been done with the support of government under National Rural Drinking Water Supply Programs Suvarna Jala and also through various zilla panchayath, gram panchayats, and municipalities, urban and rural water supply boards, ground water development agencies and others. Groundwater Board of Bangalore is actively seeking their counsel in establishing a set of framework to develop relevant standards and benchmark in the field of groundwater recharge. The implementation of V-wire technology has resulted in recuperation of bore wells in peak summer months there by stopping the need of the supply of water through water tanker. In other instances, there is a remarkable improvement in the qualitative aspect of the water.

Scalability

FLRWHS has developed a pool of talented young men and women who are trained to install the complete system. At present the firm has over 50 dealers supplying and installing the rain water harvesting system. A dedicated team of professionals constantly train, upgrade and equip the skills of dealers for the successful implementation of the technology in different parts of the country.

The installation of technology can be carried out by local plumbers and masons with help of unskilled workers. This technology has gained wide acceptance in reaching thousands of farmers with the help of government sponsored schemes involving both the central and state governments. It is also speedily gaining acceptance in the private sector.

Conclusion

The innovation provides twin benefits- it aids water recharge in dry and arid regions by addressing water requirements of a large section of society and also helps in avoidance of new borewells, need of tanker water and energy for water extraction These help in having a net positive carbon foot print and local community adaptation to water stress. The scalability of the innovation and its co-benefits has a wider applicability in the context of climate change.

Abbrevations

AFR - Alternative Fuel Resources
AHU - Air Handling Unit
BAT - Best Available Technology
BPL - Below Poverty Line
BPO - Business Process Outsourcing Services
CBO - Community Based Organization
CO2 - Carbon Dioxide
FSC - Forest Stewardship Council
FTE - Full Time Equivalent
GHG - Green House Gases
GtG - Gate to Gate
GW - Giga Watt
HDI - Human Development Index
HVAC - Heating Ventilation and Air Conditioning
ISO - International Standard Organization
IT - Information Technology
JFM - Joint Forest Management
KwH - Kilo Watt Hour
LEED - Leadership in Energy and Environmental Design
MT - Metric Tonne
ODS - Ozone Depleting Substances
OHSAS - Occupational Health and Safety Advisory Services
OPC - Ordinary Portland Cement
PPC - Portland Pozzolana Cement
PUE - Power Usage Efficiency
RWH - Rain Water Harvesting
SEC- Specific Energy Consumption
SHG - Self Help Group
TG - Turbine Generator
TPD - Tonnes per Day
TSR - Thermal Substitution Rate
VFD - Variable Frequency Drive
VOC - Volatile Organic Compound

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