

A Sustainable Environment



44%

plant area under
green cover



100+

species of birds in the
Kakinada Birds Paradise



3.5%

reduction in water withdrawal

Contribution to the SDGs



Water and Effluents

Implementing zero liquid discharge programme
R&D to enhance water efficiency of products and promoting water efficient crop management practices among farmers



Energy and Emissions

Energy efficiency measures implemented at plants



Waste

Responsible disposal of hazardous waste
Adoption of circular economy principles in packaging waste



Biodiversity

Development of the Birds Paradise and development of green belts
Green Visakha-urban environmental greening in collaboration with state and district administrations

Product Responsibility

The agriculture sector is central to the well-being of the planet and its people. While the sector is critical to feeding a rising global population, it also places pressure on the planetary boundaries. Coromandel is cognizant of the risks, opportunities and responsibility to develop products that enable the transition to sustainable agriculture. It acts towards minimizing the product's environmental impact throughout the various stages of the product's life cycle.

The Company promotes a balanced nutrient application approach customized to crop and soil needs including organic, primary, secondary, and micro-nutrients. Considering the resource constraints of Indian farms, it is continuously improving the use efficiency of nutrients and water through technology and research interventions. Coromandel is amongst India's largest water-soluble fertiliser and organic fertiliser player, carefully addressing the soil health and crop nutrient needs.

It follows an integrated pest management approach to improve crop yields by combining the use of biological, cultural and chemical practices to control pests. The Company is globally the largest neem based biopesticide manufacturer and is continuously upgrading its product portfolio towards greener chemistries. It is introducing superior delivery mechanisms to improve product efficacy and application efficiency.

Coromandel lays high emphasis on efficient processes in the manufacture of new and existing products, including efficient use of resources. For example, the Fertiliser Technology Plant (FTC) in Vishakhapatnam drives the development of efficient processes in the manufacture of new fertilisers and enhancing efficiency of producing existing products. These processes are not limited to the manufacturing process alone, but also extend to ensuring efficient nutrient delivery in end use, thereby keeping environmental needs in the forefront of the advances made.



Figure 25: Stewardship: Sustaining the greenery



Figure 26: Soil testing

Healing soils, balancing nutrition

Coromandel has pioneered efforts to enrich soil by promoting city compost and pressmud (made of sugarcane waste), both of which are rich in organic carbon. Further, oilseed cakes, molasses-based Potash and gypsum based products offer rich source of organic nutrients to improve soil health. The company undertakes soil tests through its Retail centers and Agronomists on farmer fields to determine organic carbon content and accordingly promote the benefits organic products.



Figure 27: Bio-pesticide facility at Thyagavalli

Biopesticide development through neem

Reducing the adverse environmental impact while meeting the steadily growing demand for food and fabric is paving the way for biological products. Being target specific, biologicals are derived from natural sources like plants, microbes and minerals. Spearheading this shift from the forefront, Coromandel is fast evolving its product-mix to support sustainable farming. Having ventured into bio-pesticide segment in 2018, Coromandel has become the largest manufacturer of neem seed extract-based bio products. Its state-of-the-art manufacturing facility at Cuddalore, Tamil Nadu converts neem seed to highest purity Azadirachtin through a patented extraction process. These products are Organic certified (IMO, DNV) and marketed in more than 40 countries.



Figure 28: Gromor Suraksha

Gromor Suraksha – Doing it the Right Way

Through its Gromor Suraksha “STARS” (Safety Training for Awareness on Responsible Spraying) initiative, Coromandel is conducting farmer awareness sessions for promoting the use of safety gears and safe practices in agriculture. It includes aspects like:

- Safe use of Crop Protection products
- Using safety kits
- Disposing the empty containers after use
- Do's & Don'ts of using pesticides
- Right way of storage and handling the Crop Protection products

During the year, the Company set up a Liquid Fertiliser pilot plant at its Vizag facility. Liquid fertilisers have high nutrient uptake efficiency and can significantly reduce the water needs and minimize nutrient losses. The company is testing out in-vitro delivery of biopesticide in trees through injectables and has received EPA registration of the related neem formulation. Crop specific Speciality nutrients product portfolio was further strengthened through introduction of new products targeting sugarcane and flower segment. The Crop Protection business is upgrading its products to safer chemistries and has been partnering with leading innovators. The company has a rich product pipeline backed by strong R&D capabilities and tie-ups with major research organizations.

Product Stewardship

To promote responsible crop care practices, Coromandel is partnering with leading agricultural universities in India on 'Stewardship program on Responsible use of Crop protection Chemicals' to the agriculture graduates.

In the last 3 years, the Company has collaborated with Prof Jayashankar Telangana State Agricultural University (PJTSAU), Hyderabad, University of Agricultural Sciences, Raichur (UASR), Chaudhary Charan Singh Haryana Agricultural University (CCSHAU), Hisar, and Gobind Ballabh Pant University of Agriculture and Technology (GBPUAT). Under its certification program, the company interacts with the students to improve awareness on responsible use including Dos & Don'ts on handling pesticides, importance of product label, usage of PPEs, first aid precautions and safe disposal of pesticide containers. The Company plans to expand the coverage of this program and work with more universities to improve the awareness on the product stewardship aspect.



Figure 29: Stewardship program at UAS, Raichur

Packaging and Labelling

Coromandel is focused on providing clear information to farmers on the responsible use of its products. The Company focuses on improving and optimizing packaging of existing products to address the requirements of customers as well as regulatory agencies. The department also carries out Container Content Compatibility (CCC) studies with the end goal of enhancing efficiency in the packaging process.

Considering its inert nature, being lightweight and cost effective, the Agri inputs industry largely employs Plastic for packaging its products. Coromandel understands the

growing global concern with single-use plastics and has adopted the Plastic Waste Management (PWM) Rules to improve sustenance of its operations.

In Crop Protection, the Company follows the standards set by the Crop Care Federation of India (CCFI) in addition to other applicable regulatory requirements so as to disclose necessary and relevant information on safe use. Crop protection chemicals and specialty nutrients are supported with information on safe handling, dosages, time and method of application, and enables its customers to use the products safely and for the best outcomes.

Automation

In the last two years, Coromandel has undertaken a digital transformation journey for its key manufacturing processes. Following major initiatives have been implemented to improve process efficiencies through application of automation and technology:

- 1. Manufacturing execution systems (MESs):** The system helps in online monitoring and control for plant operations based on real time DCS data. This included installation of servers and software and configuration of about 10,000 tags of all fertilizer plants (Vizag, KKD & Ennore). The company has built dashboards, KPIs event alerts, plant graphics and logbooks.
- 2. Energy Management System (EMS):** The system helps in monitoring, controlling, and optimizing the performance of generation and transmission systems. The Project involved over 144 energy meters connection and covering the cabling length of over 3000 metres.
- 3. Condition Monitoring:** Vibration sensors (over 60 installations) and IIOT installation (20 Installations) has been made for remote viewing and are configured to software and MES projects through MES project dashboards which helps in breakdown maintenance.
- 4. Water Management:** Water flowmeters and level sensors for water management has been installed for live value monitoring.
- 5. Process Automation:** This included automation projects such as pipe reactor sensors for better accuracy, moisture analyser for the products, bag counting automation, online density measurement for process control at Complex and Phosphoric acid plants.

Energy & Emissions

The contribution of the chemical sector to global emissions is about 2.2% and that of the agriculture sector is 18.4%⁶. As a manufacturer of chemical and organic products for the agricultural sector, Coromandel is conscious of its twin responsibilities. While the Company is focused on developing environmentally responsible products as covered in the product responsibility section, it is also committed to reducing the carbon footprint of its operations where it has direct operational control across our manufacturing sites.

Coromandel is focusing on enhancing its share of renewable energy in its energy mix as well as achieving greater efficiencies in energy use.

The fertiliser manufacturing operations at Vishakhapatnam and Ennore have been accessing 50% of its energy requirements from waste heat recovered from captive Sulphuric acid plants. Its plant in Kakinada uses solar energy to heat water for boilers, thus reducing its dependence on natural gas.



Figure 30: Solar power generation at Kakinada plant

6. <https://ourworldindata.org/emissions-by-sector>

The fuel and electricity consumption data for a 3-year period is shown in the table below:

Energy Consumption by the Organisation			
Fuel based-Energy Source	FY 2018-19	FY 2019-20	FY 2020-21
Furnace oil (GJ)	86,733	68,609	70,657
Diesel (GJ)	20,324	22,557	29,855
Coking Coal (Bituminous) (GJ)	1,33,202	1,31,332	1,76,499
Coal steam (Non-coking coal) (GJ)	—	1,99,408	1,65,275
LSHS (GJ)	21,493	22,097	21,562
S. Kerosene Oil (GJ)	13,98,558	12,33,683	20,69,995
PNG (GJ)	59,576	14,795	11,500
LPG (GJ)	2,074	1,991	1,953
Natural Gas (GJ)	8,22,011	7,47,665	8,58,797
Total fuel-based energy (GJ)	25,43,971	24,42,136	34,06,093
Electricity based-Energy Source (In GJ)	FY 2018-19	FY 2019-20	FY 2020-21
Electricity Purchased from Grid	3,98,447	4,14,169	4,01,900
Electricity Wheeled from renewable energy plant	7,362	12,702	21,534
Electricity Purchased from third party	3,12,817	3,29,825	3,70,378
Total electricity-based energy (GJ)	7,18,626	7,56,696	7,93,812

Higher fuel consumption in FY 20-21 is primarily due to increased consumption of Kerosene oil at its Vizag plant. The Plant undertook advanced annual turnaround in March 2021 leading to restart of its Sulphuric acid (SA) plant, a high energy consuming process. Also the SA unit underwent a cold shutdown during the year. Increase in electricity consumption was primarily driven by increased production in the CPC and SSP plants.

In recent years, the Company has deployed various initiatives at its Fertiliser, CPC and SSP plants that have resulted in considerable energy efficiencies and reduced consumption of grid-based power. A few of these steps are shown below:

Fertiliser plants	CPC plants	SSP plants
Modernized electrical low-tension switch gear	Energy efficient motors and cooling tower pumps	Replaced old motors with energy efficient motors
Installed LED lighting systems	Installed energy efficient motors and cooling tower pumps	Improved monitoring of energy consumption through digital monitoring meters
ENCON and Small Group Activity teams to oversee energy conservation, and other improvement measures have resulted in considerable energy savings.	Installed LED streetlights and solar lights	



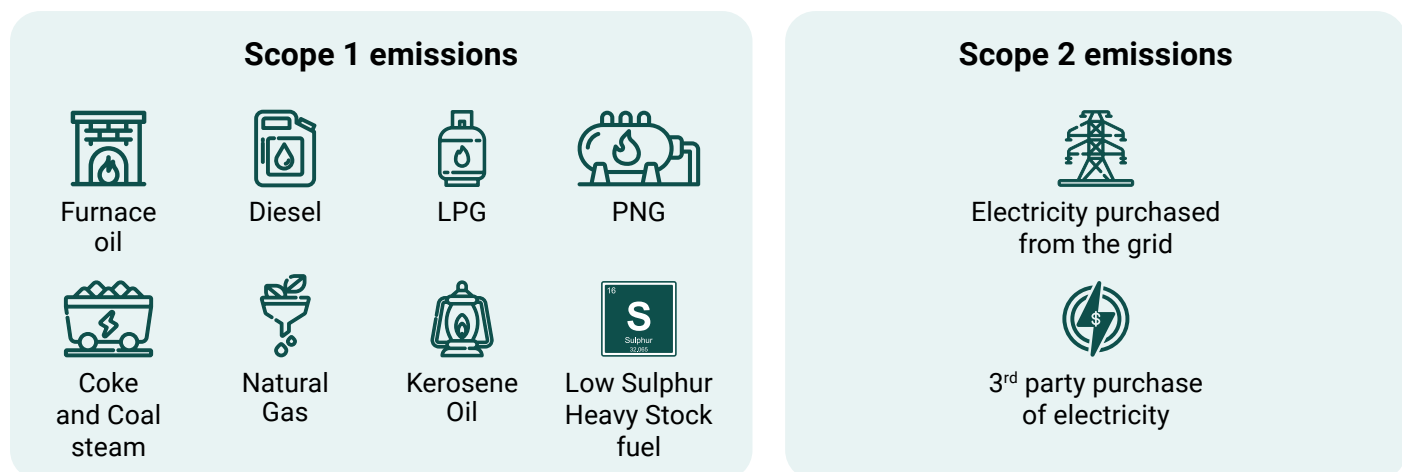
Figure 31: Smart operations leading to energy savings

Some of our noteworthy initiatives across the Company's plants during the year are shown below:

Description	Annual Energy Savings (GJ)	Key benefits
Direct loading of gypsum on to trucks in Vizag plant	2,949	No use excavators and a safer operational process
Optimization of plant layout and installation of 35,000 MT raw material internal godown in Vizag plant	2,091	Direct transfer of raw material from port to internal godown Transport fuel savings by avoiding multiple handling points for raw material
Removal of decanter machine and replacement with natural gravity flow column in Thyagavalli plant	1,356	Electricity saved through utilization of gravity
Installation of steam flow control valve to control LSHS* fuel oil storage temperature in Vizag plant * Low Sulphur Heavy Stock	1,083	Minimize wastage of steam Better control of LSHS fuel oil storage temperature
Generation of electricity through induction generators in waste heat turbine in Sarigam plant	932	Utilization of waste heat
Use of Electric Hot Water Bath Instead of 500 Kg Boiler for Heating of Tech. Drums in Jammu plant	797	Fuel savings achieved through use of electric bath

The Company's GHG emissions arise primarily from the use of fuel and electricity. The emissions are as per the guidelines of the GHG protocol.

Scope 1 emissions — Direct emissions from company-owned and controlled resources. Scope 2 -Emissions from the consumption of purchased electricity and steam.



The table below showcases Scope 1, Scope 2 and total emissions over a 3-year period. As referred to in the energy section, Scope 1 emissions increased owing to higher kerosene oil consumption in Vizag, and Scope 2 emissions due to increased production volumes in CPC and SSP plants. . On the whole, while Coromandel's overall emissions increased in FY 20-21 due to higher production, emissions intensity on the basis of revenue from operations reduced by 3.8% (i.e. from 130.9 tCO₂/lakh INR to 125.89 tCO₂/lakh INR).

Emissions (tCO ₂ e)	FY 2018-19	FY 2019-20	FY 2020-21
Scope-1	1,69,804	1,71,352	2,39,635
Scope-2	16,39,85,880	17,15,31,997	17,80,53,055
Total	16,41,55,684	17,17,03,348	17,82,92,690

In addition to the GHG emissions, the Company also monitor the emissions to air. It carries out periodic testing of ambient air quality and provide data to the Pollution Control Boards in real time. The primary sources of non-GHG emissions are from its stacks attached to the DG

sets and boilers. The emissions to air are computed on the basis of the concentration, flow rate and running hours of the equipment in question. The table below showcases the Company's total emissions to air for a 3-year period.

Emissions (In MT)	FY 2018-19	FY 2019-20	FY 2020-21
Particulate Matter (PM) Emissions	795	796	782
Sulphur Dioxide (SO ₂) Emissions	466	505	406
Ammonia (NH ₃) Emissions	614	574	633
Hydrogen Fluoride (HF) emissions	30	14	9

Water & Effluents

According to a report released by Niti Aayog in 2018, 600 million Indians face high to extreme water stress. India will be home to an estimated 1.5 billion people by 2030 and addressing the food, health and water requirements of this population will pose a challenge of immense proportions. Moreover, it has been estimated that 80% of India's freshwater is used in agriculture⁷.



Figure 32: Installation of Sea water pipeline at Ennore Plantkits

Further, with more than 50% of the Indian farms being rainfed in nature, Coromandel is committed towards developing solutions to address the water related challenges.

To maximize judicious usage of water resources along with providing high nutrient use efficiency, Coromandel has been pioneering efficient fertilization practices among the farmers through water soluble fertiliser application. The fertigation and foliar application not only conserves water usage, but also improves nutrient uptake by plants upto 90% from conventional levels of 40%-50%.

Furthermore, giving centrality to farmer's needs, Coromandel is deploying smart technology in agriculture, and is testing out soil moisture sensors that enable farmers to assess water requirements for their crops.

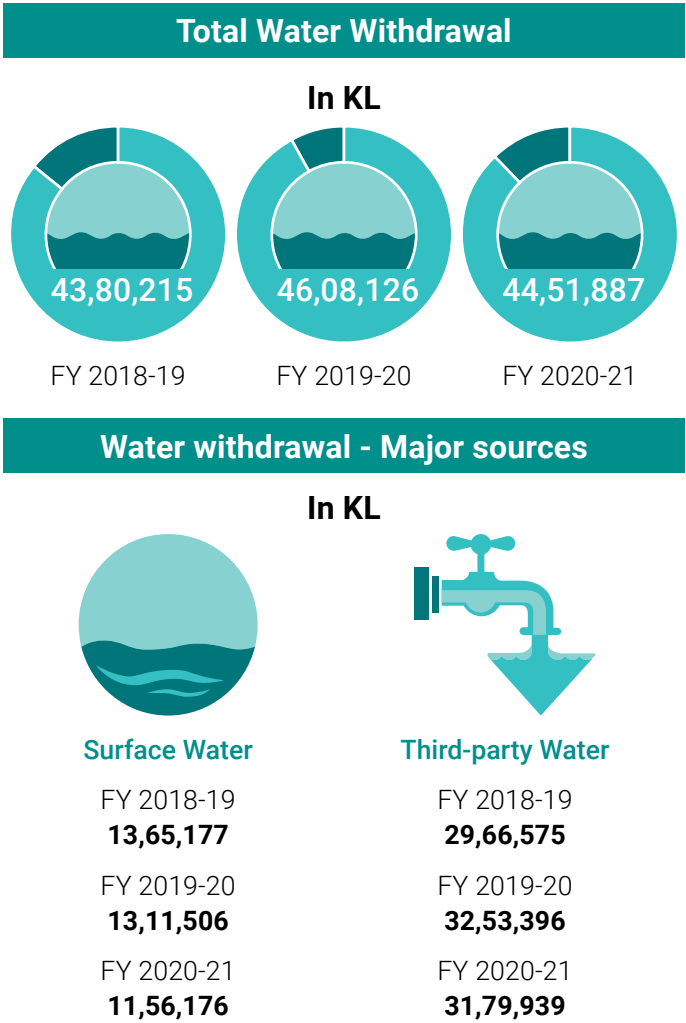
During the year, the Company has instituted measures to secure water from alternate sources such as tertiary treated wastewater plants and desalinated sea water, thus making fresh water available for consumption and agricultural purposes.

Its major Plants are fully reprocessing/treating the wastewater, while others have achieved steady reduction in the generation of wastewater. The Company's Fertilizer and SSP plants have implemented Zero Liquid Discharge systems which help in recycling and reusing the water for its processes. The CPC plants have been efficiently

7. https://www.oav.de/fileadmin/user_upload/5_Publikationen/5_Studien/170118_Study_Water_Agriculture_India.pdf

treating the effluents through its ETP facilities and is fully compliant as per the pollution control norms. During the year, it closed the outlets of delay ponds and installed recovery pits in the delay ponds enabling water to be recovered and reused, thus leading to its conservation. In FY 20-21, the water withdrawal reduced by 3.4% owing to the afore mentioned conservation methods. Furthermore, water intensity computed based on revenue from operations reduced by 10.5% (i.e. from 3.51 KL/Lakh INR to 3.14 KL/Lakh INR) . The Reduced water consumption is primarily driven by a decrease in production in its fertilizer plants, which comprise the highest share of water consumption across its business segments. The plants also started the use of sea water in their operations.

The charts below showcase the total water withdrawal for a 3-year period along with the share of water withdrawal by source.



Accumulation of phosphogypsum heaps not only leads to land losses but also causes dust emissions, soil & ground water contamination which can lead to discontent amongst the community and Government.

In order to overcome such challenges, Coromandel converted its gypsum handling from wet to dry stacking which has reduced the moisture content in the gypsum and eliminated the water requirement to carry the gypsum in the slurry form. Further the gypsum with reduced moisture content is supplied to cement industry and in agriculture / POP manufacturers.

Coromandel is pioneer in taking new initiatives for environmental sustainability and in order to showcase its commitment towards environment, the Company is working on soil remediation initiatives and converting waste land into plantation.



Figure 34: Plantation on gypsum pond



Plastic Waste Management

In March 2016, the Ministry of Environment, Forest, and Climate Change (MoEFCC) published the Plastic Waste Management (PWM) Rules 2016 with the objective of plastic waste minimization in the country and later amended the PWM Rules in 2018.

The provisions of these Rules lay emphasize on plastic waste minimization, source segregation, recycling, involving various stake holders like waste pickers, recyclers, Urban Local Bodies and waste processors in collection of plastic waste fraction either from households or any other source of its generation or intermediate material recovery facility and adopt proper recycling / Co-processing of the plastic waste / waste to energy etc. to help building circular economy for sustainability .

The rule applies to Producers/ Importers/ Brand Owners (PIBOS). As per the provisions of the PWM Rules the PIBOs must work out modalities for waste collection system based on Extended Producers Responsibility (EPR). Coromandel as brand owner is committed to abide by these rules.

As a responsible Corporate, Coromandel immediately started the adoption of the said rules and is one of the first few companies among fertilizers to approach and apply for the registration with CPCB. At the same time Coromandel has tied up with approved and competent

plastic recyclers and started fulfilling its obligation immediately and Coromandel has recycled around 2000 metric tonnes of Plastic waste. The Coromandel looks forward to demonstrate its commitment towards Environment & Sustainability.



Converting City Waste to Wealth

Nearly 70 percent of the Indian arable soil is organic carbon deficient. With an aim to balance nutritional value of soil, the Company forayed into organic fertiliser segment in 2006. Since then, it has introduced multiple variants of organic manure derived from natural sources like city waste (organic portion only), sugarcane molasses and its by-products, oil cakes and gypsum. It is supporting urban cleanliness, while reducing the stress on landfill sites. Over the last decade, Coromandel has marketed more than a million ton of organic fertiliser across India and has effectively convert Organic Waste into Farm Prosperity.



Converting bio-mass waste into bio fertiliser

The farming sector in India generates a large amount of agricultural waste, including crop residues. Owing to a paucity of sustainable management practices, many farmers burn agri waste which has the adverse impacts of excessive air pollution and respiratory ailments among residents living in the area as well as those more distantly located.

Together with Punjab Agricultural University and Aston University, Coromandel is developing technology to convert rice residue to biochar, a product which is akin to charcoal but rich in carbon. This not only contributes to improving soil health, it also supports carbon sequestration in the ground, which is an important step in mitigating the adverse impacts of climate change.



Figure 35: Biochar Pellets

Coromandel has been demonstrating the value of excess biomass to the farmers and initial results have been quite promising. Field trials are also taking place on various crops – rice, wheat, maize, potato and cotton. The commercial benefits of the technology will be huge for the farming community and will create a circular economy and a positive environmental impact.

Sustaining Biodiversity

Coromandel recognizes the importance of preserving and supporting local ecosystems. As a responsible Corporate interacting closely with the biodiversity and involved in agriculture sector, the company takes concerted efforts to sustain biodiversity in the vicinity of its operations.



Figure 36: Shantiniketan, Ankleshwar

Its fertiliser plants are amongst the greenest in India, with ~ 47% of the area under green cover. The Birds Paradise at Kakinada is testimony to the Company's commitment to its environment. In yet another effort to protect environmental bio-diversity, its Ankleshwar plant has developed Shanti Niketan, a green belt covering an area of 4 acres.

Green Visakha Project is an initiative undertaken by the industries in Visakhapatnam under the monitoring of the Standing Committee on Science and Technology, Environment and Forests. It aims for plantation of 40 lakh saplings to reduce pollution and to increase the green cover in the state. The AP Pollution Control Board and Visakhapatnam Metropolitan Region Development Authority (VMRDA) are leading the implementation of the project supported by GVMC and the district administration.



Figure 38: Sapling plantation at Vizag

In the last 10 years, Coromandel has planted ~1.45 lakh saplings, thereby not only increasing the green cover but also helping in reducing the pollution levels in and around Visakhapatnam. The survival rate of more than 85% is ensured with provision of adequate infrastructure and resources prior to handing over to the respective landowners (Andhra university, SEZ Achuthapuram etc.). In its effort, Coromandel has been receiving technical support and guidance from VMRDA and District Forest Officer towards plantation and growing the trees in all the identified areas.



Figure 37: Neem plantation at Thygavalli

Company's biopesticide business has planted more than 1 lakh neem trees at Thygavalli, Pathamadai and Sivaganaga in Tamil Nadu. Plantation is being maintained using the organic farming method and is equipped with drip irrigation systems.



Figure 39: Pelicans around Kakinada Plant

Kakinada Birds' Paradise

Ever heard of factory premises transformed into a breathtakingly beautiful bird's haven? Welcome to Kakinada 'Birds Paradise'. What was once a land with a marshy water-logged area has today transformed into a serene, lush green belt proving to be an ideal habitat for countless diverse species of birds while greatly contributing to biodiversity and conservation of the ecosystem.

In collaboration with the EGREE foundation, the Coromandel's Kakinada plant surroundings have become the largest breeding site in the East Godavari district for a variety of bird species, including the Grey Heron and the Painted Storks. The flora and fauna here are diverse and unique to the eco-system and houses around 100 species of birds mainly Waterfowls, Waders including Flamingos, Raptors, Bustards, Coursers, Cranes, Sandgrouse, Larks, Shrikes, Wheatears, and Chats.

Its efforts at the Kakinada plant have been acknowledged by the United Nations Development Programme (UNDP) and Discovery channel.

<https://www.youtube.com/watch?v=Q0FDLaQUQ18>

<https://www.youtube.com/watch?v=wPd2S4lrFUI>