



**Innovate** green technologies  
**Integrate** nature, climate, water  
**Deliver** sustainability

India is facing one of its major challenges, a water crisis! As a result of two consecutive years of weak monsoons, 330 million people — a quarter of the country's population — are affected by severe drought. The situation this year has been particularly grim in western and southern states that received below average rainfall.

According to a Niti Aayog 2018 report, 21 major cities are racing to reach zero groundwater levels by 2020 which will affect water access to 100 million people. By 2030, the country's water demand will be twice the available supply, implying severe water scarcity.

We are hopeful that the union government's newly created Jal Shakti (water) ministry, which aims to provide drinking water to every household, will combat the water crisis in a holistic and integrated perspective.

At Praj, we understand the gravity of this challenge. We have been developing technologies for water conservation as a part of our business, and working towards making villages water-sufficient through our CSR initiatives.

Our commitment to sustainable development continues in all economic, environmental and social spheres.

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# Chairman's Message

The world today is facing economic, environmental and socio-political challenges, such as increasing demand for food, materials, water and energy, while trying to mitigate and adapt to climate change.

With respect to the water crisis in India, groundwater has been steadily depleting due to unchecked exploitation. Almost two-thirds of India's reservoirs are running below normal water levels. We need to step up our efforts to recharge groundwater, create public awareness on water conservation and provide potable water to all households.

This can happen by restoring and augmenting existing local water bodies, utilizing advanced technology to geotag water assets and improve farm water efficiency through cropping patterns. Water budgeting in villages, farmer education in water conservation and modifying subsidies in micro-irrigation may also help. Urban areas need to focus on prudent use of water, reusing waste water and rainwater harvesting.

Sustainability in its truest sense can occur when society, the environment and the economy become equal beneficiaries. The clarion call to Reduce, Reuse and Recycle must extend to our homes, workplaces and communities in order to mitigate the effects of climate change.

Nations all over the world are adopting renewable sources as a part of their energy mix, and Praj's 'sustainable de-carbonization solutions through circular bio economy' plays a very crucial role in minimizing carbon footprint.

FY18-19 has been an eventful year from the sustainability standpoint. We saw a landmark development like the progressive policy initiatives in the bio energy sector aimed at



accelerating ethanol production. The SATAT program for Compressed Biogas (CBG) as a sustainable alternative for automotive fuels was also launched. At Praj, we are expanding our bio energy solutions by commercially offering CBG and gaseous renewable fuel technology.

We take our responsibility of conserving natural resources and contributing to the betterment of society very seriously. As part of its corporate social responsibility, Praj Foundation is partnering with villagers in drought prone areas of Maharashtra to make villages water sufficient.

With our commitment to making the world a better place, it is my promise to you that Praj and sustainability are inseparable and will always remain so.

Yours truly,

A handwritten signature in blue ink, appearing to read 'Pramod Chaudhari', on a light-colored background.

**Pramod Chaudhari**  
Executive Chairman  
July 2019, Pune

## De-carbonization through Circular Bio Economy

In its endeavor to create a sustainable low carbon economy, Praj has been developing and deploying technology-led innovative solutions on the principle of circular bio economy.

Circular bio economy uses biological resources to produce renewable energy and products, which can further be recovered and regenerated at the end of their service life.

Circular bio economy augurs well with our focus on contributing to economy, environment and society by cutting dependence on energy import, promoting the use of environment-friendly fuel, and boosting the agricultural sector and farmer livelihood. Praj's solutions in the bio-industrial space have garnered global recognition. Praj Industries was ranked 8<sup>th</sup> in the 'The 50 Hottest Companies in the Advanced Bio economy

2019', as released by the industry's leading publication, Biofuels Digest, USA, in April 2019. Praj's improvement in ranking from #34 in 2018 is the demonstration of stakeholders' confidence in the company's technologies, global partnerships and growth in the Indian market.



*Mr. Jim Lane, Editor & Publisher, Biofuels Digest, USA congratulating Mr. Pramod Chaudhari*



## Technologies for Sustainable Solutions

Praj is in constant pursuit of eco-friendly solutions that consume lesser resources like water, reduce emission of greenhouse gases and improve profitability for our customers. Praj Matrix, our R&D Center, is the innovation engine of the organization engaged in research of industrial biotechnology. It lays special focus on biofuels, renewable chemicals and next gen molecules with varied applications.

During the year, Praj filed 11 international patents for various technologies and processes. So far, the company has 27 patents to its credit.

In January 2019, the ground-breaking ceremony of an integrated compressed biogas (CBG) demo plant based on proprietary microbial treatment process was done at the hands of Dr. Anil Kakodkar, Chairman- High Level Committee and Chairman- Scientific Advisory Committee on Hydrocarbons of Ministry of Petroleum and Natural Gas.

This demo plant will be first of its kind integrated plant in the country. The flexible and highly instrumented plant will test, improve and optimize production of CBG from different feedstock, such as biomass, press mud, a variety of agri waste, paper mill pith, etc.



***Dr. Anil Kakodkar at the ground breaking ceremony of the CBG demo plant (2G demo plant in background)***

In FY 2018-19, Praj Matrix licensed technology to produce hyaluronic acid in the fermentation process made from only non-animal sourced ingredients. New microbial technologies for efficient stabilization of press mud and for conversion of biomass to biogas are ready to be launched. Oleochemical technologies to produce value-added products like natural Vit. E (tocopherol), phytosterol and rice bran wax are being offered to customers to generate additional revenue from vegetable oil refineries.

Praj has joined hands with Gevo, Inc., USA, to develop and commercialize technology to produce isobutanol using sugary-based feedstock. Isobutanol, a high energy platform for bio-jet fuels, is an emerging opportunity for the aviation industry. This is an important

element that takes us closer to meet our vision of an integrated bio-refinery.

We also introduced a process integrated incinerator technology called Profiit for molasses-based ethanol plants. This zero liquid discharge solution integrates process know-how with boiler technology to significantly improve the plants' operational efficiency. Its low operational expenditure also impacts the bottom line and profitability. In our 2G commercial plants, we have reduced water footprint through complete heat integration, optimizing process, steam and cooling water, as well as recycling treated water. In addition to the above, 2G commercial plants are designed for ZLD i.e all effluent generated will be treated and recycled back to process and utility. Solid waste i.e. lignin rich

wet cake and concentrated syrup burned in the boiler to generate steam is utilized in the process.

We have also introduced the option of integrating Mechanical Vapor Compression (MVR) to reduce the water footprint even further. This will be offered on a case to case basis.

Praj introduced air cooled heat exchangers in distillery plants that have reduced the consumption of water in the cooling process by up to 80%.

Due to increased plant capacity and overall automation levels, the beer industry has seen reduction in specific consumption of fresh process water. Praj, in collaboration with brewery customers, is working to further reduce water consumption by mapping all process operations, CIP regime and frequencies, etc. After analyzing the data, water consumption would further be reduced through process changes and automation. The audit of one plant has been completed and data from two others are being collected.



*Praj's 2<sup>nd</sup> generation demo plant at Shreenath Mhaskoba Sugar Factory*

## Recognition for Sustainability in Operations

As a leading player in the global biochemical processing industry, Praj accords utmost priority to make its operations greener, safer and sustainable. The company has won multiple awards for its technology, practices and leadership towards sustainability in operations.

### 1. R&D and Innovation

Praj Industries was awarded the prestigious Chemtech CEW Leadership and Excellence Award 2019 for outstanding achievement in R&D Excellence-2018. The award recognizes Praj's work in the areas of bioenergy and innovative engineering solutions towards a sustainable bio economy.



### 2. Manufacturing

The CPES BU and Manufacturing team were honored with Pune Best in Class Manufacturing Leadership Award 2018 in the Heavy Equipment category for manufacturing heavy process equipment for various renowned customers. Our manufacturing facilities focus on minimizing waste and negative impact on the environment while conserving energy and natural resources.



### 3. International Business

Praj's Kandla unit won the Highest Export Award under the Engineering & Metallurgical products category for 2017-18. Ministry of Commerce and Industry, Government of India, KASEZ Gandhidham, had organized the event on its 55<sup>th</sup> Foundation Day. Praj has successfully exported some of the most critical and large sized equipment to customers across the globe.





#### 4. Supply Chain Management

The Supply Chain Management team won the Overall Excellence in Procurement & Sourcing award in the 12<sup>th</sup> Express Logistics & Supply Chain Conclave. Apart from adopting different cost reduction techniques and innovative strategies for international sourcing, Praj promotes green supply chain by ensuring that suppliers follow environment-friendly and safe practices. Praj encourages its vendors to get certified by British Standards Institution (BSI) under Praj Green Protocol for Vendors (PGPV).



#### 5. Digitalization

Praj's Information Technology Team won IT Security-Now 2018 award in Best Batsman of the Year category. Praj bagged this award for best project implementation methodology, fastest implementation period of 45 days and quick adoption of security technologies.



#### 6. Corporate Social Responsibility

Our CSR efforts in sustainability were recognized by CSR World Congress with the Pune Corporate Social Responsibility Leadership Award 2018 in the Best Corporate Social Responsibility Practices category.





## Health and Safety at Work

Praj has a well-documented Environment, Occupational Health and Safety (EOHS) policy in place.

The process to receive Corporate Certification ISO 14001:2015 and ISO 45001 for Environmental Safety and Occupational Health & Safety Management System is currently underway. This certification helps the organization mitigate risk and improve

business performance through a safer working environment and a healthier workforce.

This year, we introduced an Online Safety Observation Reporting System to ensure safe workplace environment. Employees can report their safety observations from any location. Over 1000 observations have been reported and addressed in the past year.



*Committing to safety: Safety week celebration at manufacturing unit*



*Safety first: Fire drill at 2G demo plant*

## Commitment to Building a Sustainable Community

*"While Praj Foundation continues to focus its efforts on water conservation, education and preventive healthcare, it encourages more people to be part of the movement towards sustainability and betterment. We believe that whether you are an employee, student, customer, vendor or shareholder, you can make a difference by contributing to social causes you believe in. We need to give back to the community that has given us so much in return."*

**Mrs. Parimal Chaudhari,**  
Director, Praj Industries Ltd. and Managing Trustee, Praj Foundation



Praj Foundation, the CSR arm of the company, is aligned to the company's vision to make the world a better place through its efforts on conservation of the environment, education with emphasis on skill development and preventive healthcare for women.

### Environment

'A true conservationist is a man who knows that the world is not given by his father but borrowed from his children.' Our CSR efforts in the area of conservation of resources are focused on water, the scarcity of which affects society on various fronts – agriculture, industry and day to day living.

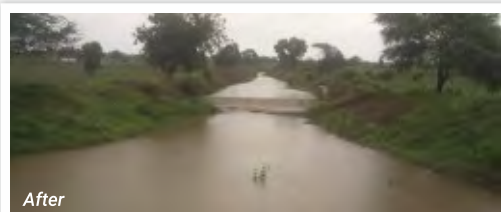
Praj's 'Sustainable Water Resources Development' addresses many of the 'Sustainable Development Goals' (SDGs). This initiative has strengthened the participation of local communities in improving water management which has led to the availability of

safe and affordable drinking water and improved access to agricultural water. This has further contributed to improved food security, economic growth and reduction of poverty.

Praj's efforts in water conservation involve helping locals take ownership of the projects through monetary contribution, planning, implementation and maintenance. The projects include recharging groundwater, desilting streams and conserving water through micro-irrigation practices, thus making the whole endeavor impactful and sustainable.

Some of the positive outcomes of the projects are as follows:

1. People's active participation through monitoring and resolution of disputes.
2. Improved groundwater table and rainwater holding capacity after repairing check dams, widening and deepening streams.
3. Rejuvenation of wells leading to year-round access to safe drinking water and zero dependence on water tankers.
4. Protective irrigation to agricultural crops and micro-irrigation systems like drip and sprinklers to conserve water.
5. Employment to landless laborers on agricultural fields which has reduced their migration outside their village in search of work.
6. Increased productivity of kharif and rabi crops. Increase in area, diversity and marketable surplus of horticultural crops.
7. Women empowerment through participation in more meaningful economic and healthcare activities.
8. Improved livestock productivity in the form of increase in population and better milk yield.



**Excavated stream before and after the monsoon at Bhutetakali, Dist. Ahmednagar**

**Check dam across the stream before and after monsoon at Deo Pimpalgaon, Dist. Jalna.**

Items	2018-19	Cumulative (since 2015)
Number of sustainable water resources development projects in Ahmednagar, Jalna and Pune	8	30
Silt removed from river beds (m3)	2.55 lakhs	16.85 lakhs
Surface as well as groundwater stored (million liters)	1,150	8,400
Rejuvenation of open wells	120	880
Rejuvenation of bore wells	90	600
Area benefited by protective irrigation	2,100 acres	9,500 acres

In Jalna cluster during the last three years:

- Productivity of crops like cotton, corn, jowar and wheat increased by 50 to 80%
- Area under horticultural crops like pomegranate, sweet lime, grapes increased by 30%



**Percolation tank prepared at Hiwara, Jalna**



**Percolation tank at Hiwara after restoration**



## Education

Praj Foundation, in partnership with Vigyan Ashram, has been implementing the Introduction to Basic Technology (IBT) program in 13 model schools in eight rural districts in Western Maharashtra. This project is in line with the Government of India's Skill India Mission that targets skill enhancement as an important tool for youth development.

The IBT program develops basic skills among students of secondary schools in villages through 'learning by doing' and helps them explore career prospects in the industrial sector. The IBT program focuses on Engineering, Energy & Environment, Agriculture & Animal Husbandry, Food Processing and Health.

Students provide various community services

based on the requirement by the local villagers. The revenue they generate is used to upgrade their labs and tools. More than 6,000 students have benefitted from this program.

This year, instructors underwent a knowledge upgrade program through training on various tools, projects and teaching methodologies.

Adarsha Prashala School, at Nagaj in Sangli district, Maharashtra, is part of the IBT program. The students designed a multi-purpose agri-power tiller that received the Best IBT Project award by Vigyan Ashram. Apart from preparing the ground for new saplings, the power tillers can be used for weeding, fertilizing, applying pesticide and creating trenches to keep critters away from damaging crops.



*Instructors trained on better teaching methods*



*Students working on projects in the IBT model school*



*Solar operated multi-purpose spray pump made by students at Shree Devi Shanta Durga High school, Malvan*



*Winning project on multi-purpose agri-power tiller*



## Preventive Healthcare

Praj Foundation believes that a healthy woman is the first step towards empowerment.

We have encouraged women in selected talukas to grow their own kitchen/nutrition garden through low cost and easily available techniques, like using native seeds, protecting plants using old saris and utilizing vertical space to grow climbers. This has increased consumption of vegetables in their diet, thereby improving their health, which has apparently brought drastic improvement in their hemoglobin (Hb) count. Over 70% women have established kitchen gardens, which have at least seven varieties of vegetables, fruits and medicinal plants. They use the traditional barter system when they grow surplus, ensuring that every family has a variety of produce.

Around 20% women have generated surplus income through vegetable sale, poultry and floriculture. Women with additional land are encouraged to go commercial by growing

vegetables, cultivate marigold and jasmine in open fields and raise backyard poultry. After satisfying their daily requirement, excess vegetables were sold in the local market generating an annual income of around INR 10,000/- each.

In Velhe and Wada talukas of Maharashtra, we have been organizing focused group discussions followed by preventive healthcare sessions for over 1,200 women in 22 villages (12 villages in Velhe and 10 in Wada). Periodic health checkups have proven that women have overcome anemia and nutritional deficiencies through simple and regular remedial changes. Over 800 women participated in 'Arogya Samwad', where they shared information and experiences related to healthy practices and encouraged other women to adopt similar healthy lifestyles.

Women have gained confidence, respect in the family and have become empowered in the real sense.



*An Arogya Samwad women's discussion at Wada*



*Vegetables and fruits in nutrition gardens*



*Backyard poultry to generate additional income*



*Cultivating marigold flowers in open fields*

## Personal Social Responsibility

Praj employees with their families make time to support causes they believe in by actively participating in Personal Social Responsibility (PSR) initiatives. Prajites participated in over 20 PSR events during the year.

The Vasundhara Swachata Abhiyan (VSA) is a volunteer-led group dedicated to the conservation of native species of trees and hills in Pune city. Praj employees with their families frequently participate in drives at Kasurdi hill, near Pune of which more than 75% saplings have survived.

Rajgad Vidyalay, a school at the foothills of Rajgad fort in the outskirts of Pune, is run by a private institution with limited funds. Praj employees took it upon themselves to renovate five classrooms by way of painting internal and external walls. The teachers and students were highly appreciative about the initiative.

The Ganesh Chaturthi festival is a major social event in Maharashtra. Praj employees are actively involved in creating awareness about installing eco-friendly Ganesha idols made of clay and at the end of the festival, immersing them responsibly in tanks so they don't pollute rivers. Employees also volunteered to collect flowers and other articles of offering for composting and therefore, sustainable disposal.

Many of our employees have gone beyond the call of duty, their daily routine and comfort, to contribute to the community.

- Every Monday and Thursday, **Kiran Jamkhindikar** collects excess food from hotels, canteens and marriage halls to distribute among beggars, footpath dwellers and labor camps through the Robin Hood Army.
- **Niranjan Bhide** is another employee who through a newspaper drive every month, raises funds which he donates to Maitri, an NGO working to reduce malnutrition among children in Melghat, Maharashtra.
- Through the self-help group, Bavdhan Citizen Movement, Prajite **Jitendra Akade** brings road, light, water and stray animal issues to the notice of govt. authorities and helps resolve them.

We appreciate the dedication and selflessness of these employees and encourage more to contribute their time and resources for the betterment of society.



*Brightening the walls of Rajgad Vidyalaya*



*Collecting of offerings after the Ganesh Chaturthi celebration*



*River cleaning drive*



*Planting saplings on hillsides*

## Highlights FY 2018-19

Revenue	Rs. Mn.	1,1411
PBT	Rs. Mn.	879
Consistent dividend paying company for		22 years

Use of renewable energy at various work premises	kWh	2,59,098
Use of recycled water at various work premises	m <sup>3</sup>	3,520
Potential to save CO <sub>2</sub> emission through generation of ethanol capacity	MT	~3.5 mn

Total number of employees*	number	1,160
Number of women employees*	number	103
Number of training days	number	1,210
Number of patents filed	number	27
Number of patents granted	number	10

\*for Praj group

## Praj's Business Offerings







*Image courtesy: SPMESM, Aurangabad*

*Sustainable water resources development project at Matarewadi, District Jalna, Maharashtra.*



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