Sustainability Report

Nagarjuna Fertilizers and Chemicals Limited

2008-13

Our Vision

"To be Global Leaders in Plant Nutrition"

Nagarjuna Fertilizers and Chemicals Limited

SUSTAINABILITY REPORT 2008-13

"A Journey of thousand miles starts with a single step."

1. Overview of Industry and Business Operations

1.1. The Indian Fertilizer Industry and NFCL

The Indian fertilizer industry is divided into three major sectors – Public, Private and Cooperative. There are around 141 fertilizer plants in operation in the country – 29 Urea Plants, 19 (Diammonium Phosphate) DAP and NP/NPK complex plants, 82 Single Super Phosphate plants, 10 Ammonium Sulphate (AS) Plants and one Calcium Ammonium Nitrate (CAN) Plant.

Nagarjuna Fertilizers and Chemicals Limited (NFCL) is the flagship company of the Nagarjuna Group. NFCL is a public limited privately owned company and operates in the N Segment of the Fertilizer Industry.

About NFCL

Kakinada

01st Aug 1992

Unit I Commenced Production

19th March 1998

Unit II Commenced Production

Capacity – Ammonia

*2*1325*

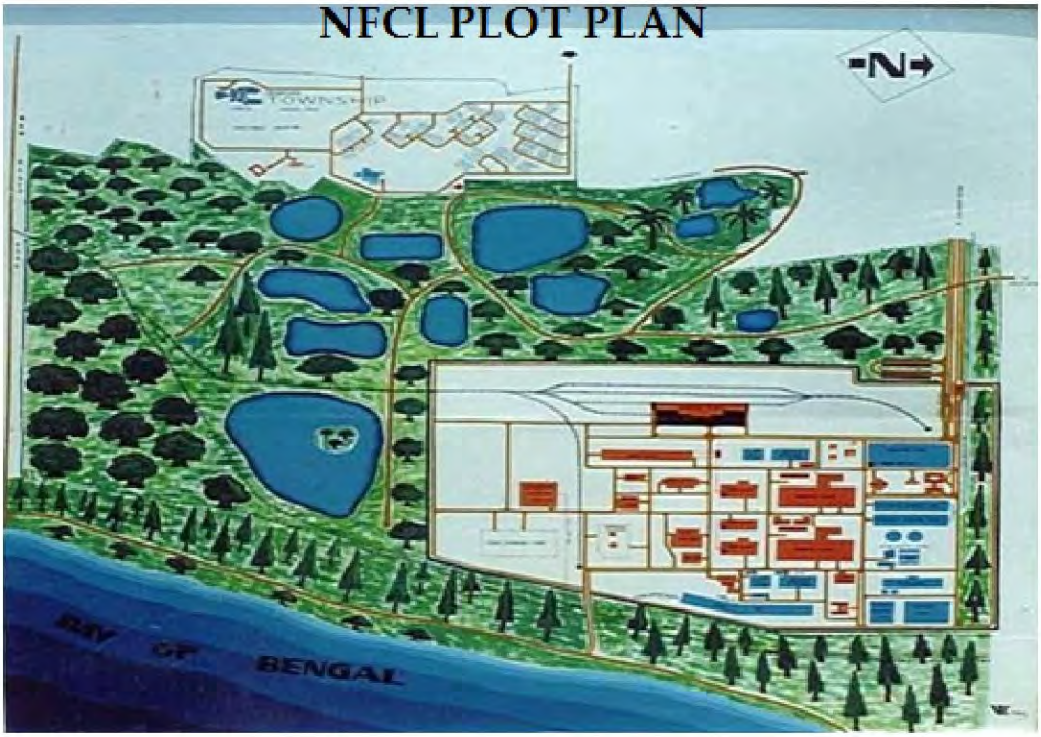
Capacity – Urea

*2*2325*

In addition to manufacturing Urea at Kakinada, the company also manufactures and markets micro-irrigation systems and equipments at three locations – two in Andhra Pradesh and one in Gujarat. The company is also into import and trading of fertilizers, including phosphatic and potassic fertilizers, specialty fertilizers and micro nutrients. [i]The company also undertakes technology development in Research and Development in areas of Plant Nutrition Solutions technology, platforms, fuels and feedstock.

We are currently supplying about 50% of Andhra Pradesh's annual urea requirement of 2 million tons. Nagarjuna has been nominated as the Lead

Fertilizer Supplier (LFS) by the Government of India in Andhra Pradesh, Orissa and West Bengal to act as a coordinator between the Government and the Industry.



1.2. Nagarjuna Group

Nagarjuna Group is a US$ 3 billion asset-based group. Nagarjuna is recognized as one of the most successful integrated agricultural input brands in India. We are ranked amongst the largest fertilizer companies in India (with a market share of 10% in urea and a market share of 30% in specialty fertilizers); amongst the top three plant protection companies in India (we manufacture and market a wide range of plant protection chemicals); we are ranked amongst the top two micro irrigation

Figure 1: We are present across the entire Plant Nutrition Value Chain

companies in India (we manufacture and market a wide range of micro irrigation equipments). We also offer a wide range of services in agricultural output procurement, trading, food processing, packaging and marketing.

We have recently entered the fuels and feedstock business and have significant investments in hydrocarbon, bio, and silicon based fuels and feedstock.

Nagarjuna also has investments in power generation (based on natural gas and hydroelectric).

Research and Development plays a significant role in our strategy. We have been investing significantly into developing better agricultural inputs and new forms of fuels, energy and feedstock.

1.3. About NFCL's Agribusiness

Nagarjuna is an integrated Agribusiness Group with core competencies in the fields of plant nutrition, plant protection, irrigation, farm services and agricultural output management.

Our products and services are designed to provide our consumers access to safe, nutritious and better tasting food products and to provide our growers with maximum economic returns. With a total agribusiness of over US$ 1 billion, we are one of the most recognized agricultural brands in India.

We are present across the entire plant nutrition value chain.

Figure 2. Our Core Values

1.4. Our Brand, Products and Services

Nagarjuna is one of the most respected and successful Plant Nutrition Brands in the country. Our presence in the entire plant nutrition value chain is established by our product and service offerings and product portfolio.

(A) Product and Service Offerings

1. Nutrients – Nitrogen, Phosphate, Potash and Micro Nutrients (Bulks and Specialties)
2. Biologics – Organic Acids, Enzymes, Organic Fertilizers, etc.
3. Irrigation and Nutrigation Systems
4. Plant Nutrition Services

(B) Plant Nutrient Product Portfolio

1. Manufactured (Urea)
2. Non-Manufactured (DAP, MAP, MOP, Water Soluble Fertilizers, Micronutrients, Bio-products, Customized Fertilizers, and Seeds).

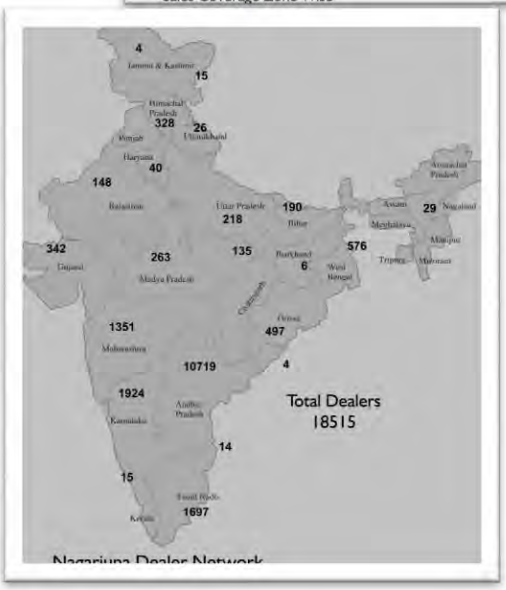
1.5. Sales and Marketing Network

Nagarjuna has the largest market penetration *'through various agricultural input companies, product brands and ranges'.* Our company uses the Groups' Pan-India Brands, Sales, Marketing and Distribution capabilities to sell its products.

Impact of Our Reach & Strong Relationships

Reach: We sell products

1. Across all the 28 states and union territories in India
2. In all the agriculturally important villages across the country
3. Directly to village level retailers



Relationships: Nagarjuna has

1. Decades old, strong and proven relationships with farmers and retailers
2. Continuous intensive farmer and retailer relationship management programs
3. Strong and continuous farmer and retailer development programs

Results: As a result of our efforts, Nagarjuna is fortunate to have

1. Loyal customers - Farmers and Retailers.
2. High volume growth, vertical growth, 'same product sales' and horizontal growth.
3. Premium pricing vis-à-vis competition
4. Negligible accounts receivable
5. Demand for various products which exceeds supplies

Market Position in India

Nagarjuna is today the largest specialties fertilizer company in India (with 30% of the Indian market share it introduced the concept of specialties in India). Nagarjuna is also one of the largest bulk fertilizer companies in India with market leadership positions in most of the markets and products that we serve.

It is widely recognized by agronomists that plant nutrition is directly responsible for approximately half of the agricultural yield.

The balance is provided by other factors like better irrigation, imported seeds, cultivation practices, pest control and planting.

Nagarjuna is one of the leading manufacturers and suppliers of plant nutrients in India. The potential benefits from improved plant nutrition are virtually limitless. With the right plant nutrition, it is not surprising that the grower can produce higher yields, better flavored and greater

nutritional food products, which form the core of our plant nutrition strategy.

We supply a broad portfolio of nutrition products and services that include both macro and micro fertilizers.

We believe that farm profitability is dependent on comprehensive farm advisory services that make precise application of nutrients possible while empowering customers in making the right farm business decisions. We employ information technology and soil testing for nutrient recommendation.

Over the last 26 years, Nagarjuna Fertilizers and Chemicals Limited marketed a cumulative 797,56,033 MT of fertilizers, serviced a cumulative 53,60,18,229 acres of land area and managed a cumulative 21,69,55,907 farmer engagements

Venturing Beyond India

Nagarjuna is also growing into other markets beyond India. Nagarjuna is already selling into a few African Countries through dealers but is aggressively expanding into direct marketing in Africa and plans to enter South America and other Asian Countries soon.

1.6. Supply Chain Operations

Our international procurement system with strong long term supplier relationships and new supplier development capabilities have given us the capacity to cut costs, increase market share and profitability without too much dependence on relying on own manufacturing capacity. We have highly

advanced, efficient and proven pan India logistics network, which includes transport management (shipping, rail, and road), handling and storage/warehouse management.

Nagarjuna Pan India Storage and Warehousing Capability

- From 13,000 ton warehouse near ports to 100 tones at village level
- Total warehousing capacity over 300,000 tones

Port Operations
Coverage and Network

Rail Operations
Coverage and Network

Northern Railway
Northern Eastern Railway
North East Frontier Railway
North Central Railway
North Western Railway
Eastern Railway
East Coast Railway
East Central Railway
Central Railway
Konkan Railway
Southern Railway
South Eastern Railway
South East Central Railway
South Central Railway
South Western Railway
Western Railway
West Central Railway

Port handling and Packing

- Port operations handling experience across India as seen in the diagram
- Handled Bulk cargo as well as Containers
- Deep water operations experience as well as shallow water through barges
- Packaging range from 100 gms to 50 kg bags from bulks as well as container cargo.

Road Operations Network

Truck Capacities

1.7. Micro Irrigation Business

One of the most serious challenges for mankind in the 21st century will be triggered by the scarcity of fresh water. India is heavily dependent on agriculture as a key driver of economy. The combined impact of population growth, pollution and climate change are likely to produce a drastic decline in water supply in the coming decades. Supplies are already problematic for up to a third of the world's population.

As agriculture alone consumes 60% of today's fresh water, it is imperative that water saving should start from here. Micro-irrigation provides the best solution.

Nagarjuna's micro irrigation business started in the year 1994 to address the irrigation problems of farmers living in water and energy scarce regions and also in regions where water, energy and agricultural input (labor, nutrition and plant protection) supplies are expensive. Since then, Nagarjuna has accumulated a depth of agronomic knowledge that enables it to respond to the specific needs of a crop and the grower with the right product and service solution.

We offer products and services that ensure slow, regular and precise delivery of water and agricultural inputs to the crop. The result: optimum growth and healthy plants, fewer pests, healthy environment and substantial cost savings.

We are constantly expanding our capacity, product portfolio and market presence. We are the second-best and second-largest micro irrigation company in India.

1.8. Agri Services Business

We provide services to facilitate farm yield and profitability enhancement through timely agricultural technology transfer and critical information dissemination, both online and offline through the Company's SBU iKisan.

We have a wide experience in farm produce procurement, primary processing, storage, secondary processing, packaging, branding and marketing, as also trading and exporting.

1.9. Research & Development

Over the years, our relentless R&D efforts have played a crucial role in our success in -

- Engineering superior seeds to enhance yield and quality of target crops
- Developing new plant nutrition, plant protection and micro irrigation products and services.
- Developing advanced manufacturing technologies
- Constantly creating, updating and providing valuable agricultural information both online and offline – to develop knowledge and solutions critical for improvement of farm productivity.

Despite the dramatic shift in scientific advances in recent decades, there are still better solutions waiting to be discovered. Researchers around the world are searching for new approaches to agriculture.

In line with our mission, we are investing substantial resources in cutting-edge basic research for providing consumers access to safe, nutritious and better tasting food products and for providing farmers with maximum economic returns.

1.10. Fuels & Feedstocks Business

Our aim at Nagarjuna is to meet the Fuels, Feedstocks and Energy needs, in ways that are affordable and environmentally viable, now and in the future. Nagarjuna is an upcoming integrated energy enterprise with core competencies in the fields of petroleum and power.

Bio Fuels and Feedstocks

Nagarjuna is in a unique position with experience and understanding of the Agriculture Sector, the traditional Hydrocarbon Fuels and Feedstock Sector and Industrial Biotechnology, which provides us with unique insights and opportunities to develop sustainable and competitive fuels and feedstocks.

The Group has invested significantly and developed unique competence in developing, identifying, integrating and scaling up patented 3rd generation biofuels and feedstock production technologies. Our versatile and competitive research platform covers seed research, biomass separation and treatment research, microbial engineering, fermentation technology development, product separation and purification technology development and scale up.

Our global patents cover all aspect of biofuel products from novel seeds to product purification technologies. The company has access to and has ongoing global research alliances with reputed research institutes and agencies. Being in the agriculture, hydrocarbon and chemical business for the past several decades, the company has access to the current and past business relationships with the largest of agri, chemical and oil companies in the world. This gives the company a unique opportunity to establish and commercialize products and technologies sooner than most companies in the space.

Silicon Feedstocks

Nagarjuna has recently entered into the Silane Chemistry Business. The business based out of Luxembourg and Germany is focused on developing and commercializing next generation silane chemicals for applications in solar power, semi conductors and high end ceramics.

2. Our Approach to Business Sustainability

2.1. Our Corporate Sustainability Policy

Our approach to business sustainability stems from our strongly held urge to be in harmony with nature and community. Ever since we began our business of fertilizer production at Kakinada in the state of Andhra Pradesh, India, in 1992, it has been our constant endeavor to go beyond the stipulated regulatory standards for environmental and social performance.

Nagarjuna Group is a dream willed into reality by our founder - Shri K V K Raju - a visionary who had a firm belief in his mission of 'Serving Society through Industry'.

This mission has been the guiding light of our Group and has had an overarching influence on our management approach.

Our achievements in implementing best safety practices, adopting best occupational health standards, protecting the environment, effective management of resources – water and fuel, deploying technological innovations, and working with the local community and other stakeholders have not only motivated us to take on new challenges to raise the benchmarks but also helped us in building a culture of concern for society and environment around us.

Our Guiding Principles

- To promote awareness of environment, health, safety and social responsibility among all stakeholders – employees, alliances, investors, customers and suppliers.
- To ensure implementation of best practices in the areas of environment, health, safety and social responsibility across the value chain.
- To audit and report on regular basis various measures adopted towards fulfilling our responsibilities towards all our stakeholders.

The Scope of our Corporate Sustainability Policy covers our

Products

Production Facilities

Offices

Supply Chain

2.2. Our Corporate Social Responsibility Policy

What does CSR mean to us?

At Nagarjuna, practicing CSR means integrating social and environmental objectives with our core business objectives to meet all stakeholders' expectations.

It implies,

- Conducting affairs of our company in a socially acceptable manner
- Understanding, supporting and developing the communities and the cultures within which we work
- Protecting the environment and safety of the people connected with the company and the surroundings
- Enhancing the value of the company through sustainable growth

At Nagarjuna, CSR is an initiative to "create new value" to economic, environmental and social issues. We at Nagarjuna undertook a study in 2008 to assess our various CSR initiatives and provide a better focus, thrust and consolidate the various activities already being performed by the Company.

At Nagarjuna, our CSR approach is to identify our company with the society to establish rapport, increase competitiveness and achieve sustainable growth for better social development.

As a responsible corporate citizen, our efforts are focused to take care of all our stakeholders – customers, employees, regulators, investors, suppliers, local community and the environment.

Nagarjuna Foundation was established to act as an 'umbrella' for our CSR efforts. Nagarjuna Foundation has been able to take forward this initiative and contribute to society in Social welfare, Education, Environment, Health Care, Sports and Cultural Activities.

Our Guiding Principles

- We recognize that we must integrate our business values and operations to meet the expectations of all our stakeholders, that includes customers, employees, regulators, investors, suppliers, the community at large and the environment.

- We recognize that our social and economic responsibility and commitment to preserve the environment form an integral part of our

business. We aim to demonstrate these responsibilities through effective policy formulation and implementation.

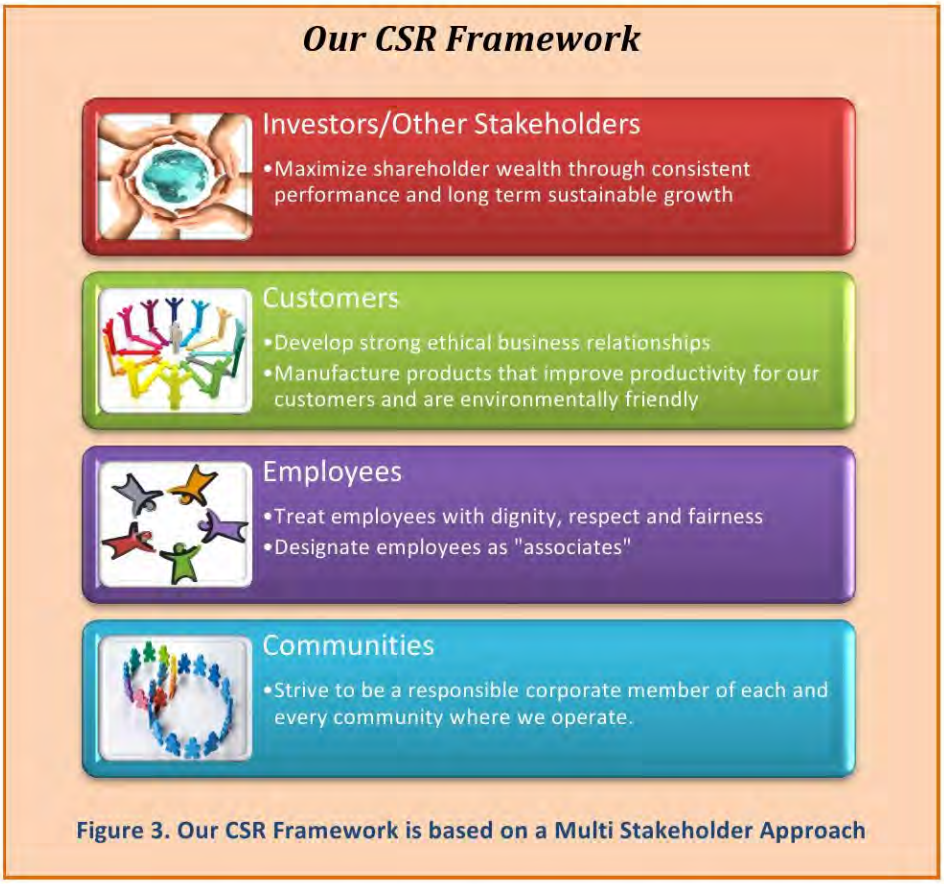


Figure 3. Our CSR Framework is based on a Multi Stakeholder Approach

- We take into serious consideration all feedback from our stakeholders and aim to meet their aspirations and our commitments.

- We strive to be honest and transparent, at all times, in our communication with all our stakeholders on all aspects of our governance, corporate strategy, targets and performance.

- The responsibility of translating this CSR policy into action rests with all associates throughout the company.

Nagarjuna Foundation

Nagarjuna Foundation has supported nearly 250 NGOs and touched the lives of nearly 16,000 infants, children, youth, elderly, several physically

disabled and those infected with life threatening diseases among others. These initiatives are spread across the country where the Corporate Office, manufacturing facilities and 30 branch offices of the company are located. Nagarjuna takes up the initiatives through contribution and support which varies from donating various capital goods such as solar water heaters, water purifiers, geysers, computers, inverters, refrigerators, furniture, etc., along with essentials like groceries, clothes, school uniforms, blankets, medicines, books and other stationery items etc.

2.3. Our Focus on Environment Management

A holistic approach towards environment management championed by our founders, led to the formulation of an Integrated Environmental Management Plan (EMP). The EMP was envisioned during the conceptualization stage of the project itself and emphasis was laid on

Figure 4. Approach to Environment Management

adhering to strict international standards. We have adopted a proactive approach in environment management that is more concerned with integrated approaches -*"Pollution Prevention" – rather than end-of-the pipe approaches -"Pollution Control"*. Our plant operations follow the 3R concept - Reduce, Recycle and Reuse – as a preventive measure, wherever possible.

Our Environment Management Philosophy

"While laws and regulations are promulgated to control pollution, the fulfillment of this objective depends on the social responsibility of those engaged in industry.

This responsibility extends much beyond the narrow confines of compliance with the statutory stipulated standards.

Our aim is, and must be, to maintain ecological harmony that is nature's invaluable gift to the mankind."

Our goal is to remain a zero-effluent discharge facility which focuses our efforts to develop innovative ways to detoxify or neutralize effluents.

A key aspect of our EMP is the development and maintenance of a green belt adjacent to our fertilizer plant at Kakinada. The green belt supports diverse flora and fauna and is a safe habitat for wildlife. This vast expanse of natural forest acts as a carbon sink and is an ecological asset. We maintain a zoo that hosts star turtles, deer, and various bird and animal species. These wild animals have been nurtured under professional expertise and care. This mutual coexistence of our Business with Nature is a visible evidence and testimony to our contribution to Nature.

Our Safety Policy

"NFCL shall ensure that the fertilizers produced, the material used, the additives and intermediate products are processed and manufactured, handled, stored, transported, distributed and used in a safe way with regard to health, occupational and public safety , environment and security"

Nagarjuna Group's commitment towards Environmental Management is widely appreciated and prestigious awards were conferred by International Fertilizers Association (IFA, France), Fertilizers Association of India (FAI, New Delhi), Chemical Manufacturers' Association, World Environment Foundation, CII, FE & VI, Indian Chemical Council, GAIL Greentech Foundation, etc.

The technology of the plant coupled with the equipment design and the additional measures have enabled the manufacturing facility at Kakinada to treat their major effluents within the respective plants and recycle back

for process reuse. The pollutants emitted are much lower than the prescribed emission levels.

NFCL has a track record of being one of the best operators of fertilizer plants following the best global Environment, Health and Safety standards. Various measures such as Water Conservation measures, Water and Air Pollution Control measures, Carbon Footprint study and other measures are taken up regularly, which is reflected in the table below.

Energy and Water Consumption, Effleunt Generation for 2012-13

	Norm	Performance
Specific energy consumption	5.712 Gcal / MT Urea specified by the Government of India	5.600 Gcal/MT of Urea
Specific Water Consumption	8.0 M^3/MT of Urea specified by CREP	5.129 M^3/MT of Urea
Specific Effluent Generation	1.5 M^3/MT of Urea specified by CPCB norm	0.661 M^3/MT of Urea

In 2009-10, Carbon Dioxide recovery unit was commissioned to reduce energy consumption and air pollution. NFCL fertilizer plants are being operated with 3.16 million accident free man-hours as on March 31, 2012.

2.4. Customer Health & Safety

We have adopted the principles of **"Product Stewardship Code"** of Responsible Care Management system for urea – the single product being

manufactured at our Kakinada plant. Product Stewardship demonstrates our commitment to Responsible Care through active assessment of our products at every stage in their life cycle, from the sourcing of raw materials, through manufacture and use, to eventual disposal.

Carbon Footprint

NFCL's carbon footprint is the second best under Nitrogenous Fertilizer manufacturing industries in India.

This involves us working very closely with our customers, suppliers and others in the supply chain to ensure that they understand the environmental, health, safety and security (EHS&S) issues related to our products.

According to the requirements of Product Stewardship Code, we have developed procedures to address EHS&S related issues emanating from use of urea by farmer.

Basically, urea is non-hazardous in nature; however, we have established awareness programs for our stakeholders (farmers, distributers, transporters and general public) on effective usage, transportation and emergency responses at various stages.

We have completed the Process Safety Management System (PSMS) and have undertaken actions for obtaining accreditation RC 14001 towards Responsible Care Management. The same approach will be followed for upcoming new products also.

We are also complying with Hazardous Wastes (Management, Handling and Trans-boundary) Rules 2008.

2.5. Global Warming Mitigation & Energy Policy

Global Warming Mitigation

We have adopted global warming mitigation measures to reduce our carbon footprint. In 2011, we carried out GHG (Green House Gas) inventorization (carbon footprint study of NFCL Complex) using the guidelines of ISO 14064 with the assistance of CII-Sohrabji Godrej Green Business Centre.

This analysis has given us a focused approach to identify opportunities for reducing or eliminating GHG.

Our Energy Policy

We have defined our Energy Policy with a focus on continuous energy improvement. Every year, we launch energy saving schemes targeting reduction in specific energy consumption, reliability improvement and adoption of advanced technologies.

2.6. Our Key Performance Indicators and Targets

The key performance indicators for us are-

- Specific energy consumption
- Specific GHG emissions
- Specific water consumption
- Specific effluent generation
- Renewable energy usage
- Substitution of non-environment friendly materials
- Raw material utilization

The targets for the next 3 years (2012-13 to 2014-15) have been determined and widely communicated to our stakeholders. Our experience tells us that we have fared much better on most of the above parameters as compared to the statutory norms or our peers' performance in our industry.

These targets for NFCL Complex are set by the site in-charge after consultations with all departments, and then put forward to the Director and Chief Operating Officer for approval.

Sustainability Performance Targets 2012-15

- *Specific Energy consumption reduction by 0.25% every year compared to previous year*
- *Specific Raw Water Consumption reduction by 0.5% every year compared to previous year*
- *Specific Effluent Water generation reduction by 0.5% every year compared to previous year*
- *Phasing out Ozone Depleting Substances (ODS) by 2016*

3. Overview of Sustainability Performance

3.1. Sustainability Performance in last 5 FYs – 2008-09 to 2012-13

Sustainability Parameter		2012-13	2011-12	2010-11	2009-10	2008-09
Planet						
Emissions						
Carbon Emission Intensity for Urea	MT CO2e/MT Urea	0.51	0.52	0.49	0.50	0.64
Carbon Emission Intensity for Ammonia	MT CO2e/MT Ammonia	0.89	0.91	0.86	0.88	1.12
Total GHG Emissions from NFCL Facility	CO2e emissions (thousand MT)	797.7	810.5	813.6	742.0	876.3
Resource Consumption						
Specific Raw Water Consumption	M3/MT Urea	5.13	5.20	5.05	5.17	5.29
Specific Energy Consumption	G Cal/MT	5.60	5.64	5.60	5.59	5.61
Waste Generation						
Specific Effluent Water Generation	M3/MT Urea	0.66	0.67	0.68	0.77	0.78
Disclosures						
Unplanned Air Releases	No of incidents	1	3	3	1	4
People						
Development Initiatives						
Employees	Training Man days/ Employee	3.12	6.76	4.21	3.90	4.01
Grievance Redressal[1]						
Conflict Resolution (Employees)	%age of cases resolved	NIL	NIL	1	NIL	NIL
Employee Attrition						
Voluntary Turnover Cases	%age of total employee strength	11.47	17.9	12.62	13.07	16.50
Health & Safety						
No. of accidents/fatal injuries	No. of reportable cases	NIL	1	NIL	NIL	NIL
Social Spend						
CSR Initiatives	In Cr	1.26	1.13	1.16	0.60	0.02
Employee Welfare Activities[2]	In Cr	9.43	35.63	52.66	7.56	6.05

[1] Cases Resolved/Cases Reported in a year
[2] Excludes salary and fringe benefits

Profits						
Annual Production						
Urea	MMT	1.566	1.563	1.655	1.482	1.378
Sales						
Sales (of Manufactured Urea)	MMT	1.568	1.563	1.648	1.505	1.397
Sales of specialty fertilizers	MTS	12853	12211	9226	8263	9890
Sales of micro irrigation equipment	In Rs Crores	190.77	146.34	117.03	95.76	60.88
Returns						
Profit after Tax	in Rs Crores	81.06	135.96	117.35	66.37	32.41
EPS	in Rs	1.36	2.27	2.74	1.55	0.76
Liabilities and expected financial implications						
Land Acquisition Cases	No of Cases(Amount)	10 (88 lacs)	10 (<88 lacs)	10 (<88 lacs)	--	--
Employment Cases	No of Cases(Amount)	3(5.5 lacs)	3(5.5 lacs)	3(5.5 lacs)	--	--
Compensation Cases	No of Cases(Amount)	22(2.76 Cr)	24(2.76 Cr)	24(2.76 Cr)	--	--

3.2. Major Awards & Accolades Won by the Company

Year	Awards & Certifications	Area
2012	CII Environmental Best Practices Award 2012 for implementing dry de-dusting system at conveyors area of Urea Plants under the 'Most Innovative Environmental Project' Category.	**Safety, Health, Environment & Security**
2011	We have voluntarily undergone "RC Logo Audit" by Indian Chemical Council (ICC), to assess the extent of implementation of RC requirements in various codes of practices as per the guiding principles of ICC. (Received the prestigious RC 14001 : 2008 [Responsible Care] certification)	**Safety, Health, Environment & Security**
2011	National Safety Council Award for the year 2010 for developing and implementing good Occupational Safety and Health Management Systems & Procedures and achieving significant performance.	**Safety, Health, Environment & Security**
2011	Fertilizer Association of India (FAI) Award for 'Excellence in Safety for the year 2009-10'.	**Safety, Health, Environment & Security**
2011	Economic Times and Frost & Sullivan prestigious 'India Manufacturing Excellence (IMEA) – Platinum Award' in 'Process Sector' category for the year 2010.	**Best Management**
2011	British Safety Council's Merit Award for the year 2010 awarded for commitment to the health, safety and well-being of workforce (British Safety Council, UK, 'International Safety Award for Best Safety Performance'.	**Safety, Health, Well Being**
2010	Best Management Award from AP State Government for the year 2009-10 for maintaining excellent cordial industrial relations and for effective implementation of employee welfare activities.	**Best Management**
2010	The 'Financial Express-Emergent Ventures Green Business Leadership' Best Performer Award for the year 2009-10 under Chemicals and Fertilizers category organized by The Financial Express & Emergent Ventures in India.	**Best Performance**
2010	Two awards from Indian Chemical Council (ICC), Mumbai, for the year 2009-10. The awards have come in the categories of "Water Resource Management in Chemical Industry" under EHS Environment and "Certificate of Merit" for the 'Best Complaint under Responsible Care for Codes Environment Protection and Process Safety Management'.	**Water Management/ Environment Protection/ Process Safety**

2009	Two awards from the Fertilizer Association of India (FAI).We won the prestigious FAI Environmental Protection Award in the Nitrogenous Fertilizer Plants category and stood as joint winner for excellence in Safety Award. We have been awarded for the 3rd consecutive year and 5th time in the span of last 8 years and this reckoning has been done out of 31 Nitrogenous Fertilizers Plants in the country.	**Environment Protection/Safety**
2009	Green Leaf 2nd Runner-Up Award in the Global Competition for Excellence and Innovation in Safety, Health and Environment held by International Fertilizer Industry Association (IFA).	**Safety/Health/ Environment**
2008	National Safety Council Award from National Safety Council, Andhra Pradesh, Chapter fro implementing the Process Safety Management Systems (PSMS).	**Safety/Health/ Environment**
2008	For the third time, Nagarjuna Fertilizers and Chemicals Limited has won the prestigious FAI Environmental Protection Award in the nitrogenous fertilizer plants category for the year 2006-07. NFCL has been honored for outstanding contribution for the sustainability of ecological balance at Kakinada Plant. This Award reflects the collective effort, dedication and commitment of NFCL associates and responsibility of NFCL towards the society.	**Safety/Health/ Environment**
2007	NFCL has been awarded with prestigious 'National Award for Excellence in Water Management' by CII-Sohrabji Godrej Green Business Centre, Hyderabad.	**Water Management**
2006	NFCL has won the 'Best Technical Innovation' Award from Fertilizer Association of India for performance excellence in the filed of production technology.	**Best Performance**
2006	NFCL has been awarded with 'Best Management' by Labour Department, Govt. of Andhra Pradesh on the occasion of May Day.	**Best Management**
2006	NFCL participated in the Corporate Social Responsibility Award – 2004-05 competitions, which were organized by The Energy and Resources Institute (TERI), New Delhi. A total of 180 companies participated. NFCL was short listed in the Best Ten Companies and given a 'Certificate of Appreciation', for its efforts towards good Corporate Citizenship and sustainable initiatives amongst Corporates with turnover above 500 crore rupees.	**Sustainability**
2006	Award for 'Excellence in Natural Gas Conservation' in the Fertilizer Sector category from Gas Authority of India Limited (GAIL).	**Sustainability**
2005	FAI (Fertilizer Association of India) Environment Protection Award in the Nitrogenous fertilizer plants category for the year 2004-05.	**Safety/Health/ Environment**
2005	5 Star Rating in O H & S Audit from British Safety Council, UK	**Safety/Health/ Environment**

2005	Commendation Award in 'Leadership and Excellence Awards in Safety, Health & Environment (SHE) 2004', by Confederation of Indian Industry, Southern Region, Chennai	**Safety/Health/ Environment**
2005	Water Efficient Unit Award during 'National Award for Excellence in Water Management 2004' by Confederation of Indian Industry, Hyderabad	**Water Management**
2004	Award for Good Practices in Cleaner Production and Pollution Control by A P Pollution Control Board.	**Safety/Health/ Environment**
2004	Environmental Protection Award in Nitrogenous Fertilizer Plants for 2001-02 by Fertilizer Association of India.	**Safety/Health/ Environment**
2002	OHSAS 18001 Certification from BVQI, Netherlands.	
2002	Commendation Trophy by National Safety Council for implementing OHSAS 18001 by A P Chapter and Director of Factories, Andhra Pradesh.	**Safety/Health/ Environment**
2001	Bronze Award for Occupational Safety for 2001 by ROSPA, UK.	**Safety/Health/ Environment**
2001	Best Environmental Improvement Effort by Industries located in the State by FAPCCI.	**Safety/Health/ Environment**
2001	Best Environmental Management Plan 2000-01 by A P Pollution Control Board, Visakhapatnam.	**Safety/Health/ Environment**
2001	Bronze Award for Occupational Safety for 2000 by ROSPA, UK	**Safety/Health/ Environment**
2000	Best School Industry linkage by NCERT	**Education**
2000	ISO 14001 EMS Certification by BVQI, Nethelands.	
2000	3 Star Rating in OH&S Audit by British Safety Council, UK	**Safety/Health/ Environment**
2000	Vanamitra Award 1999 for developing and maintaining Green Belt by Govt. of Andhra Pradesh	**Safety/Health/ Environment**
1999	Merit Award for 1998 by Royal Society for the Prevention of Accidents (ROSPA).	**Safety/Health/ Environment**
1999	Paryavarana Parirakshak Award by Rotary International District 3020 & Rotary Club of Waltair.	**Safety/Health/ Environment**
1999	Golden Peacock Environment Management Award 1998 by World Environment Foundation (WEF), New Delh	**Safety/Health/ Environment**
1999	National Safety Award for 1998 by Bristih Safety Cuncil, UK	**Safety/Health/ Environment**

1999	'Best Workers Welfare (including Family Planning) effort by an Industrial or Commercial Unit in the State' for 1997-98 from A P Chamber of Commerce and Industry.	**Best Management**
1998	National Safety Award for 1997 by British Safety Council, U K	**Safety/Health/ Environment**
1998	Merit Award for 1997 from ROSPA, U K	**Safety/Health/ Environment**
1998	Awards for Innovative and Purposeful Programmes for 1996 from ICMA, Mumbai	**Best Management**
1997	National Safety Award for 1996 by British Safety Council, UK	**Safety/Health/ Environment**
1997	Award of Merit for 1994-95 from National Safety Council, USA	**Safety/Health/ Environment**
1996	Rajiv Gandhi Parti Bhoomi Mitra Award for 1994-96 by Waste Land Development, Govt. of India.	**Safety/Health/ Environment**
1996	National Safety Award for 1995 by British Safety Council, UK	**Safety/Health/ Environment**
1996	Golden Peacock National Quality Award for 1995 by Institute of Directors, New Delhi	**Safety/Health/ Environment**
1996	Awards for Environmental Control Strategies & Safety in Chemical Plants for 1994 from ICMA, Bombay	**Safety/Health/ Environment**
1995	Best Industrial Canteen for 1994 by National Safety Council, A P Chapter, Hyderabad	**Safety/Health/ Environment**
1995	Good Housekeeping for 1994 by National Safety Council, AP Chapter, Hyderabad	**Safety/Health/ Environment**
1995	ISO 9002 Certification from BVQI, Netherlands	
1995	National Safety Award for 1994 by British Safety Council, UK	**Safety/Health/ Environment**
1993	'EPIC' Award for Anti Pollution measures taken by the Industry from Environment Public Interest Committee, Kakinada.	**Safety/Health/ Environment**

4. Governance Structures & Accountability Framework

4.1. Corporate Governance Policy

At Nagarjuna, corporate governance means self regulation, upholding our core values, and conducting business in an ethical manner. We are open to new ideas and strive to evolve better management practices to enable us to manage our responsibilities more effectively and deliver our commitments to our stakeholders on a sustainable basis. Our company is driven by a desire to be more competitive and to be globally recognized.

Governance Philosophy

"Building a culture of compliance is more than meeting regulations and standards."

We have been pioneers in inculcating the principles of ethical business during our early years in Industry, much before it was brought out, by the Govt. of India, as a statutory compliance through clause 49 of the Listing Agreement.

Our philosophy on corporate governance is based on preserving core values and ethical business conduct, commitment to maximizing shareholder value on a sustained basis while looking after the welfare of multiple stakeholders -a fundamental value shared across our company – from our Board of Directors, management, to our associates, and is also critical to our success.

This value system has helped us institutionalize structures and procedures that have improved the efficacy of the Board and has inculcated a culture of transparency, accountability and integrity across the company.

Our commitment to stakeholders rests on our belief that corporate reputations are built and sustained on long term basis from perceptions of management strength, corporate performance and corporate values.

Our contributory factor is our self regulatory system of prompt reporting, monitoring, certification, and voluntary code of practice and standards, which improves management effectiveness, supervision and accountability to stakeholders.

Our business conduct is based on the principles of – trusteeship, transparency, accountability, quality and service, integrity, professional interaction and mutual respect.

Our Board of Directors comprises eminent individuals from diverse disciplines with immense knowledge, which represents the stakeholders' interests in perpetuating a successful business and optimizing long term financial returns.

We ensure that the majority of our Board is constituted by strong and independent Directors who can exercise objective judgment independently.

We encourage informal meetings of independent directors before the scheduled Board meeting to ensure free and active participation from all the independent directors. A prominent non-executive director is designated as the "Lead Independent Director".

Our Board takes active participation on matters relating to policy formulation, its implementation and strategic issues, which are crucial for the long term development of the organization.

Our Governance Principles

***P**reserving core values and ethical business conduct*
***C**ommitment to maximizing shareholder value on sustainable basis*
***E**nhance the efficacy of the Board and inculcate a culture of transparency, accountability and integrity across the company*
***P**erceiving and mitigating the various risks that impact the company*
***M**aking timely and transparent disclosures*
***L**egal and statutory compliances*

The Board functions through various committees to enhance the Board's effectiveness. Each committee has a charter delineating the committee's jurisdiction, duties and responsibilities. This ensures better focus, oversight and monitoring of sensitive matters:

1. Management Committee
2. Banking Committee
3. Investment Committee
4. Asset Sale Management Committee
5. Warrants Committee
6. Remuneration Committee
7. Shares and Debentures Committee
8. Audit Committee
9. Investor Grievance Committee

Timely communication of our financial performance and addressing investor grievances are of utmost importance to us. It is worthwhile to mention that NFCL is one of the first companies to forward unaudited financial results and related shareholder information through emails to the

shareholders. This was later mandated by the Ministry of Corporate Affairs, Govt. of India.

We also forward important communications in the vernacular to enable shareholders to understand the notices being sent by the company. This helps us in getting response from our shareholders.

4.2. Sustainability Performance Parameters

The current awareness on environmental issues pertaining to industrial projects lays an emphasis on communicating our strategic imperatives and sustainability performance to all our stakeholders. Transparency plays an important role in building trust amongst our stakeholders.

We have identified **key environmental performance indicators** – *specific energy consumption, GHG emissions, specific water consumption, specific effluent generation, renewable energy usage, substitution of non-environment friendly materials, raw material utilization and optimization* – that are periodically monitored.

With regard to our **social performance**, we are conducting periodic benchmarking surveys, employee engagement studies through external consultants, and various interactive development programs, community awareness programs by in-house and external faculty. We gather feedback on these initiatives that act as inputs for future target setting.

4.3. Accountability Structure for Social and Environmental Performance

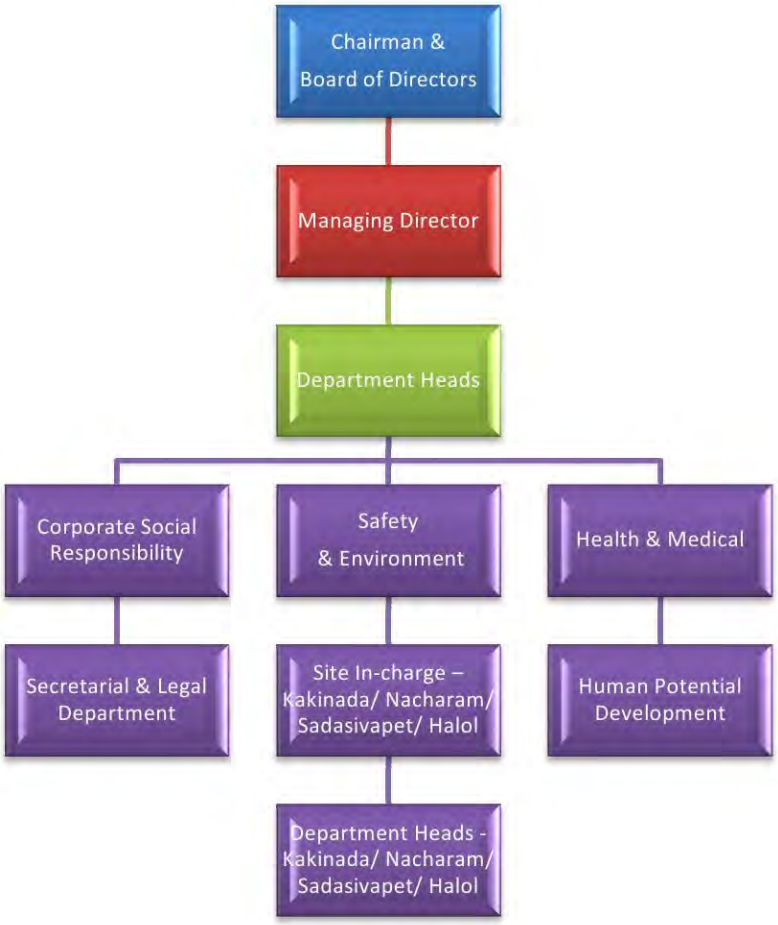


Figure 5: Accountability Structure for Environmental & Social Performance

4.4. Monitoring Impact and Assessing Risk

We have conducted Impact and Risk Assessment Studies thrice since the inception of the company- in 1989, 1996 and 2011. We had engaged Richardson & Cruddas Ltd., Chennai, for the first study in 1990 and TCS, Pune for the second study in 1994.

For the recent study in 2011, we had engaged National Environmental Engineering Research Institute (NEERI), Nagpur for Environment Impact

and Risk Assessment on air, noise, water, land and other ecological parameters and socio-economic components.

In the process of their study, NEERI surveyed 10 villages that are within a radius of 10 km of the Kakinada plant. NEERI also collected secondary data from various govt. agencies, e.g., Forest Department, Census Office, and Meteorological Department for the prediction of impacts on air, noise, water, land, biology/ecology and socio-economic environment. NEERI certified that the plant does not have any major negative impact.

4.5. Corporate Ethics

As a responsible corporate, we consciously follow corporate ethics in both our business and corporate interactions. The various codes and policies adopted by the company act as guiding principles in its functioning. Some of our codes and policies are -

- Code of Conduct and Ethics for Senior Management
- Code of Conduct for Prevention of Insider Trading
- Legal Compliance Policy
- Whistle Blower's Policy
- Policy of Vendors' Grievances
- Policy on Supply Chain
- Policy on Succession Planning
- Policy on Employee Participation in Management
- Policy on Conflict Management
- Policy on Training for Board of Directors
- Policy on Induction of Directors
- Policy on Corporate Governance
- Policy on Corporate Sustainability
- Board Charter

All new hires/associates are taken through key company policies, codes of conduct and ethics, computer usage undertaking, non-disclosure of confidentiality agreement and standard operating procedures (SOPs) of the company during the induction program that is coordinated by the Human Potential Department (HPD).

The HPD manual containing details of various policies of the company is shared with the associates from time to time at various work locations by the representatives of HPD and any queries of the associates are clarified.

We have taken strong measures to prevent corrupt practices. Instances of corruption (integrity related subjects) are viewed seriously and strong action is initiated against those involved. The investigation process is supported by Internal Audit Department as well as specialist external agencies hired on need basis.

5. Triple Bottom Line Strategy – People, Planet, Profits

5.1. The Changing Business Paradigm

The global population is growing at the rate of 1.1% and it is estimated that by year 2050, it would be over 9 billion. Availability of natural resources like water and fossil fuels would not only become scarce but also critical in some parts of the world.

It has been estimated that water and food security would be the two major concerns for the global economy by the middle of this century. This is bound to put pressure on agricultural productivity. The key challenge would be to offer sustainable solutions to the farming community to raise crop yield without damaging the environment.

It is understood that in such a demand-driven, resource-constrained scenario, the demand for fertilizers would increase manifold accentuating the need for environmentally responsible and sustainable fertilizer production technologies

Figure 6. The 3BL Approach

Further, bringing awareness on fertilizer best management practices to ensure optimum usage and better information sharing practices would be a challenge.

Being a fertilizer company, we foresee our role as vital in ensuring food security. Fertilizers provide necessary nutrients to crops to improve yield. However, the fertilizer production process, transportation, storage and end-user applications can impact the environment in many unfavorable ways – greenhouse gas emissions, water and soil pollution.

Our effort to define our triple bottom line strategy largely rests on our extensive analysis of the impact of our business operations on environment, economy and society.

5.2. Impact of Business Operations on Environment

Major **Fertilizers** fall into three general categories - nitrogen **(N)** based, phosphorus **(P)** based, and combined nitrogen-phosphorus **(N-P)** based. Our company is into the production of nitrogen **(N)** based fertilizer – urea.

Urea (NH2CONH2) is also known as carbamide, carbonyl diamine, carbamimidic acid and isourea. It has the highest nitrogen content of all solid nitrogenous fertilizers in common use. Therefore, it has the lowest transportation costs per unit of nitrogen nutrient. Urea is highly soluble in water and is, therefore, also very suitable for use in fertilizer solutions (in combination with ammonium nitrate: UAN), e.g., in 'foliar feed' fertilizers.

*A **Green House Gas** (GHG) is a gas in the atmosphere that absorbs and emits radiation within the thermal infrared range.*

This process is the fundamental cause of the Greenhouse effect which is the prime contributor for global warming.

*"**Global Warming**" refers to the increase of the Earth's average surface temperature due to a build-up of greenhouse gases in the atmosphere.*

Production of urea requires ammonia (NH_3) and carbon dioxide (CO_2) as the inputs. The process is energy intensive typically requiring significant use of energy from fossil fuels, and resulting in significant generation of greenhouse gases. The potential environmental issues associated include the greenhouse gas emissions (GHG), wastewater, hazardous materials, other wastes and noise.

In recent times, considerable interest and concerns have been generated around greenhouse gas emissions from industries.

Climate change poses a major threat to our existence. The vast majority of climate change research strongly confirms a direct relation between human activity, the rising levels of greenhouse gases in the atmosphere and climate change.

The impacts of growing GHG emissions such as higher average temperature, rising sea water level, submerging of low-lying areas and unpredictable changes in climatic conditions are being validated and noticed day by day.

Climate Change

is defined as, "change of climate that is attributed directly or indirectly to human activity that alters the composition of global atmosphere and which is in addition to natural climate variability observed over comparable time periods."

India has been identified as one of the climate change *"hotspots"* joining a group of countries which are amongst the most vulnerable to such hazards. Increasing GHG levels in the atmosphere and associated impacts have instigated Governments, Non-Governmental organizations and individuals to take proactive measures to curtail the rate of growth of GHGs.

End of Pipe Emissions: Our urea manufacturing facility at Kakinada emits greenhouse gases – mainly carbon dioxide (CO_2) and some SO_X and NO_X emissions.

Process Emissions: Process emissions **from ammonia plants** consist mainly of natural gas, hydrogen (H_2), carbon dioxide (CO_2), ammonia (NH_3), and carbon monoxide (CO).

Fugitive emissions of NH_3 from storage tanks, valves, flanges and tubing may also occur, especially during transportation or transfer. Non-routine emissions associated with process upsets or accidents may contain natural gas, carbon monoxide (CO), hydrogen (H_2), carbon dioxide (CO_2), volatile organic compounds (VOCs), nitrogen oxide (NO_X), and ammonia (NH_3).Safety precautions at this stage reduce the likelihood of any leakage.

Carbon dioxide (CO_2) removal in ammonia production facilities generates concentrated CO_2 emissions. Our ammonia and urea facilities are integrated, therefore, the ammonia process derived CO_2 can be consumed almost completely if the produced ammonia is transformed into urea.

Process emissions from urea plants consist mainly of ammonia (NH_3) and dust. Fugitive emissions of NH_3 from tanks, valves, flanges and tubing may also occur. Prilling towers and granulators are a major source of emission of urea dust. The final product is prilled or granulated requiring a large volume of cooling air, which is subsequently discharged into the atmosphere.

Safety measures are mandatory to capture or neutralize unconsumed/ intermediary gases generated during the manufacturing processes.

Efficient fertilization is synonymous with the minimization of nutrient losses to the environment, without sacrificing crop yields.

Emissions from Product Usage: Urea is a stable, colourless and odorless solid at room temperature that will melt at 135°C.

It is highly water-soluble, and slowly hydrolyses in the presence of water (or water vapour), to give ammonium carbamate, which slowly decomposes to ammonia and carbon dioxide. Many soil bacteria possess the enzyme urease, which catalyzes the conversion of the urea molecule to two ammonia molecules and one carbon dioxide molecule. Thus, urea fertilizers are very rapidly transformed to ammonium form in soils.

Careful attention must be paid to all aspects of product quality to maximize the efficiency of fertilization. Excess nutrients, especially nitrogen, not taken up by the crop, are likely to be lost to the environment. There is a risk of uneven fertilization or over-fertilization that can lead to pollution of some areas. Lack of nutrients leads to under-fertilization that result in loss of yield and/or quality of crop.

Evidently, correct fertilization must be accompanied by other proper agricultural practices. Studies indicate that the low efficiency of fertilizer use in India has been a matter of concern. Nitrogen use efficiency in rice is only 30-35 percent with an overall efficiency level of 50 percent. Inefficiencies in fertilizer use represent not only an environmental hazard but also a substantial economic loss.

Research finds that in developing countries, like India, farmers are more inclined to focus on short term gains by applying excessive fertilizers during the season rather than build the fertility of the soil for a long term benefits. This behavior of the farmer is mainly because of his limited financial resources, insecure land tenure, and a prevailing uncertainty.

This necessitates the need to train farmers – the end users of our products, to make appropriate use of nutrients and avoid over-fertilization.

Impact on Soil Biodiversity

Among soil bacteria known to carry urease, some ammonia-oxidizing bacteria (AOB) such as species of *Nitrosomonas* are also able to assimilate the carbon dioxide released by the reaction to make biomass via the Calvin Cycle, and harvest energy by oxidizing ammonia (the other product of urease) to nitrite, a process termed as *nitrification*. Nitrite-oxidizing bacteria, especially *Nitrobacter*, oxidizes nitrite to nitrate, which is extremely mobile in soils and is a major cause of water pollution from agriculture. Ammonia and nitrate are readily absorbed by plants, and are the dominant sources of nitrogen for plant growth.

Depletion of Natural Resources

Natural gas is a major feedstock for the production of ammonia. It is a naturally occurring hydrocarbon gas mixture consisting primarily of methane, a relatively potent greenhouse gas with a GWP (global warming potential) that is 21 times that of CO_2, though the use of natural gas is a relatively better option than using coal as fuel. Our facility consumes natural gas, delivered through the KG Basin in Andhra Pradesh.

Water is a scarce resource and is used in the urea production process.

5.3. Key Challenges & Opportunities

As a fertilizer producer, we are sensitive to changes in our business environment. Dealing with a carbon-constrained future, climate change and growing energy demand in a world where the concentration of carbon dioxide in the atmosphere has already reached a record high, is a challenge for us.

In June 2008, the Govt. of India released the National Action Plan on Climate Change, a policy document outlining a number of steps and measures that focus on achieving GHG mitigation and adaptation to climate change in ways that also promote the country's development objectives.

Sustainability Performance Targets

Specific Energy consumption reduction by 0.25% every year compared to previous year.

Specific Raw Water consumption reduction by 0.5% every year compared to previous year.

Specific Effluent Water generation reduction by 0.5% every year compared to previous year.

Phasing out Ozone Deleting Substances (ODS) by 2016.

The National Plan discusses GHG mitigation options in the industry and ways to promote energy efficiency in residential & commercial sector.

According to the Plan, CO_2 emissions from fuel and electricity use in the industrial sector can be reduced by 16% by 2031 compared to the Business As Usual (BAU) scenario.

We take these challenges as opportunities to redefine our business model, revisit our strategies and draw an action plan to address the emerging

sustainability issues. Some of the opportunities we have already identified and have started working upon and have helped in defining our key strategic imperatives are -

Reducing Carbon Footprint:

The high energy intensity of the production process makes it imperative to focus on innovative methods to reduce energy consumption by improvising the production processes in order to make them more energy efficient.

Substituting Natural Gas as Feedstock

Finding innovative and sustainable solutions to substitute natural gas can ensure long term sustainability of the fertilizer industry. Natural gas is a non-renewable source and its availability and pricing is an issue in India.

Carbon Capture from Ammonia Production

Production of ammonia results in vast emissions of carbon dioxide which in turn is needed for urea production. Capturing CO2 from ammonia production to act as input to the urea manufacturing process can offset total carbon emissions significantly.

Water Conservation & Recycling

Water is used as a coolant and also in the production process. Adopting best practices for water conservation and effective water recycling techniques can minimize intake.

Environmental Hazards from Overuse of Fertilizers

Training farmers to adopt safe practices in urea storage and application to crops, better handling processes, and soil testing would go a long way in conserving soil biodiversity and reducing GHG emissions.

Toxic & Hazardous Waste

Ammonia is a dangerous gas and can wreak havoc in case of leakage. Utmost safety precautions, awareness among employees and local workers are needed.

Smart Farming Practices

Adopting best farming practices, linking farmers directly to markets and implementing drip water irrigation systems are some areas where we have made significant impact.

Reduce Wastage of Urea when Applied to Crops

Practically, around 20-30% of urea is actually utilized by the crops while the rest goes off as waste. This presents us with an opportunity to stagger the release of nitrogen so that crops can maximize the use of nitrogen released.

Figure 7: Strategic Imperatives for Business Sustainability

6. Strategic Imperatives for Business Sustainability: Managing People for Sustainability

Our people philosophy is based on our appreciation of the potential each individual brings to the organization. Every individual has a role to play in achieving the company's goals. We have developed a culture where our people are treated as our "associates" and not as "human resources". Our HR function is reckoned as "**Human Potential Development**" department – that instills the belief that every individual has the potential to perform and the ability to excel by raising his or her potential.

6.1. Employee Participation in Management

We strongly believe that participatory management practices encourage better communication of ideas and build a culture of sharing and caring –

"Our Culture – Our Role"

is a unique program conducted every month, where all associates actively participate to discuss a host of work related issues.

The interactions and experience sharing have helped in improving the work standards and shop floor conditions, and has enhanced the bonding of the associates with the Organization.

This program is continuing for over 4 years and is handled by Mr R Rammohan Rao – a veteran trade union leader and a popular trainer.

essential for a socially and environmentally sensitive workforce. At our NFCL Kakinada complex, we have focused our efforts to engage employees in various initiatives related to environment, safety, health, welfare and housekeeping.

Participatory Fora at NFCL Kakinada	Frequency of Meetings
Departmental Safety Committee	Monthly
Central Safety Committee	Quarterly
Works Committee	Bi-monthly
Contractors' Safety Committee	Once in 4 months
Games and Sports Committee	Monthly
Canteen Management Committee	Once in 45 days
Suggestion Scheme Committee	Once in 45 days
Good Housekeeping Committee	Once in 4 months
Participatory Fora Corporate Level Committees	
Risk Management Committee	Quarterly
Grievance Redressal Committee	Quarterly

6.2. Performance Management System

We had introduced Balanced Scorecard (BSC) based Performance Management System (PMS) in the year 2005. So far, we have traversed a long distance and gained valuable insights through our experience in implementation. Inspired by this knowledge, we have designed an innovative scorecard-based assessment system that would align various performance dimensions with industry-best practices. The scorecard assessment system covers the following:

a) **Balanced Scorecard (BSC):** This scorecard gives an overall perspective of organizational performance with respect to Customer, Financial & Internal Processes dimensions.

b) **Development Scorecard (DSC):** This scorecard focuses on the Organizational Development (Learning & Growth) from the perspective of People, Processes, and Information and Rare assets.

c) **Risk Scorecard (RSC):** This scorecard identifies/specifies the risks pertaining to our business and helps us in formulating risk mitigation strategies.

d) **Eco-System Scorecard (ESC):** This scorecard captures how our organization is faring on community and environment perspectives.

We have made a beginning and as a first step, the above Scorecards have been assigned to all Department Heads/Functional Heads only. These are aimed to achieve greater cohesiveness in implementing the long term strategic growth plans of the organization.

For associates below the Department/Functional Head level, the normal BSC comprising of four perspectives, viz – Financial, Customer, Internal Business Processes and Learning and Growth is applicable up to NG4 level.

For NG3 and below levels, simple KRAs are applicable.

The overall strategic direction, that we have set forth, calls for major focus on the Development Score Card which has a long term perspective.

6.3. Compensation & Performance Linkages

Linking performance to rewards is an essential aspect of human resource development. We have set ambitious targets on environmental and social performance. In order to motivate our associates to give their best in achieving these targets, we have linked a part of compensation of Divisional Heads to their social and environmental performance.

The Divisional Heads drive the scorecards wherein in ESC and DSC KRAs related to environment and community activities are focused.

The Functional Heads have the system of four scorecards, viz., Balanced Scorecard (BSC), Development Scorecard (DSC), Risk Scorecard (RSC) and Eco System Scorecard (ESC).

Associates from the levels of Sr. Manager and above have performance pay as part of their CTC linked to the performance during the assessment year (April – March).

7. Strategic Imperatives for Business Sustainability: Managing Environment

Environmental Sustainability is critical to our business. Our consistent approach in adhering to an Integrated Environment Management Plan has enabled us to resolve key issues and engage us in taking proactive steps to ensure safety of our employees, customers, vendors, local community and environment.

We owe much credit to our founders who had initiated a series of environmental control and monitoring mechanisms in the basic design of the plant itself to ensure strict adherence to International Standards.

7.1. Implementing the Integrated Environment Management Plan

- **Environmental Impact Assessment (EIA):** The genesis of this plan began with the EIA assessment at the pre-project stage based on which the EMP was developed incorporating all the findings of the EIA. Utmost care was taken to maximize the recycling and reuse of various effluents generated.

- **Focus on Pollution Control:** A number of new technological features implemented at the Kakinada complex were introduced for the first time in India. Some of the major pollution control features installed in the process plants at design stage itself are

  - *Disc oil separators for removal of oil &grease*
  - *Use of low NO_x emission, high efficiency burners in furnaces*
  - *De-dusting system for Prill Towers in urea plants,*

- *Dust extraction system in the product handling and Bagging Plant*
- *Non-chromatic cooling water treatment system with chemicals that are easily biodegradable*
- *Facilities to segregate process, storm/rain water and oily water to enable effective treatment of pollutants*
- *Impervious lining of all pits and tanks to avoid seepage of any effluent to the ground water system*
- *Flare stacks with continuous and dual firing facility*

- **Emissions Reduction through Carbon Capture:** Going ahead, in the year 2009, our pollution prevention measures were further strengthened when we installed a 450 MTPD Carbon Dioxide Recovery (CDR) Unit, which recovers the $CO_2$from the flue gases, which were earlier vented out into the atmosphere.

- **Dry-de-Dusting System:** We installed this system to recover fine dust of Urea across the conveyor gallery in both urea plants.

GHG Reduction Energy Savings

Numerous energy saving schemes were implemented, which resulted in GHG emission reduction as well as reducing fossil fuel compensation.	
Fuel Switch: From Naptha to Natural Gas	**Use of naphtha, which has higher sulfur and carbon as compared to natural gas, has been discontinued.**
Emissions Reduction: Carbon Dioxide Recovery Plant	Recovery of 450 MTPD of CO_2 from Ammonia plant reformer flue gases serves as input to urea manufacture and helps in reducing emissions.
Emissions Reduction: Low NO_x burners	Used in ammonia plant reformers to improve process efficiency and prevent harm to environment.
Eliminating ODS	Conversion of BCF-1211 fire extinguisher system

Fire Extinguishers: From Halon to CO2	to CO_2 fire extinguisher system for gas turbines.
Renewable Energy: Solar Energy	We propose to deploy solar energy for cooking and water heating purposes in office buildings.
Renewable Energy: Wind Energy	We have established a 14.7 MW wind farm in consonance with the Electricity Act 2003 and NAPCC 2008.

7.2. Zero Discharge of Liquid Effluents outside the Complex

While our basic philosophy is to treat the pollutants in the concerned plant itself, an Effluent Treatment Plant (ETP) has been built as a secondary treatment to check the effluent and also as a back-up in case of any upset in the process plants.

It has a sludge treatment system, a disc oil separator, and two equalization ponds of 9600m³ capacity each. From the equalization ponds, the treated effluents are pumped to a holding pond of 21,000 m³ capacity, wherein fish are bred, which indicates the purity of final effluent.

The water from the holding pond is distributed in the vast green belt area through drip irrigation method[3], thereby making the complex ***"zero-liquid effluent discharge outside the complex".***

7.3. Ambient Air Monitoring

Regular monitoring of air quality is important to us to check any possible pollution. At the Kakinada complex, we have five unmanned ambient air quality monitoring stations in and outside the factory for

[3] Drip Irrigation has been applied in select areas in Green Belt

continuous monitoring of all possible pollutants. Data from these stations is continuously analyzed and recorded.

In addition to the five monitoring stations, an ambient air monitoring mobile van is also available to monitor the level of pollutants outside the factory premises to meet any exigency.

7.4. Renewable Energy Generation

We have embarked upon generation of electric energy through wind power. This is in line with the National Action Plan for Climate Change (NAPCC). The NAPCC announced in June 2008 by the Govt. of India, proposes increasing the share of renewable energy in the total energy mix to 15% by 2020 which is currently around 6%.

In view of the above, NFCL has established Wind Farm of 14.7 MW capacity, which consists of 7 Wind Turbo Generators (WTGs) with rated generation capacity of 2.1 MW each, at Tirunelveli, Tamil Nadu, during year 2010. These are under generation mode since September/October 2010. The total generated power in the FY 2011-12(upto Jan'12) has been 24.08 million units of electric power. Presently, the electric power is sold to Tamil Nadu Electricity Board (TNEB) on preferential tariff @ Rs.3.39 per KWH as per the terms of PPA signed.

The Electricity Act, 2003 (EA 2003) stimulated the development of Renewable Energy (RE) based power generation by mandating State Electricity Regulatory Commissions (SERC) with the function of renewable energy promotion within the State.

Under EA 2003, the SERCs set targets for Distribution Companies and Captive Power Users to purchase certain percentage of their total

power requirement from renewable energy sources. Such a target is termed as "Renewable Purchase Obligation" (RPO) to promote the RE power. Andhra Pradesh is likely to impose such obligation for Captive Power users and renew the RPO obligation for meeting 5% of the power demand from renewable sources. The policy is expected to be reviewed soon as this is a mandatory requirement of Electricity Act, 2003. The RPO obligation differs from State to State. For Tamil Nadu, the RPO is 9% of the Captive Power use and will be applicable from 01st April 2013.

As of now, the regulations released by different SERCs do not recognize purchase of renewable energy from outside the State for the purpose of fulfillment of RPO targets. However, inter-state transfer of renewable power for meeting the RPO obligation is expected to be permitted. Considering the above, the Govt. of Andhra Pradesh is also expected to set RPO targets for DISCOMs and Captive Power Users which will enable NFCL to meet RPO obligations. The present capacity of the Wind Farm can meet 10% of the present captive load of existing Kakinada Plants and 5% of the complex including the Expansion Project-3. According to the Gazette Notification by the state of Tamil Nadu, 9% of the Captive Power Usage has to be met by Renewable Energy sources and that obligation can be met if we terminate the PPA with TNEB and our generation can be considered against the Captive Use of the sister Company, NOCL, to meet its RPO obligation.

7.5. Emissions Reduction by Switching Fuel

Wind Energy is a potential source of emission reductions and conservation of fossil fuels. Accordingly, the Project was taken up with

the MoEF, Govt. of India for the Host Country Approval and UNFCCC for the approval under Clean Development Mechanism (CDM).

The WTG Project has been registered with UNFCCC under CDM w.e.f August 22, 2011. The Project is entitled to generate 27,431 Carbon Emission Reduction Units (CERs) per annum @ rated capacity of WTG generation of 47.1 lakh units/annum/machine. With the average CER Price of 8.5 Euro per unit in the current financial year (which has been low and is expected to improve in future), the minimum anticipated revenue for the project under CDM will be Rs.1.57 crores per annum, besides the revenue due to generation of power which is around Rs.10.7 crores per annum.

The generation capacity of 14.7 MW can be bartered against RPO when the enforcement of RPO is made applicable by the Govt.of Andhra Pradesh through inter-state transfer. Accordingly, it will be one of the positive contributors for the sustainability of the company, as the purchase of Renewable Energy Certificates is going to be costlier in periods to come in view of huge escalation in the energy rates.

7.6. Green Belt

The environmental measures taken in the factory design were merged with the establishment of green belt adjacent and around NFCL Kakinada plant.

A deer park has been developed as a precursor to introduction of other animals, which is authorized by the Central Zoo Authority, New Delhi.

The Green Belt is home to many bird species.

The company has invested significantly and successfully transformed more than 600 acres of highly saline marshy area devoid of any vegetation into a lush Green Belt at Kakinada with over 400,000 trees such as *Pongamia glabra*, Rain tree, Neem, *Ficus carities* among others. There are over 120 animals like Spotted Deers, Sambars, Guinea Pigs, Rabbits, etc., over 130 birds such as Pea Fowls, Turkey Fowls, Australian Ducks, Khajana Ducks, Guinea Fowl, Emu etc., and 147 reptiles like Star Tortoise etc.

Eleven water bodies spread across 160 acres have been formed in the Green Belt which serve as a habitat for fishes and birds, both indigenous and migratory such as Grey Heron, Purple Heron and Cranes. A deer park has been developed as a precursor to introduction of other animals, which is authorized by the Central Zoo Authority, New Delhi.

The development of this Green Belt brought forth some challenges-

- To overcome adverse soil conditions, thrust was given to proper selection of tree species and appropriate planting techniques.

- Drip irrigation techniques have been adopted in selected areas.

- Eleven water bodies have been formed which serve as a habitat for birds, both migratory and indigenous.

The evolution of this Green Belt is the outcome of the combined wisdom and experience of the country's best experts in such diverse disciplines as forestry, horticulture, soil chemistry, ornithology, landscaping, animals and aquatic life. To name a few, Mr. Zafar Fautehally (Ornithologist), Dr. M H Mari Gowda (Horticulturist), Dr. Govinda Rajan (Soil Specialist), are some of the eminent persons involved.

8. Strategic Imperatives for Business Sustainability: Managing Innovation for Sustainability

We have undertaken technology development in areas of Plant Nutrition Solutions, Technology Platforms and Fuels and Feedstock.

Our in-house R&D function has relevant expertise to take these challenges and has a key role to play in our business sustainability. Our R&D team is expected to

- Ensure a long-term sustainable nutrient management system for crop production,
- Develop more efficient mineral nutrient uptake by crop plants and improve intra and intercellular use of nutrients without detrimentally affecting the environment.

Our R & D program has been designed in such a way that it addresses the bottlenecks across the entire Plant Nutrition Value Chain resulting in complete end-to-end solutions, right from raw material development, to better use-efficiency of nutrients and finally sustainable packaging solutions for the products.

We have achieved this by interventions in all the key areas across the value chain through technology development that has also resulted in development of rare assets in the form of Intellectual Property. By having regular stage gate analysis at each of the development stages we make sure that the technology being developed is meeting all the parameters and objectives. We envision that this will result in the development of technology that is sustainable and results in low carbon footprint.

8.1. Strategic Objectives

Our technology development is driven by the following objectives:

- To reduce **energy costs**
- To reduce raw **material wastage**
- To reduce **pollution**
- To increase **process safety**
- To reduce **capital**
- To reduce **operating costs**
- To reduce **process complexity**
- To enhance **scalability**
- To reduce **manpower intensity**
- To enhance raw **material availability**
- To reduce raw **material cost**
- To enhance raw **material quality**

8.2. Innovation through Research

Improvement in existing product(s): We believe in continuously improving our product development technologies related to Urea production and revisiting our objectives so that our business operations remain environment friendly and contribute to sustainable development.

Intervention in the area of raw material: At present, urea is produced from hydrocarbon sources – natural gas in our case, which is the main raw material both as fuel and feedstock. Due to heavy demand for fossil fuels in almost all industries, there are inherent

associated disadvantages in relying on such fuel sources. The main bottlenecks are that -

- Fast depletion of hydrocarbons would make it a scarcer resource in future
- Hydrocarbon based raw materials leave a carbon footprint
- No control over price of gas
- Uncertainty in availability of a steady supply
- Proximity to the natural gas source is a constraint as large plant capacities are needed to achieve economies of scale that drives up initial investment cost

We have addressed the above limitations by developing Bio-Hydrogen technology that uses Biomass as the raw material for producing the alternate feedstock for urea production. This will open up the chance to utilize the agricultural biomass/waste that accounts for 85% of the agricultural produce.

8.3. Biological Hydrogen

The raw material alternative that we are developing is through Biological Hydrogen production technology, which is a sustainable & economical end to end technology solution for sustainable and renewable raw material.

This project is partially supported by Department of Biotechnology, Government of India. We have completed the Proof of Concept for the Bio-Hydrogen production and are currently implementing the pilot plant for establishing the Proof of Value.

Benefits of Bio-Hydrogen Production Technology

The major benefit of having Bio-Hydrogen production technology is that it gives us an option to explore a radically different business model.

Presently, we have large centralized production plants which are capital intensive and cannot offer customized fertilizers. Our Bio-Hydrogen technology development plan, on the other hand, will help in setting up small decentralized ammonia units in remote places as the raw material used is Biomass and not hydrocarbons. By having decentralized ammonia units, the forces of demand-supply of customized fertilizers at locations of their use will be easy to manage.

Additionally, it will open up decentralized, economically viable, green energy opportunities at rural and remote locations with relatively lower transmission costs and drop-off losses, and will also help in opening up of decentralized, small and customized fertilizer units. The decentralized units will help in customized fertilizer production based on crop/soil requirement.

The crop residue at the site can be used as raw material. This process enables better control over raw material.In addition to Bio-Hydrogen technology, we are also working on other raw material substitutes for

The uniqueness of the project is that the entire biomass will be utilized for the production of Bio – Hydrogen and

globally no one has entered the pilot plant stage for Bio Hydrogen production yet. So this makes us the pioneers in this area.

which we have just completed the Proof of Concept stage and will start the Proof of Value stage soon.

8.4. Product Differentiation

Presently only 20-30% of urea is efficiently used by plants and the remaining is not utilized. This results in wastage and increased costs. We are working in several ways to change the structure of urea to increase its use-efficiency. This will benefit the environment, our business and the farmers. It would also pave the way for producing 'greener' products that would help differentiate our products in the marketplace.

With interventions in raw materials, final product and packaging, we can make the whole value chain

8.5. Intervention for Greener Packaging

Presently, the packaging material used is hydrocarbon based and we have addressed this by coming up with a technology development solution that uses non-hydrocarbon material like Bio-Plastic for packaging.

8.6. Customized Fertilizers Manufacture

Soil is the third-largest carbon sink in the world, after the oceans and fossil fuels themselves, and a change in the way we farm could offset a quarter of global carbon dioxide emissions annually. Land use accounts for more than 30 per cent of the world's greenhouse gas emissions. There is a need to improve the efficiency of fertilization process to reduce wastage of nutrients and improve crop yield.

Customized Fertilizer (CF) helps in optimizing the nutrient content as per requirement and thereby avoids excessive application of conventional fertilizers. With improved soil fertility and enhanced crop yield, CF is a farmer-friendly product.

Integrated with soil information, the customized fertilizer is formulated on sound plant nutrition principles, thus becoming soil and crop specific fertilizer. It contains both macro nutrients (N, P and K) and micro nutrients (S, Zn and B) and provides balanced crop nutrition to the soil. Prolonged inadequate and indiscriminate use of fertilizers is resulting in nutrient imbalance in soil and the CF precisely addresses this issue.

Customized Fertilizer (CF) helps in optimizing the nutrient content as per requirement and thereby avoids excessive application of conventional fertilizers.

With improved soil fertility and enhanced crop yield, CF is a farmer-friendly product.

We have recently commissioned a Customized Fertilizer (CF) plant of 400 MTPD capacity. The plant is constructed at the NFCL Kakinada complex.

Customized Fertilizer is produced in granulated form which ensures uniform distribution of nutrients. As part of pollution prevention, the CF plant is equipped with Cyclones and Wet Scrubbers, which capture dust generated, if any, in the manufacturing process and it is recycled back.

9. Strategic Imperatives for Business Sustainability: Promoting Water Conservation Practices

Drip irrigation, sometimes called trickle irrigation, is an irrigation method which saves water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing and emitters.

Water is applied close to plants so that only part of the soil in which the roots grow is wetted, unlike surface and sprinkler irrigation, which involves wetting the whole soil profile. It is done with the help of narrow tubes which deliver water directly to the base of the plant.

With drip irrigation, water applications are more frequent (usually every 1-3 days) than with other methods and this provides a very favorable high moisture level in the soil in which plants can flourish. In some cases, fertilizer and other nutrients are also delivered along with the water in a process known as fertigation.

There are various advantages of drip irrigation:

- The direct application of water reduces use, sometimes by as much as 30% to 50% as compared to water used in surface irrigation. In addition to conserving water, drip irrigation reduces the problems of salinization and water logging.
- Drip systems have been shown to achieve up to 95% water efficiency.
- In water scarce environments, drip irrigation may allow for agriculture in areas where impact, furrow or flood irrigation would not be possible.

9.1. Our Experiences with Drip Irrigation

Changes that have occurred on account of usage of our products	
Before Usage	After Usage
Farmers were not able to take more crops per year due to water shortage in summer season and high water requirement in conventional flood irrigation method.	Farmers are able to take more crops per year due to high water use efficiencies in micro irrigation resulting in water saving and considerably less water requirement in summer season.
Farmers were confined to cultivate irrigated crops on lesser area due to high water requirement with conventional flood irrigation method.	Farmers are able to cultivate irrigated crops on larger area due to significant water saving in micro irrigation and are able to irrigate more area with the existing water source.
Farmers were not able to change the planting season with conventional flood irrigation method.	Farmers are able to change the planting season with usage of micro irrigation, and thereby benefit by availing best price for their produce
Farmers were not able to control the quality of crop due to irrigation constraints in flood irrigation system in critical crop growth stages.	Farmers are able to improve quality of crop by distributing water uniformly and timely with micro irrigation system in critical crop growth stages.

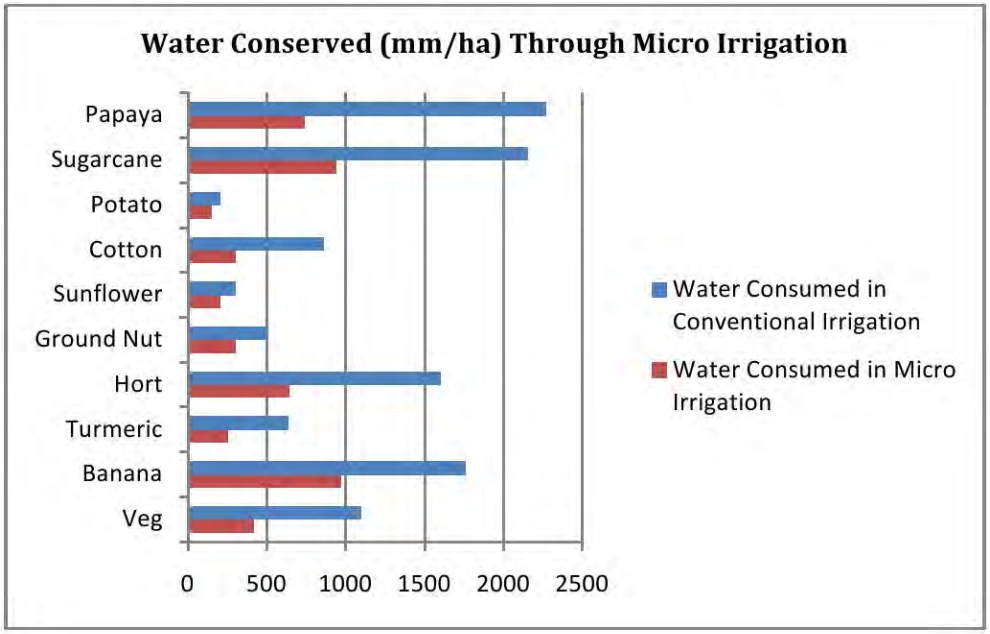
Quantity of water actually conserved on account of usage of our products.

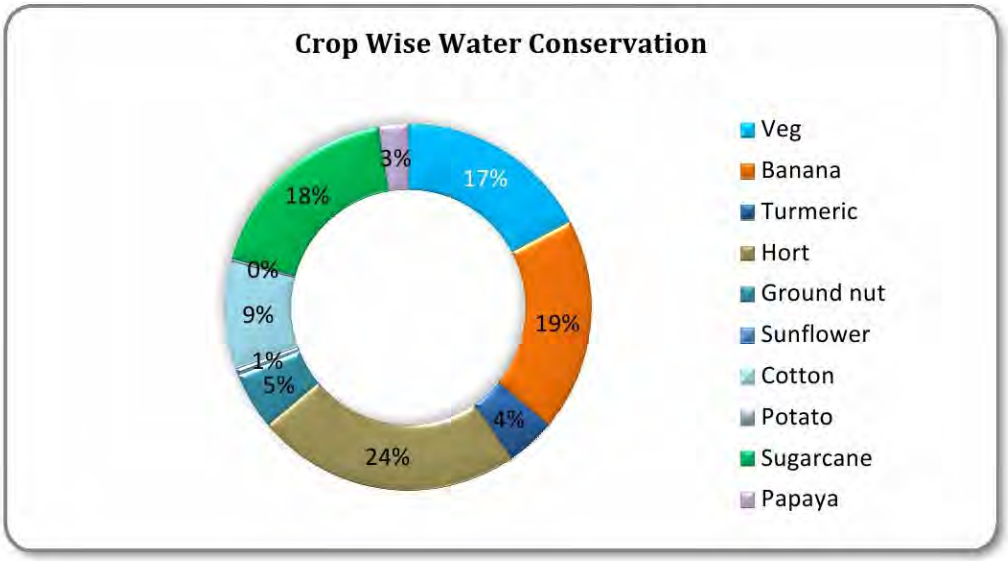
During last five years, we have installed drip irrigation systems covering an area of about 64,000 hectares for various crops like sugarcane, banana, turmeric, vegetables, papaya, orchards, cotton and potato.

NFCL has also installed sprinkler irrigation system covering an approximate area of 17,000 hectares for crops like groundnut, sunflower, wheat, etc.

With the above installations, over the last five years (2007-09 to 2012-13) NFCL has been instrumental in saving water amounting to 95,873

Hectare Meter through drip and sprinkler systems spread across an area of about 81,000 hectares.





9.2. Success Stories of Benefits of Micro Irrigation

With installation of Micro Irrigation System, farmers can

- Save water by 40-60%
- Save labor cost by 20-30%

- Cultivate more crops per year over the same area
- Cultivate more land due to better availability of uniform and timely water supply throughout the year
- Increase productivity by 40-50%
- Realize better prices for their produce due to better quality and availability of agro-produce in peak seasons

Micro Irrigation Success Stories - Papaya

Name of Farmer : Mr. N.Surendra
Location : T.Kammapally, Kadapa Dist. , AP
Crop : Papaya
Date of Plantation : 14th Oct 2007
Area : 3 Acres
Yield : 53 Tones/Acre
Yield Increase with Drip : 76.9%

9.3. Benefits to Company, Community & Country

- ***Water Conservation:*** With installation of Micro Irrigation Systems, there is lot of saving in the natural resources like water to the farming community in specific and to the country in general.

- ***Energy Conservation:*** With Micro Irrigation Systems, the farming community is benefited by saving on electricity due to reduced water demand.

- ***Employment Alternatives***: Micro Irrigation Industry is providing very good employment opportunities directly and indirectly and increasing national income. Our company is providing direct employment to around 500 employees and also to various other agencies involved indirectly.

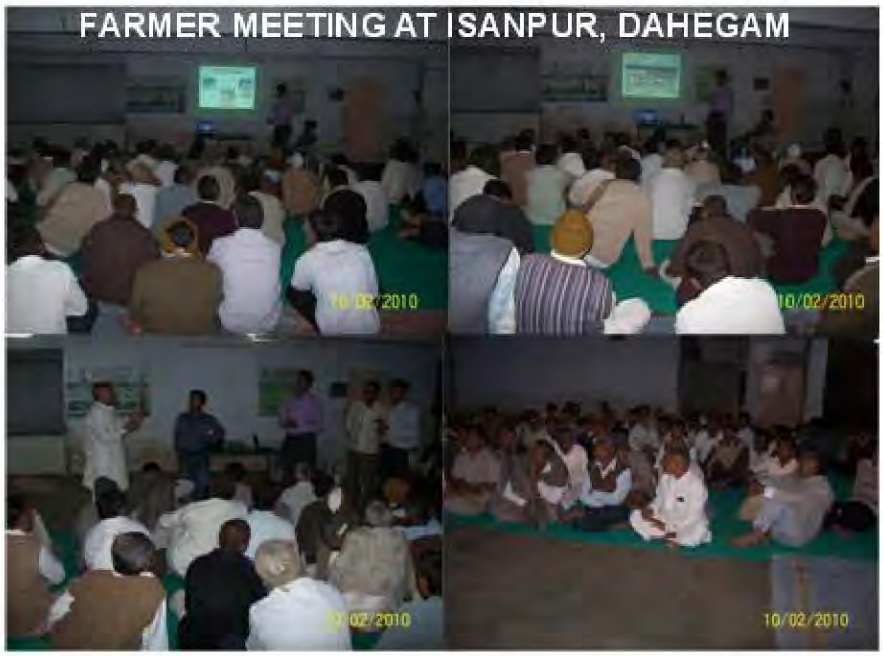
- ***Agricultural Productivity:*** Micro Irrigation Industry is playing a vital role in increasing agricultural productivity and food security of the nation. It is also contributing in earning foreign exchange through export of agricultural produce.

9.4. Changes in Cropping Patterns on Account of Usage of Our Product

With the adoption of Micro Irrigation Systems, the farmers can change the cropping patterns and are able to take more crops in a year. The MI System enables the farmers to cultivate in summer season also due to reduced demand for water as compared to conventional irrigation methods.

With the usage of our Micro Irrigation Systems, the farmers are able to produce more than one commercial crop in a year.

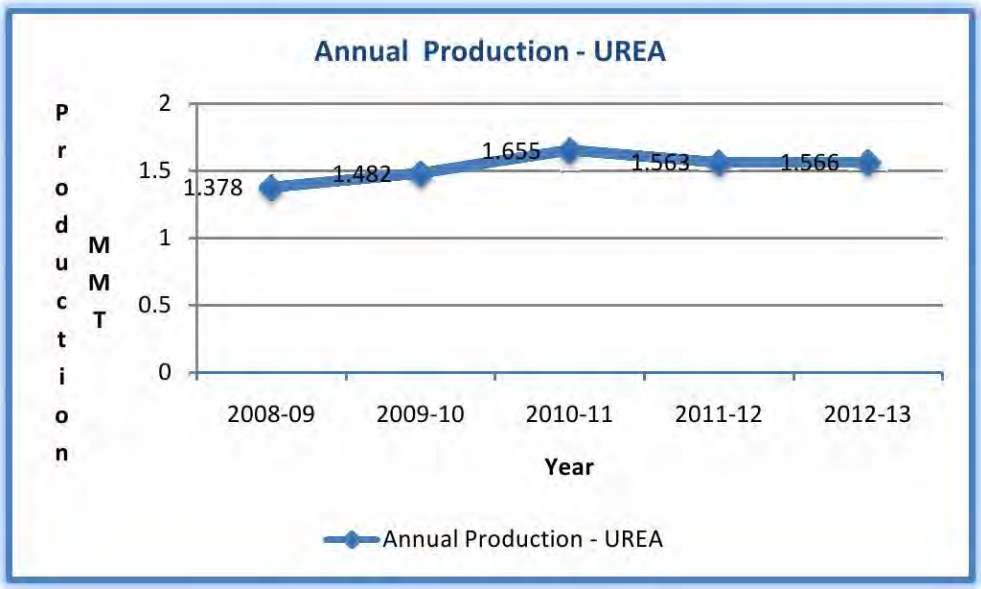
9.5. Training Programs on Micro Irrigation Systems

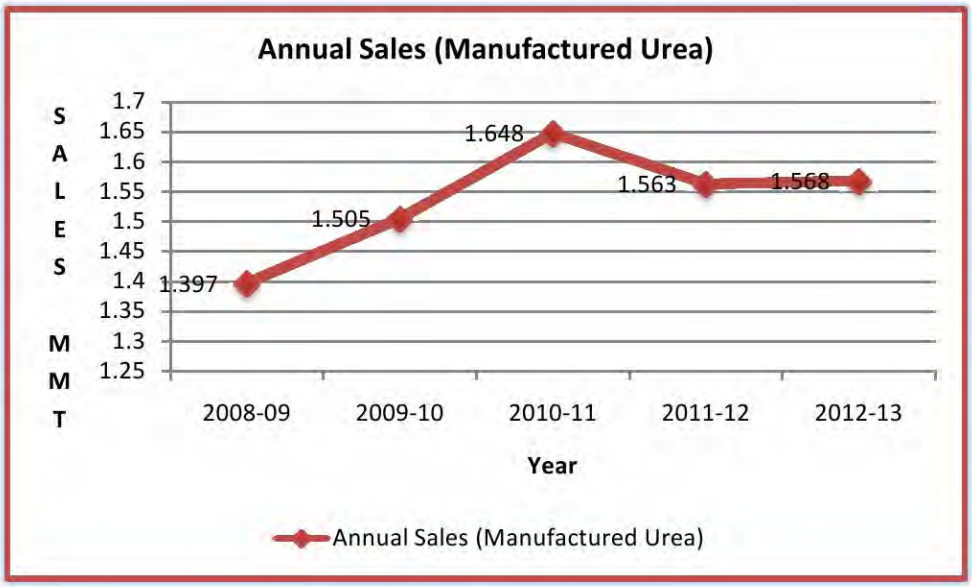


- We conduct training programs on operation &maintenance of MI systems on regular basis for the farmers.
- Farmer field visits are arranged to create awareness among the farmers about new crops under MI system and new crop cultivation practices.
- Farmer visits to NFCL MI plants are arranged to make the farmers aware about production process and quality standards followed in the plant.
- Seminars on use of Water Soluble Fertilizers are arranged in coordination with NFCL WSF team to educate the farmers on benefits of using water soluble fertilizers through drip irrigation system.

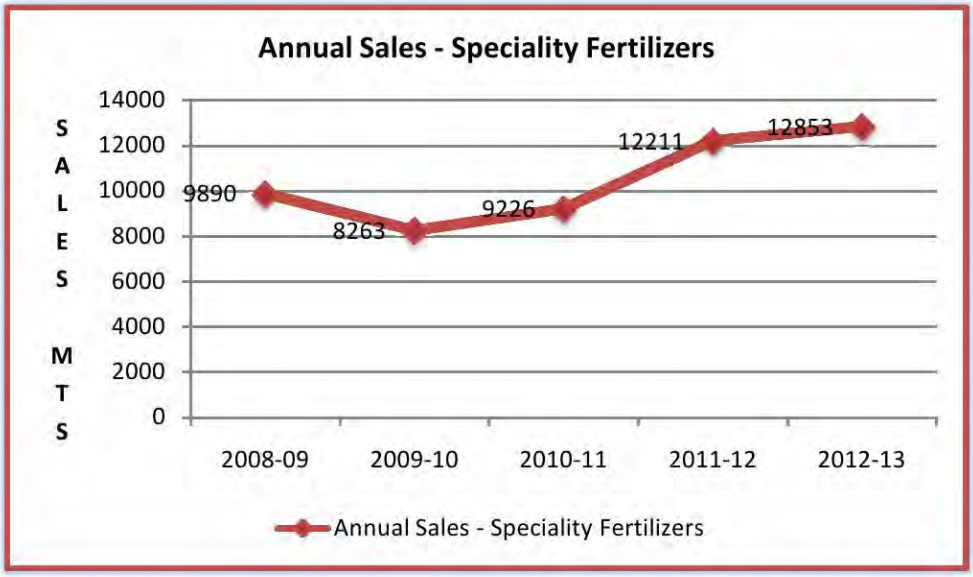
10. Triple Bottom Line Performance – Economic

In 2012-13, the sales of manufactured urea were 1.568 MMT.

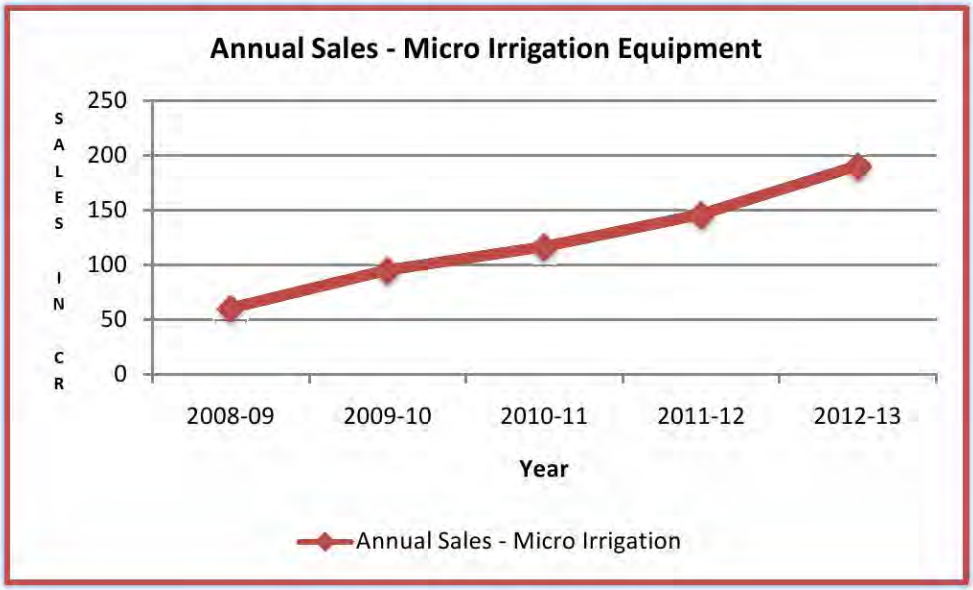


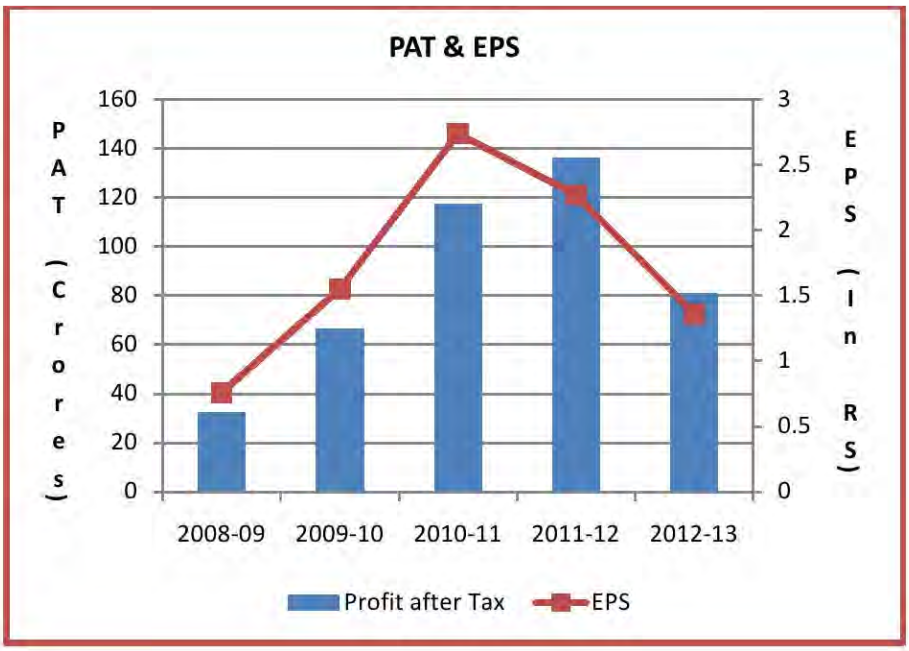


Our sale of specialty fertilizers increased 39.31% over last two years.



Our micro irrigation division recorded a growth of 30.36% in sales revenue aggregating to 190.77 crores (2012-13) as compared with that of the previous year (146.34 crores).





During the year, we have taken various initiatives for improving energy efficiency, safety, health, environment, reliability and cost reduction.

Our R&D Activities carried out at different facilitates are as follows:

Production Facility at Kakinada

There is no separate and full-fledged R&D department at NFCL Kakinada. However, the engineers engaged in Technical Services, Production, General Engineering and Maintenance Departments undertake activities, which are aimed at improvements in the following areas:

i. Energy Conservation
ii. Capacity Enhancement
iii. Environment Protection
iv. Process & Personnel Safety
v. Enhancement of Plant Reliability
vi. Rain Water Harvesting for Conservation of Raw Water Intake
vii. Exploration for Usage of Renewable Energy Sources like Solar, etc.

Production Facility of MI and PVC Plant

i. Development of alternate grades of raw material to reduce the dependency on limited sources
ii. Captive consumption of process scrap in non-prime products by implementing process scrap re-granulation
iii. Explore the possibilities of process improvements to control cost - better equipment utilization, capacity enhancement, indigenization of critical spare parts, etc.

Benefits Derived as a result of the above efforts at production facility at Kakinada

These improvements achieved results in the areas of production performance, specific raw water consumption, treated effluent generation, environmental protection, and process and personnel safety.

11. Triple Bottom Line Performance –Social

11.1. Social Imperatives at NFCL

NFCL Kakinada is located in a small industrial cluster spread around a radius of 10 kms very close to the coast of Bay of Bengal. Being the oldest industrial set up in the vicinity, it has been a torchbearer in acting upon the developmental needs of local communities.

Constructed adjacent to the Kakinada port, the plant has turned around some of the harsh natural disadvantages.

11.2. Setting the Social Priorities

Privileged Assets

Our people, our customers, our investors, our processes, our technologies and our eco-system (Alliances, Community and Environment) are our Privileged Assets.

Capable People

Since inception over 35 years, Nagarjuna has always 'believed, practiced and known to be a place where people are given a lot of value and respect'.

We take actions that strengthen us and inspire the best in others by building relationships with integrity, honesty, humility and hard work.

Talent: Significant investment (time and money) goes into retaining, attracting and developing the best talent in the industry.

Culture: We believe in nurturing a culture that encourages integrity, relationships and performance.

- **Structure:** Our reporting structures are evolved to meet the complex and ever changing challenges of the business.

Efficient Processes

We constantly benchmark our processes with the best in the world across the supply chain and support services.

IT has also played a key role in Nagarjuna's ability to be quick and efficient. New projects in HR and IT are constantly taken up to enhance our capabilities, reaction speed and efficiency.

Loyal Customers (Farmers and Retailers)

Over 70% of India's population lives in villages. Reaching out to nearly 200,000 villages everyday, we cover majority of the agriculturally important villages and customers in India. Intensive customer relationship management, constant farmer and retailer growth and development programs and super offerings over the decades have helped in developing very loyal customers.

Supporting Investors

Our original investors who constituted primarily of our customers have supported the company over decades through good and bad times.

We continue to encourage and build our traditional investors and also build on our strong base of retail and institutional investors.

Technologies

R & D plays a significant role in our business. We have been committed to technology development for over a decade now. This commitment has helped us accomplish significant breakthroughs in scientific understanding, IP, products and also made possible new business models.

Strong Alliances

Relationships as a principle have driven Nagarjuna from its inception in 1973 and will continue to be a key driver in the future. Several alliances have lasted for several decades a true testament of our commitment to think beyond ourselves. Nagarjuna has a unique privilege to be associated with the best companies in the world across the Agricultural value chain, which we believe will become a key factor in our drive to attain leadership positions in the markets we operate in.

Vibrant and Supporting Environment and Community

Environment, Health and Safety

Our commitment to Environment, Health and Safety systems is an integral part of our business strategy and takes precedence over all other considerations. We maintain the highest standards, most robust and safe technologies, equipment and products as well as qualified, experienced and trained manpower, which are essential to our future growth.

Our EHS mission also encompasses responsibility of protecting the local community and environment from potential hazards.

Corporate Social and Environment Responsibilities

An organization must continually earn the right to operate in the communities and countries in which it produces and sells. We are

committed to giving back more to the society than what we take from it in terms of its resources.

The organization is not a stand-alone economic entity but **an integral part of the society**. We believe that the organization fulfils its obligations by sharing its resources for community building activities, which are ultimately reinvested in the business through the various stakeholders who form a part of the community; the customers, employees and investors.

Afforestation, Endangered Species Preservation, Energy & Water Conservation, Drinking Water Purification Systems and Food Donation, Free Education and Teachers Training, Scholarships, Free Books and Bags Donation, Medical Camps, Free Houses for Disaster Victims, Vocational Training, Traditional ART Promotion etc., are some of the areas that Nagarjuna has been focusing on.

At NFCL, social needs of local communities are assessed through a baseline survey in selected areas. The survey is based on objective indicators through which the social, economic and environmental needs are identified. Changes in these indicators such as - household income levels, cropping pattern, market prices for agricultural produce, ground water levels, percentage of literacy, infant mortality rates, and biological/chemical assessments of water contaminants over a period of time are analyzed to understand how effectively the local community is meeting its needs, and to identify the gaps.

Unmet or partially-met social, economic, or environmental needs are identified by comparing a desirable vision, "*what should be*", with the current observed performance ("*what is*" or the baseline survey). This

comparison helps in identifying some of the gaps where we can make appropriate interventions:

1. *Regular updates on market prices*
2. *Awareness on primary/field level value addition activities*
3. *Forming Commodity Societies*
4. *Group Farming*
5. *Organized Marketing*
6. *Technical and Financial Support*

In order to meet these needs, we have initiated many schemes:

K V K Raju Krishi Vignan Kendram at Kakinada acts as a key resource center for farmers and conducts training programs to facilitate adoption of best agricultural practices. During last five years, around 23,405 farmers have been trained on Best Cultivation Practices and on proper usage of agri inputs.

Fertilizer usage is an important aspect of our business. We are aware of the harmful environmental impacts due to inappropriate use of fertilizers. India ranks second among nations where fertilizers are over-used. This also puts a heavy drain on economy as fertilizer is a subsidized product. Thus, training on sustainable agricultural practices becomes vital from an economic and an environmental viewpoint.

Our HPD department organizes training programs on judicious and safe use of fertilizers and chemicals in agriculture to safeguard the environment and reduce pollution, thereby building awareness on eco-friendly farming that is needed for sustainable agriculture.

11.3. Training Farmers on Campus

We impart knowledge on best technology to farmers through training programs. These programs are generally conducted during off season,

i.e., May-July. The farmers are given residential training for selected crops for three days by internal faculty and external faculty from local agricultural research institute in Andhra Pradesh.

The **Krishi Vignan Kendram** has trained farmers to act as advisors to the farmers in their respective areas and act as spokesperson for us.

Off-campus/On-site Programs

Apart from this we organize off-campus programs where scientists visit villages and address the farmers on the spot by inspecting their fields, thereby benefiting the farmers.

With the above two programs, NFCL has successfully transferred technology to farmers on wide range of crops helping farmers increase farm productivity and prosperity.

11.4. Soil Analysis for Balanced Nutrition

We also conduct soil analysis for the farmers and advise them to use nutrients as per the report for better yields. Our Soil Testing Laboratory at Kakinada has the capacity of analyzing 12,000 samples in a year.

Farmers' meetings are conducted and advisory services provided to the farmers. In other States, services of local soil testing lab facilities are availed to analyze the samples in the vernacular. Through soil analysis, we advise farmers to apply balanced nutrition as per the crop and increase the productivity.

During the last five years we have analyzed about 30,000 soil samples.

11.5. Crop Seminars & Growers Meets

We have also conducted crop seminars and growers' meet on important crops, e.g., paddy, cotton, grapes, potato and other vegetables in Andhra Pradesh, Karnataka, Maharashtra and West Bengal.

In these meetings, farmers are invited at important markets/villages and suggestions are given by our officials and scientists on best cultivation practices and proper usage of agri inputs. Farm visits are also organized

wherein reputed scientists give timely solutions and demonstrate the practical approach.

These initiatives have helped us touch upon the farming community in many ways and have helped us extend our philosophy of *'serving society through industry'*. Our programs have educated farmers on the latest agricultural practices and best use of agri inputs. This has facilitated farmers to take early intervention measures to save input cost, adopt best plant protection practices and make agriculture sustainable.

11.6. Dealer Training

Our dealers constitute a relevant segment among our stakeholders because they have a direct effect on our profitability and sales. Dealers are responsible for extending our market presence by delivering products throughout the supply chain/distribution network.

We organize Dealers' Meets regularly to update dealers on company plans and policies. The dealer meetings are organized frequently at different locations. Higher officials from Corporate Office attend and explain the company's present operations and future plans.

Dealers are given training on products and usage in relation to the crops. They are also provided with inputs on latest developments in fertilizer business and agriculture. This helps in better planning and successful business.

Around 2380 farmers and 7514 dealers have been trained so far on best cultivation practices, water conservation, energy conservation, environmental risks of fertilizer usage, health risks and their prevention.

11.7. Knowledge Sharing Centers

Knowledge Sharing Centers (KSC) is a facility provided at cluster (group of villages) level in order to cater to the information needs of the rural community. Market and weather information being the most important of all information, is much emphasized. The KSCs make use of the developments in ICT to achieve their objectives through its components. There are various components set up in the KSCs to cater different needs. Following are the components of a KSC:

1. **Touch Screen Kiosk (TSK)** - provides one to one communication. TSK is a stand-alone system equipped with a computer and touch screen. Information is customized based on the cluster's requirements and is loaded in the system for quick access.

2. **Display Announcement Package**- is the solution for communicating to small groups of around 15 farmers. A television mounted in the KSC displays the input (audio/video) run on the computer.

3. **IVRS and Sasyavani**- are designed to enable remote access to information. Interactive Voice Response System (IVRS) service is intended to serve the farmer regardless of his location. Through this service, required information is accessed just by dialing the IVRS number. *Sasyavani* is a further simplification of the IVRS wherein voice messages are pushed through mobiles. The service is developed keeping in view the strong penetration of mobile technology in rural India.

4. **Internet-** is provided as a support to access information. It serves to provide information useful for the rural youths and children. In

addition to these, equipment like printers and scanners are provided as well for facilities like photocopying, etc.

The KSC set-up has helped the rural community to access important information that helps improve crop productivity, and in turn sell it through the right channel, at the right time, and at the right market.

Developing Market Linkages for Local Community

A Case Study of 'Sri Aurobindo Mango Growers' Society'

Farmers constitute the most important segment of local stakeholders – both as a consumer of our fertilizers and as a member of the local community. Updates on market prices of farm produce are a sought-after input for the farmers.

Dupahad cluster of Nalgonda district is one of the areas in Andhra Pradesh with high potential for mango. Almost 200 acres of land is under mango cultivation in this area. The place is occupied by a large number of vendors and commission agents. These agents offer some money to the farmers well before the season and take the orchards for lease. These offers by the agents are way too low than the market prices in local market. Other farmers who sell the produce at the local markets have concerns as well, in terms of genuine pricing, correct weighing, commission and cess charges, etc,, that almost pools up to a loss of 20 to 30 percent on the market price.

Market linkages concept by Ikisan has aimed at breaking this chain by creating a channel that directly linked the farmers to retail chains and corporate buyers in the cities.

Market linkages activity for mango which was carried out effectively in 2009 has brought about much learning. One of the most important learning was the need to 'group up'. This idea was drawn out from the experience of previous transactions made with the retail chains.

Formation of a society or group was envisioned to overcome the constraints and limitations involved in marketing. A formal society attracts retailers owing to its structured and organized set up. This also increases the bargaining power of the farmers. Since sustainability is the main objective of the activities under the project, formation of a society was vital. It was decided, with the consent of the farmers, to form a society of mango growers in order to meet the industry requirements in terms of both quantity and quality.

The aims and objectives of the society mentioned in the agreement were as follows:

- *To work on the loopholes involved in the marketing of mango from the Dupahad area to various retailers.*
- *Mutual understanding and sharing of all kinds of information related to crop among the members.*
- *Pooling up of produce to make the quantities considerably large based on the requirements of the retailers.*
- *Increase the profitability by directly linking to corporate retailers, avoiding exploitation by the local vendors/agents.*

The society was named as **'Sri Aurobindo Mango Growers' Society'** registered with the 'Registrar Office of the Registrar of Societies', Nalgonda District in April 2010. The society is growing in its size and business through the years.

A supply of 160 tons was made by the society in 2011, which is the highest among transactions made by the society to retailers.

11.8. Hearing the Customers' Voice

Reaching the Customer

We are doing publicity of our products periodically by advertising in print media, cable TV, wall paintings, hoardings and brochures. We are following the procedures in marketing communication. The products are promoted in line with the quality, usage pattern and its benefits.

Measuring Customer Satisfaction

Our marketing surveys are conducted twice a year and help us gain insights into customer's requirements. Our Promotion & Publicity team organizes and coordinates the conduct of the above surveys and undertakes analysis of the data.

The survey is administered at random to a sample size of 150 for customers and 150 for end-users as per standard norms. In-charge (area office) facilitates market survey through in-house personnel / third-party agency, as directed by Head of the Promotion & Publicity team. The questionnaires are designed to capture the customer perception about the product and services and their satisfaction levels as per the standard formats for customers and for end-users. The questionnaires are administered in vernacular / English

The data collected from the above surveys is collated and analyzed as per relevant provisions using various analytical techniques. The Promotion & Publicity team provides feedback on the above surveys to the Head of Marketing function for his review and onward communication to Marketing Representatives at all appropriate levels. Customer complaints are analyzed once in three months as per defined norms with respect to in-

flow of customer complaints on product quality, bag quality & delivery and customer accounts.

Outcomes of the Recent Survey

In a recent survey, Nagarjuna Urea has been rated as excellent (60%) by majority of the respondents for prill size, free flow, packing, weight and brand image. Price and extension services are rated as good (40%) by majority of respondents. With reference to all the urea attributes between various urea brands available in the market, 94% of respondents indicated that Nagarjuna Urea meets their expectations. Prill size, free flow and packing quality are rated by the respondents as the most important attributes for selecting a urea brand. Seventy percent of the respondents indicated a relatively long term association with NFCL.

Actions Planned to Improve Satisfaction

- Maintaining quality parameters, viz., prill size, free flow, packing, weight by keeping brand image.
- Extension services and advertisements to be regularly conducted.
- Ensuring product availability at all times.

We have been conducting extensive field promotional activities with personnel from promotional and advertising teams. In this, technical services are given to farmers on need basis for better productivity and cost optimization.

11.9. Customer Feedback

Nagarjuna's customers are loyal and Nagarjuna is the first company they turn to for products and service-needs, advice and help. We reproduce feedback of some of our customers in their own words.

"I have used the Company's products viz., Amino Plus & N-Bloom @ 2 ml / liter on Tea Gardens and found that both the products are useful and give better crop in comparison to conventional products"

Mr. Aloke Banerjee
Manager, Kamalapur Tea Estate
Darjeeling, West Bengal

"I have applied Customized Fertilizer on Rabi Paddy-2012 and observed that the pest and disease incidence are less when compared to other farming practice on Rice. I have got 6 qt more yield/ Acre compared to the other farmers. The additional cost of fertilizer application in CF was Rs.2,325/- while the additional profit by using CF was Rs. 4,300/-"

Mr. L.Swamireddy
Porandla,village, Kareemnagar Dist., Andhra Pradesh.

"I have been using NFCL water soluble fertilizers for the last 2 years for cultivating Sugarcane on 18 Acres of my land. The Sugarcane yield has increased by 30% when compared to the other farming practice. I am satisfied about the Nagarjuna product and am recommending the Nagarjuna brand to other farmers."

Mr. Dharmaraj B Malgunde

Mohol (Taluq), Sholapur(Dist), Maharashtra

"I am using Nagarjuna's Specialty Fertilizer for the last 2 years on my fields. Earlier I used to practice flood irrigation system with bulk fertilizers only from which I used to get yield of 70 mts per acre average. Later I implemented drip irrigation and started using Nagarjuna Specialty Fertilizers and since then noticed 20 mts growth in the yields. I appreciate the quality of products and believe that Nagarjuna is one of the best Specialty Fertilizers."

Mr. Manesh Jaysighrao Pharade

Jawali Dist, Satara

"I installed drip irrigation system of Nagarjuna Fertilizers & Chemicals Ltd. under GGRCL scheme. Its Reg. No. is BHR- 6015. I have grown Brinjal (Var. Gulabi Ringan) in 1.5 acre, I have produced Brinjal of Rs. 1,95,000/- against the cost of expenses was Rs. 90,000/- Nagarjuna drip system is running in good condition in my field and I am totally satisfied."

Mr. Imran Mohammadsafi
Zarna, Ta.Valia, Dist. Bharuch

"I have used NFCL Products on the cauliflower grown on 0.40 ha of land. The yield per ha in Drip method is 19.20 t/Ha compared to 11.20 t/Ha as per the traditional methods. I am very happy with the 71% increase in yield because of Nagarjuna"

Mr. Hanuman Sahay
Amer (Dist), Jaipur, Rajasthan

"I have used NFCL Products on the Tomato (Kranti) grown on 0.40 ha of land. The yield per ha in Drip method is 32 t/Ha when compared to 20 t/Ha as per the traditional methods. We had a 60% increase in yield"

Mr. Madan Lal Yadav

Chomu, District Jaipur, Rajasthan

11.10. Nagarjuna Foundation

Besides these focused interventions, we do believe that "*generous giving*" to society is an integral part of our social responsibility. These initiatives are on occasions and issues that do not directly link to our business but, we being a responsible corporate citizen, are indirectly deeply touched upon.

Supporting Blind School: Financial Aid being extended to the Inmates of Blind School at Mandapeta on regular basis

We undertake CSR activities based on the charter approved by our Board and with the active involvement of all the associates in the company and the Group.

The company has earmarked a budget of INR two crores for CSR activities. All CSR activities in the group are conducted under the aegis of Nagarjuna Foundation.

Funding an Early Intervention Centre - Nagarjuna Foundation provided financial support[4] to an Early Intervention Center for Exceptional Children at Kakinada, for children up to the age of 6 years. This Centre is affiliated to Uma Educational & Technical Society, Kakinada. The objective of this centre is to offer services to children who have special needs due to delayed development, neuromuscular and musculoskeletal disorders.

Over 300[5] children have availed the services of the Center. The Center provides services to help these children to manage their daily chores and teaches their parents to act as a co-therapist with the larger objective of rehabilitating the child.

Currently, over 60 children are availing regular guidance and counseling at the centre.

Early Intervention Center: Dr. Shew, Physiotherapist, New Zealand demonstrating Physiotherapy at the Early Intervention

The center is supported by professionals who help the children learn and enhance their physical and mental capabilities.

[4] INR 1.40 lacs per year
[5] As on 28th Feb 2012

Table 1: Our CSR Initiatives

Area	Activities
Education	Conducting awareness on Road Safety, Health and Environment
	Sponsor education for meritorious, economically weaker students
	Education scholarships, Infrastructure support to primary schools
	Assistance to *Advipudi* School
Environment	Planting of trees at KVK Raju *Sundaravanamu* – the Green Belt
	Creating awareness on alternative sources of energy
	Developing Kakinada Beach and other town areas
	Sponsoring of Tree Guards at Sidhardha Nagar Welfare Association, Kakinada
	Rennovation of Stadium
	Garden Maintenance
Traffic Safety	Replacing/maintaining traffic lights
	Spreading awareness on traffic regulation
Health & Charity	Running the mobile hospital services and extending its reach
	Providing assistance to Early Intervention Center
	Organize veterinary, health & eye camps, blood donation camps
	Providing drinking water and sanitation facilities
	Providing drinking water at various places in Hyderabad during summers
	Partnering with State Government for development of health and safety, polio eradication, women and child care
	Providing of Mineral Water Plant at the Kakinada Police Station.
	Supporting a School run for the economically poor blind children at Kakinada
	Supported IRTTODDD to produce their 3rd CD, the income on sale of this CD would be an income for the Blind School being looked after by IRTTODDD.
	Conducted Eye camps in support with Sarvani Super Market and

	Meghana Medicals on two different occasions respectively
	Conducted a Mega Health Camp
	Conducted Blood donation camp by Red Cross at Hyderabad Conducted Blood donation camps frequently at Kakinada
Old Age Homes & Orphanages	Providing infrastructure support
Youth Empowerment	Organizing sports in rural areas
Entrepreneurship Development	Sponsoring NGO programs related to social issues
Associates	Encouraging associates to do community service
Rehabilitation Services	Playing an active role in supplying essentials to people affected by natural calamities
Public Educaion	Collobration with Mohan Foundation for promotion of public awareness about Multi organ donations.
	Awarding of Gold Medal annually to the topper in the Post graduate Certificate in Agri Business Management Programme.
Spiritual and Cultural	Support to Vedanta Institute on Spiritual Dialogues of the Gita
	Support to Ramakrishna Matt
	Support to Guild of Service Seva Samaj
	Support to Hindi Academy in publishing a widely circulated Hindi Magazine
	Support to Saidehi Seva Samita
	One time support to NTR Memorial Trust
	Renovation of Temple Guruvana Sri Durga Ksheta at Mangalore
Calamities Relief	Flood Relief in October 2009
	Assisted and gave immediate support to save a Leading Fertilizer Company in Kakinada from a grave calamity of an Ammonia Leakage in their Plant.

Founder's Day and Chairman's Birthday celebrated for the years 2009 - 2012	Organizing various CSR activities and supporting around 98_ Centers all over India in a very strong manner by providing books, text books, stationery, sports items, various capital goods such as electronic appliances, solar water heaters, water purifiers, geysers, computers, inverters, refrigerators, furniture, clothes, uniforms, blankets, medicines, groceries and a meal on that day.

Environment Management of nearby villages through Mobile Air Monitoring Station

11.11. Education - Akshara School

We have a CBSE affiliated school at our Kakinada complex that was established in 1990. Currently, there are over 1500 students with 58 teaching and 15 non-teaching staff. The school is one of the best educational institutions in the region and boasts of well-placed alumni both in India and abroad.

Akshara School: During 2011-12, the school secured 100% results in Class X Board Examinations

11.12. Smt. Sittamma Mobile Health Care Chariot

A mobile ambulance has been put into service wherein an experienced senior doctor along with a nurse visits villages on specified days of the week and renders medical aid to the needy in that village.

Examining the Villagers by the Doctor on daily visits through "Smt.Sittamma Mobile Healthcare Chariot"

The ambulance goes to the specified location at the specified timing. Free medicines are given to the patients and necessary treatment is provided to each and every one who comes to the doctor. No consultation fee is taken.

First aid and medicines are provided free of cost to the needy patients. For chronic ailments, the villagers are counseled, guided and helped to take treatment under *Arogyashree* or in Government General Hospital by speaking to the concerned specialists.

Villages namely - *Settibaligipeta, Sundaraiah colony, Santhanapuri colony, New Kakinada, Bondagunta, Godariguna, Vakalpudi & Valaspakala*have benefited from this Scheme.

On an average, nearly 2000 people are availing the benefit on monthly basis. The main beneficiaries are the elderly people, ladies and children. There is good response from all these villages.

11.13. Voluntary Initiatives from Employees

At NFCL, our employees are encouraged to participate voluntarily in developmental activities initiated by local NGOs.

Some of our employees are active members of KRIYA, a non-government, non-profit organization working in the field of school education in Andhra Pradesh. The focus is on children who come from poor families with illiterate parents.

KRIYA conducts children festivals (*Pillala Panduga*) to encourage joyful and activity-based learning to fill the gaps between theory and practice in teaching and develops children in a holistic way.

KRIYA organizes free coaching centers for polytechnic entrance test and provides scholarships for needy students to continue their education.

Honing Talent through Stage Activities

The voluntary participation of our members helps in developing a culture where corporate social responsibility is not considered as the management's domain but goes beyond and percolates to the employee level.

12. Triple Bottom Line Performance – Environmental

12.1. Monitoring and Reducing Carbon Footprint

We are consistently striving to reduce our carbon footprint. Carbon footprint can be defined as a measure of the impact human activities have on the environment in terms of the amount of greenhouse gases produced. It is the amount of $C0_2$ equivalent emitted as a part of our everyday operations. It is often expressed as tons of $C0_2$ or tons of carbon emitted on an annual basis.

With increasing importance to climate change and GHG issues, we have identified the following drivers for compiling a GHG inventory and for monitoring our carbon footprint:

- *Managing GHG risks and identifying cost-effective reduction opportunities*
- *Employee satisfaction and public reporting*
- *Participating in GHG markets and gaining recognition for early voluntary action*
- *Environmental co-benefits*

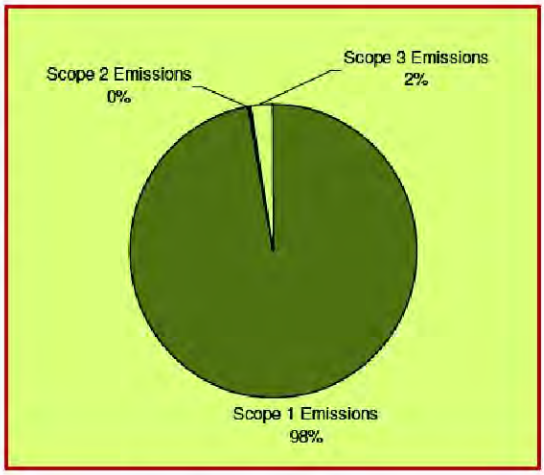
12.2. How do we measure our carbon footprint?

We have developed tools for Estimation and Inventory Management of all GHG emissions within our Kakinada Complex. We have adopted the five overarching accounting & reporting principles - Relevance, Completeness,

Consistency, Transparency, and Accuracy- as highlighted in the GHG Protocol Corporate Standard for developing the Excel-based tool for assessing present GHG emissions as well as for monitoring future business activities. GHG emissions of any business can broadly be divided into three categories:

1. *Scope I Emissions:* It is the measure of direct emissions occurring due to activities owned and controlled by the organization.
2. *Scope II Emissions:* It is the measure of indirect emissions occurring from purchase of various forms of energy.
3. *Scope III Emissions:* It is the measure of indirect emissions occurring from activities like business travel, travel of employees to office, outsourced activities, etc. These are essentially activities earned out in premises or circumstances not owned, governed or controlled by the organization.

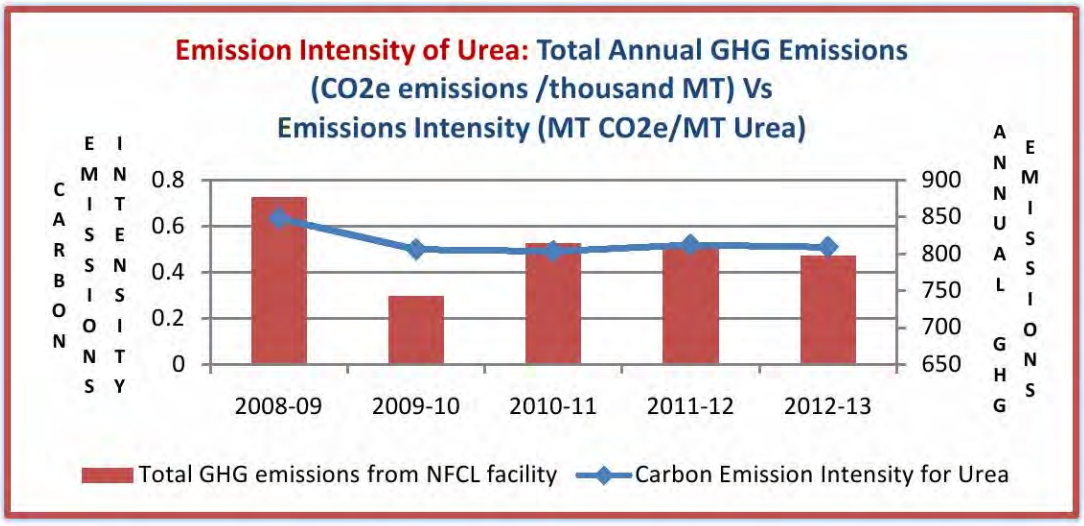
The majority, 98%, of emissions in our business operations pertain to Scope I emissions. In the last 3 years, we have been able to bring down our carbon footprint and have set a benchmark for ourselves.

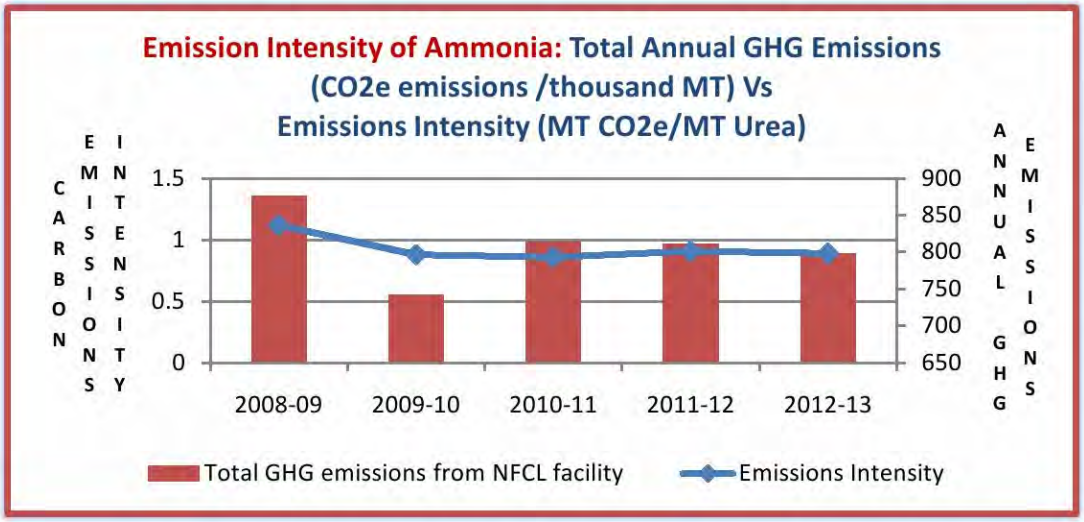


The following two measures were the prime contributors for NFCL Carbon Emission Intensity reduction by 21.3% from 2008-09 to 2009-10

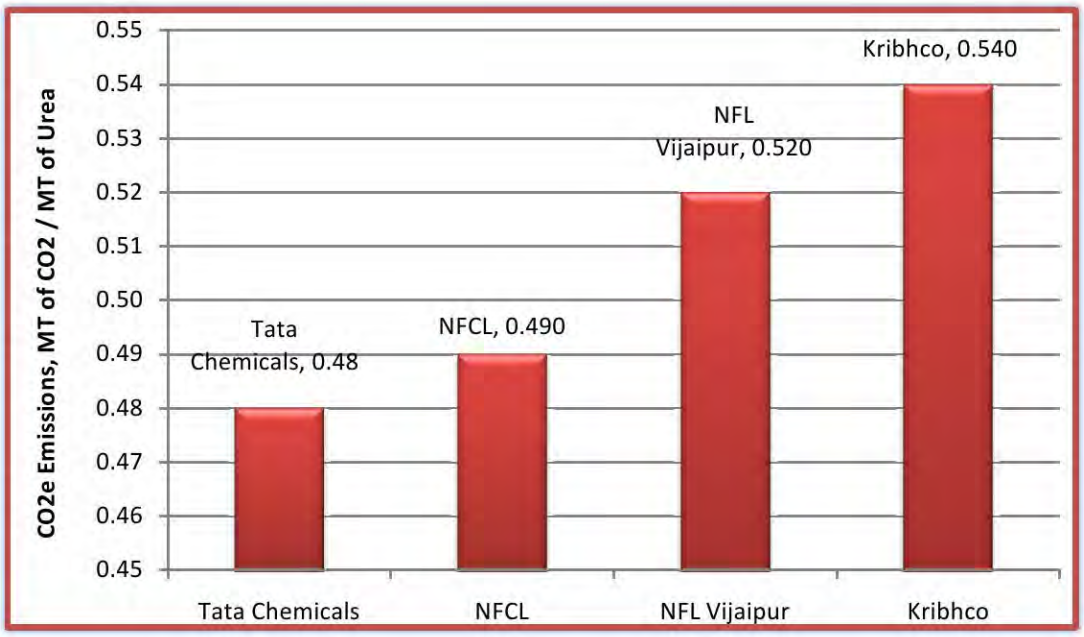
- Installation of Carbon Dioxide Recovery Unit. This Unit recovers the CO2 from flue gas, which is otherwise vented to atmosphere. The CO2 thus recovered from this Unit is used for Urea production.

- Changeover of entire Complex operations to Natural Gas mode.


Emission Intensity of Urea: Total Annual GHG Emissions
(CO2e emissions /thousand MT) Vs
Emissions Intensity (MT CO2e/MT Urea)
CARBON EMISSIONS INTENSITY
ANNUAL GHG EMISSIONS
0.8
0.6
0.4
0.2
0
900
850
800
750
700
650
2008-09
2009-10
2010-11
2011-12
2012-13
Total GHG emissions from NFCL facility
Carbon Emission Intensity for Urea


Emission Intensity of Ammonia: Total Annual GHG Emissions
(CO2e emissions /thousand MT) Vs
Emissions Intensity (MT CO2e/MT Urea)
CARBON EMISSIONS INTENSITY
ANNUAL GHG EMISSIONS
1.5
1
0.5
0
900
850
800
750
700
650
2008-09
2009-10
2010-11
2011-12
2012-13
Total GHG emissions from NFCL facility
Emissions Intensity

Comparison of NFCL Carbon Footprint with Peer Group- (Carbon Performance Benchmarking within Fertilizer Industry)

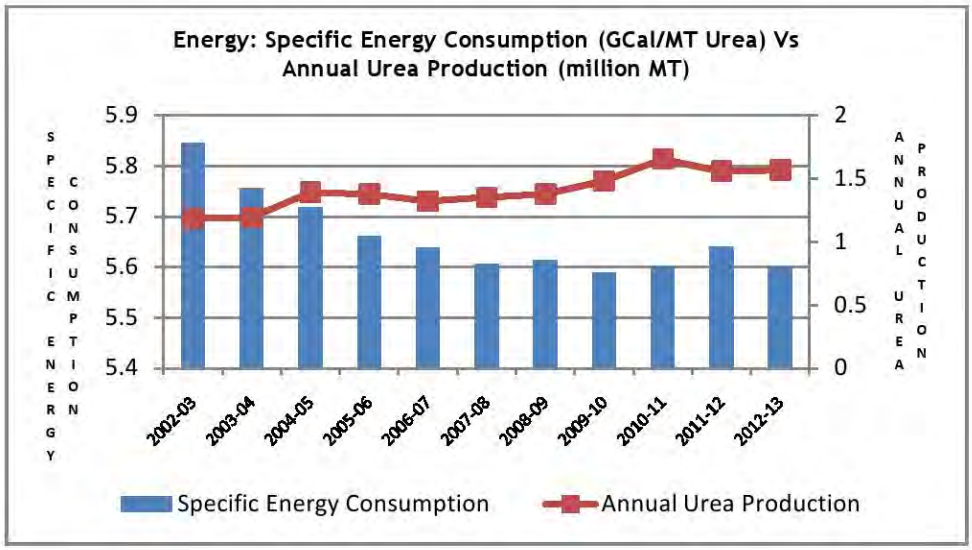


Within the Fertilizer Industry in India, our carbon footprint is the second best. As part of the continuous improvement and also as part of Corporate Environmental Responsibility, further steps are being taken to improve NFCL's Carbon Footprint by implementing GHG abatement projects such as replacing the existing R22 based refrigerants with eco-friendly R134a, installation of energy saving projects, and logistics management.

12.3. Energy Conservation Initiatives

Major Energy Saving Initiatives at NFCL from 2008-09 to 2012-13

Schemes Implemented at NFCL Kakinada	Energy Savings (Million K cal per year)
Fluid coupling installation for A-I ID Fan	2688
Installation of Advance Process Control in Ammonia-II	14470
Installation of S-300 synthesis convertor in parallel to the existing S-200 in Ammonia I	31221
Additional heat recovery from reformer flue gas in Ammonia I	15488
Additional heat recovery from HRSG C	23415
Installation of Advanced Process Control in Ammonia I	12000
Installation of aerodynamic diffusers in inlet and inter modular ducts of Ammonia II combustion air pre-heater	3340
Fluid Coupling Installation for A I FD Fan	2688
Suction Chilling for Ammonia I Process Air Compressor & Ammonia II Syngas Compressor	15120
Installation of MP Pre Decomposer in both Urea Plants	31680
Heating Surface area addition for Ammonia I Feed Coil	3570
CO2 Compressor Discharge Pipeline replacement for reducing the pressure drop	2500
Using Urea plant-II LS steam in Ammonia-II Syn. Gas compressor VAM (Vapour absorption mechanism)	**3298**
Ammonia-I Cooling water pump drive change over from Turbine to Motor	**17136**
Urea-II Reactor trays replaced with high efficiency Casale Trays.	**27594**
Total Annual Energy Savings Per Year	**206208**



12.4. Water Resource Management

Our water supply comes from the Godavari River through an irrigation canal upto *Samalkot*, where there is a summer storage tank with storage capacity of 2.0 million m^3 in 350 acres area. Raw water is received from *Samalkot* summer storage tank (maintained by Public Health & Engineering), 13 kms away from the plant site and flows by gravity through underground water pipe lines.

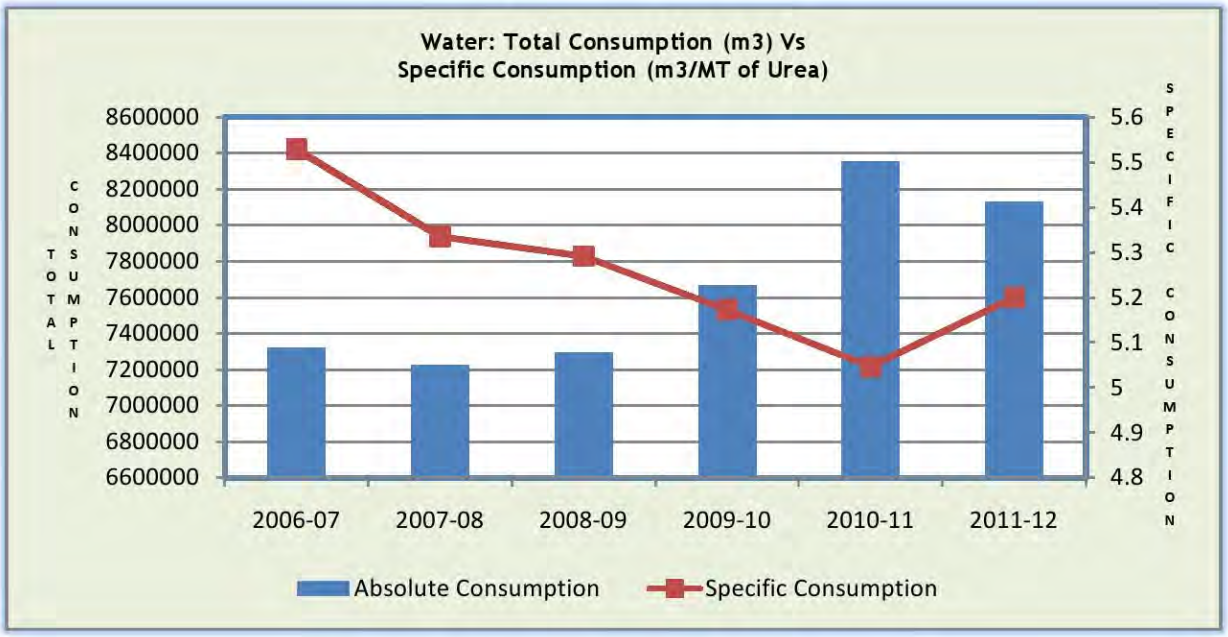
Water Usage Pattern

70% *- Cooling Tower Make-up*

20% *- Process Usage, Fire Water, Drinking Water, Domestic Usage*

10% *- Seepage & Evaporation losses*

NFCL has authorized approvals for drawl of water upto 40,000 m^3/day. At present, we are consuming around 22,000 m^3/day for both plants together. An additional summer storage tank with capacity of 3,50,000 m^3 storage was constructed at our NFCL premises to meet the requirements in the summer season due to canals closure by the irrigation department.



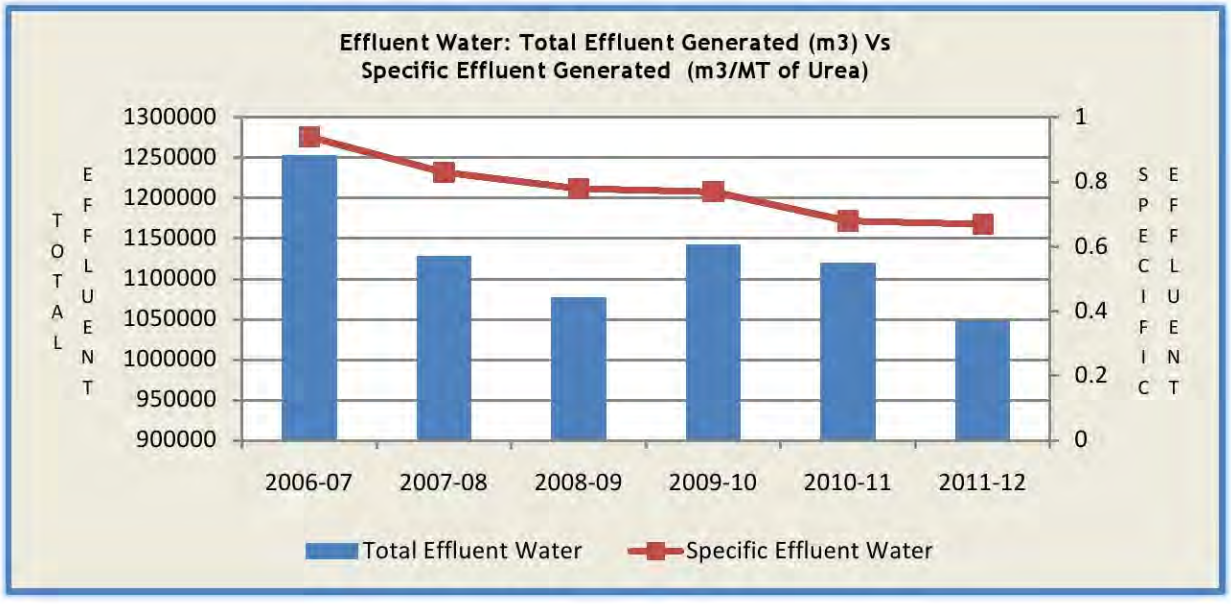
Major Water Conservation Methods

Water Conserved	Initiatives taken at NFCL Kakinada Complex
1950 m3/day	Increasing the Cycles of Concentration in Cooling Towers from 6 to 9, that resulted in saving of 1950 m^3 / Day of makeup water.
640 m3/day	Recycling of 640 m^3 / Day of water from DM plant (Rinse Water from Weak Base Anion, Strong Base Anion and mixed beds), Water from Online Analyzers, Back Wash Water from Condensate Polishing Unit are used as makeup in Cooling Towers.
500m3/day	Boiler Blow Down Water is being used as Cooling Towers make up (500m3/day)
700m3/day	Clarified water from sand filters backwash pit in Raw Water Pretreatment is recycled back to raw water reservoirs (700 m^3 / Day).
Difficult to measure	Cathodic Protection is provided for Fire Water Pipe System to minimize leaks.
200m3/day	CDR Plant Effluent is being used as CT makeup.
44,650 m3/year	Rain Water Harvesting is being done.

12.5. Waste Management

Primarily individual plants in the complex treat their major effluents within the respective plants and recycle back for process reuse. A centralized effluent treatment plant was provided to take care of other minor and innocuous effluents like Cooling Tower blow-downs, Treated Oily Water, DM Plant Effluents, Process Plant Effluents, etc.

The major effluents generated in the process plants are normally treated in the process plants themselves except during upsets, which is very rare. The Effluent Treatment Plant (ETP) receives only innocuous effluents from cooling towers, boilers, oily water from process plants, floor washings, rain water, and mostly serves as secondary treatment and back-up unit.



The effluents from the process plants and the acidic-alkaline water produced during regeneration of ion exchange resins in the DM plant are sent to equalization ponds. Also the oily effluents from various plants are treated in disc oil separators and sent to equalization pond after removing the oil. The water from the equalization pond is sent to holding pond and

from there it is pumped to Green Belt for its sustenance and development. The entire treated effluent generated is being utilized for the sustenance and development of Green Belt only. Hence, we are **"Zero Effluent Discharge Plant".**

12.6. Major Water Pollution Control Measures

Water Pollution Control Measures at NFCL Kakinada Complex
Process Condensate Stripper in each Ammonia Plant, which removes carbon dioxide, ammonia and methanol. 1000 m^3 capacity of off-spec condensate tank provided to divert condensate during plant upsets. This off-spec condensate can be treated subsequently.
Disc oil separators provided to separate oil from the liquid effluent.
Deep-hydrolyser and distillation column provided to treat the process condensate in Urea Plants. 1000 m^3 capacity of off-spec condensate tank was provided to divert condensate during plant upsets. This off-spec condensate can be treated subsequently.
All the pits and tanks are lined with impervious lining so as to prevent seepage of any effluent into the ground water.
Neutralization pits are provided to receive the DM Plant effluents and adjust the pH by adding either acid or alkali.
Additional disc oil separator provided in Effluent Treatment Plant to take care of upset condition of the disc oil separator in main plants.
Installed and operating 100 KLD Sewage Treatment Plant for Canteen Effluent and Technical Building Sewage to improve storm water quality.

12.7. Major Air Pollution Control Measures

Purpose	Air Pollution Control Measures at NFCL Kakinada
Ammonia Recovery & Recycling Hydrogen in Ammonia Plants	Purge Gas Recovery Unit (PGRU) was incorporated. In case of PGRU trip, the gases after ammonia absorption are burnt in auxiliary boilers where the chimney height is 120m. This allows for better dispersion of NO_X formed, if any.
Process Improvement	Low NO_X emission and high efficiency burners at Ammonia Plant Reformers
Carbon Dioxide Recovery	Carbon Dioxide Recovery Plant was installed that removes 450 MTPD CO2 from Ammonia Plant I reformer flue gases.
Better Dispersion of CO2 and NOX	Primary Reformer Stack has been raised to 40m (10m over the conventional 30m) to allow better dispersion of CO2 and NOX in the flue gases.
Safety	All the safety valve discharges are connected to flare stacks.
Urea Dust Removal	De-dusting system provided at the top of Prill Towers to bring down the urea dust and ammonia emission levels below the statutory limits.
Safety	All relief valves and safety valves releasing vapours in Urea plants are connected to stacks extended up to the top of the Prill Towers.
Dust Reduction	Dust extraction system provided to reduce the dust at the bottom of the Prilling Towers and product handling area.
Ammonia Leakage Prevention	Ammonia sensors are fixed in the ammonia storage area, ammonia plant and processing areas, which will detect and give indication in the control rooms in case of any ammonia leak.
Better Dispersion of Flue Gases	120 m height chimney was provided for Boilers in spite of using low sulfur Natural Gas as fuel.
Ammonia Leakage Prevention	Two double wall double integrity Ammonia Storage Tanks with facilities like emergency power for refrigeration system, dedicated flare stack, water curtain, etc, are provided.
Chlorine Leakage Protection	Chlorine absorption systems were provided at chlorine handling areas.

Dust Extraction in Bagging Plant	Two independent dust extraction systems have been provided in the Bagging Plant where De Mineralized (DM) Water is used to remove urea. This solution is sent to Urea Plant for urea recovery.

13. Report Parameters - Boundary, Scope, Data collection, and Limitations

This is our first sustainability report. The reporting period is from April 2008 to March 2012 *(now revised upto March 2013)*– a period when our business operations underwent significant changes. The group also underwent a restructuring exercise to realign its goals in the plant nutrition domain. These strategic changes have resulted in marked improvement in our economic, social and environmental performance.

The process for determining report content is based on the materiality of the parameters and relevance of our initiatives to address key environmental and social aspects of our business.

Boundary

The report takes into account the NFCL Fertilizer Manufacturing Unit at Kakinada, Andhra Pradesh, India.

Scope

The Scope is limited to

- Urea manufactured by NFCL at Kakinada Complex
- Specialty Fertilizers manufactured by NFCL at Kakinada Complex

Though NFCL trades in other fertilizer products (including imports) and offers other services, they do not form part of this report.

Limitations & Exceptions

- Ecological footprint of products during application (after sales) and end-of-life stage are not part of this report. For instance, agricultural emissions are not taken into account.

- Ecological footprint of MI plants at Baroda and Nacharam are not part of this report. However, the report highlights the potential of MI systems in water conservation.

- Valuation of ecological assets at Kakinada Complex – forest cover as 'carbon sink' and rich biodiversity supported by the forests – has not been taken into account, and hence, not a part of this report.

- Renewable Energy Initiative of the company in the adjacent state – Tamil Nadu, has been taken into account owing to the strategic linkage to energy requirements at NFCL Kakinada.

*Installations/offices/premises/plants other than NFCL Kakinada do not form part of this report. Likewise, the Micro-Irrigation equipment manufacturing plants at Baroda and Hyderabad are not a part of this report.

These limitations would be addressed in the subsequent reporting period.

Data Collection

Primary Sources – The consultants interviewed and discussed with the CMD, Directors, Business Unit Head and Departmental/Functional Heads at the Corporate Office, Hyderabad, and Plant-Level during the plant visit.

Specific queries were also addressed through email communication.

Secondary Sources – Annual Reports, Analysis & Write Ups from Functional Heads, Company Policies, Manuals, and Reports.