Sustainability Impact of JAIN’s Hi-Tech Innovations in Agri-Food Sector

Dr. P. Soman and Atin Kumar Tyagi
ICID, WG-CLIMATE Meeting
Bali, Indonesia

Corporate philosophy

<table>
<thead>
<tr>
<th>Mission</th>
<th>Leave this world better than you found it</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision</td>
<td>Establish leadership in whatever we do at home &amp; abroad</td>
</tr>
<tr>
<td>Credo</td>
<td>Serve &amp; strive through strain &amp; stress; Do our noblest, that’s success</td>
</tr>
<tr>
<td>Goal</td>
<td>Achieve continued growth through sustained innovation for total customer satisfaction and fair return to all other stakeholders. Meet this objective by producing quality products at optimum cost and marketing them at reasonable prices</td>
</tr>
<tr>
<td>Guiding principle</td>
<td>Toil and sweat to manage our resources (men, material and money) in an integrated, efficient, economic &amp; sustained manner. Earn profit, keeping in view commitment to society and environment</td>
</tr>
<tr>
<td>Quality perspective</td>
<td>Make quality a way of life</td>
</tr>
<tr>
<td>Work culture</td>
<td>Experience: ‘Work is life, life is work’</td>
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</tbody>
</table>

Company manifesto “More crop, per drop” now a national vision
Jain Irrigation – A snapshot

1963
Started our trading business in agricultural inputs and equipment

Company has 33 manufacturing plants

USD 1.2 Bn+
Aggregate revenue as on 31st March, 2018

5.2mn
Farmer lives have been touched

12,000 Associates globally

Started our trading business in agricultural inputs and equipment

1986
Incorporated in

USD 759mn
Market capitalisation as on May 25, 2018

USD 1.2 Bn+
Aggregate revenue as on 31st March, 2018

5.2mn
Farmer lives have been touched

12,000 Associates globally

In tissue culture production of banana and pomegranate globally

Manufacturer of plastic pipes in India

Micro-irrigation company in India

#1

#2

#3

USD 215mn (22%)¹
PVC Pipes and fittings, Polyethylene Pipes, Turnkey Projects

USD 232mn (24%)¹
Fruit pulps, concentrates, vegetable dehydrations, spice processing, etc.

USD 438mn (45%)¹
Drip & Sprinkler Systems, Precision Farming Advisory

USD 86mn (9%)¹
Renewable Energy Tissue Culture, PVC Sheets

¹ Audited consolidated Sales amount and % of total sales for Fiscal 2015-16
A Glocal Brand

GLOBAL OPERATIONS

- Plant: 19
- Warehouses: 26
- Distributors: 2700+

A Business Model that Generates Value and Shares it across the Circular Value Chain
Completing the Agricultural Value Chain

Quality Achievements (Certifications - Plastic, Green Energy, Agri & Food Park)

ISO 9001:2008 (Quality Management System)
- MIS (Drip & Sprinkler Irrigation Sys.) Division
- Plastic Pipe & Fittings Division
- Plastic Sheet Division
- Precision Farming Systems Division
- Tissue Culture Division

ISO : 22000:2005 (Food Safety Management System)
- Onion & Vegetable Dehydration Division
- Fruit Processing Division

ISO 14001:2004 (Environment Management System)
- MIS (Drip & Sprinkler Irrigation Sys.) Division
- Plastic Pipe & Fittings Division
- Plastic Sheet Division
- Precision Farming Systems Division

ISO 14001:2004 (Environment Management System)
- Onion & Vegetable Dehydration Division
- Fruit Processing Division

OHSAS 18001:2007 (Occupational Health & Safety Management System)
- MIS (Drip & Sprinkler Irrigation Sys.) Division
- Plastic Pipe & Fittings Division
- Plastic Sheet Division
- Precision Farming Systems Division

Five Star Rated Dripline
ISTEA (Cemagref - France) has rated ‘Jain Turbo Excel’ & ‘Jain Turbine Super’ with five stars for excellence in performance.
- M3 Division

GMA SAFE
Grocery Manufacturers Association Supplier Assessments for Food Excellence
- Onion & Vegetable Dehydration Division

GLOBALGAP
- Agriculture Division

BRC (British Retail Consortium)
Global Food standard Certified Company
- Onion & Vegetable Dehydration Division
- Fruit Processing Division

JAIN GAP
Jain Irrigation Systems Ltd. Certification Systems for Indian Farmers

SGF (SURE – GLOBAL – FAIR)
- Fruit Processing Division

NCS-TCP (National Certification System for Tissue Culture Raised Plants)
- Tissue Culture Production Facility

HALAL (Majlis Ulama Indonesia UPOM MUI)
Onion & Vegetable Dehydration Division
Fruit Processing Division

NABL (National Accreditation Board for Testing and Calibration Laboratories)
- Jain R&D
Innovation - Micro- Irrigation Solutions

Water in Agriculture

‘In India more than 80% of available fresh water is used in agriculture with 30-40% water use efficiency. Competing demand from other sectors will not allow this luxury to continue.’ This is creating enormous pressure on ecosystems and biodiversity (e.g. habitat loss, increased risk/threat, human-animal conflict).

In the recent decades India has shifted its status from a ‘water adequate’ to ‘water stressed’ country given that per capita availability of water has reduced from 1816 cubic meters to 1545 cubic meters from the period of 2001 to 2011.
India also tops the list of largest ground water abstracting countries having **30 million abstraction wells withdrawing 251 km$^3$ ground water per year**.

Out of total sown area **60% is irrigated** with ground water which in turn contributes to **40% of the food production**.

**Irrigation alone consumes up to 20% of India's total electricity.**

roughly **4% of India’s total carbon emissions** are due to groundwater abstraction

**Drop of 1m in groundwater table** after water withdrawal will increase India’s CO$_2$ emission by 1%.
DRIP- FERTIGATION TECHNOLOGY

• ‘Micro irrigation, combined with fertigation and skilled crop management can give 50% -300% more crop yields while using 30-70% less water.’

• Efficient resource use - water, fertilizer, pesticide, and power.

• This would be the Crux for future green revolution and achieving food security thru water and energy security.

Within Agriculture

GHG Emissions from Agriculture- in million tCO$_2$eq

Source: MoEF-INCCA
Micro Irrigation Impact on GHG Mitigation

Impact estimation till 2019 March

Estimated Energy Savings (GWh)
- Drip Irrigation: 2170.32
- Sprinkler: 11896.20
- Total: 14066.51

Estimated CO2 Emissions Reduction (million tons CO2 equivalent)
- Drip Irrigation: 10.71
- Sprinkler: 1.95
- Total: 12.66

MIS Impact on Water Savings

Impact estimation till 2019 March

Estimated Water Savings (BCM)
- Drip Irrigation: 14
- Sprinkler: 15
- Total: 64.57
Innovation - Rice with Drip Irrigation

PRODUCTIVITY UNDER DRIP FERTIGATION

UDUMALPET, TAMIL NADU (2008)

<table>
<thead>
<tr>
<th>Method</th>
<th>Yield (t/ac)</th>
<th>Water use (million liter/ac)</th>
<th>Power Use (units/ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flood</td>
<td>3.1</td>
<td>9.5</td>
<td>467</td>
</tr>
<tr>
<td>Drip</td>
<td>3.8</td>
<td>3.2</td>
<td>226</td>
</tr>
<tr>
<td>Difference%</td>
<td><strong>22.5</strong></td>
<td><strong>66.3</strong></td>
<td>52</td>
</tr>
</tbody>
</table>
Soil Structure is maintained

Maintained the aerobic Condition in the Soil
Rice with Drip Contd...

➢ Once adopted the technology would benefit several million farmers globally.
➢ Rice yield increased up to 40 %
➢ Water saved up to 70%
➢ Energy conservation up to 60 %
➢ Increased efficiency of water and fertiliser usage to up to 80%
➢ Reduced skin, respiratory and mosquito related diseases
➢ No or low methane emission
➢ Reduced amount of nitrate leaching into water bodies
➢ Soil health protection leading to consistent crop production

Innovation- ‘Resource to Root’ based Integrated Irrigation Solutions
Innovation- 24*7 Drinking Water Supply
Water use efficiency in urban sector using 24x7 water supply distribution

Number of problems in current water supply systems in India:

- Intermittent, zone-wise operation of valves
- Irregular water supply with leakages
- Low supply pressure requires individual pumping
- Possibility of contamination during no supply time
- Free of cost/ per yearly fixed cost leading to public wastage of water

Solution:
- HDPE Pipes (High Density Poly Ethylene)

Benefits of HDPE Pipes:

- Coil form thereby reducing number of joints & possibility of contamination
- 100 years life – reduced maintenance
- Corrosion free water
- Easy for taking branch connection

Why 24x7 water supply system:

- No leakages, no contamination
- Reduced consumption, negligible wastage
- Assured water supply to all levels of society
- Generation of regular revenue makes corporation to maintain system effectively

Results:
- JISL supplied, installed and commissioned 24x7 water supply in four cities in Karnataka since last four years

Hi-tech integrated solutions for city utilities

MIS
Piping
Agro
Others

Smart City: Objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of ‘Smart’ Solutions

AMRUT: Atal Mission for Rejuvenation and Urban Transformation
**KANTAI WATERSHED**

1. Represents two major restoration and conservation activities - one at Jain Hills (1100 acres) and the PPP model based check dam at Girna River.
2. Comprises of 16 villages.
3. Draining approx. 21,000 acre area.
4. Jain micro watershed has 1400 acre.
5. Jain Takarkheda and Plastic park includes 600 acre area.
6. Population of the all the villages in around 1,05,400.
7. Nearly 4500 people work in Jain Irrigation during peak season at all the facilities.
8. More than 50% area is irrigated.
9. More than 65% peoples use drip irrigation for irrigating the crop.
CONSERVING WATER, LAND AND BIODIVERSITY

Jain Hills micro watershed and Jain Sagar
Bird Roosting Areas in Jain Micro Watershed

1) Area around Jain Sagar (Bhaucha Dhakka)
2) Kantai Chairman's Office
3) Ecotone Between Govt. Forest & Jains'
4) Near Jain Dhadi Area
5) Reserve Forest Area
6) Jain Hills Top Area, Mango Plantation
7) Around Z.P. Dam Area
8) Behind Gandhi Teerth
9) Behind Jain Valley Office Area
10) Jain Mahasagar

<table>
<thead>
<tr>
<th>Flora and Fauna</th>
<th>Types</th>
<th>Total No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flora</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trees</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Herbs &amp; Shrubs</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Climbers &amp; Grasses</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Fauna</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>Butterflies</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Insects &amp; Reptiles</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Mammals</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>184</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tree Type</th>
<th>Total No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(no. of plant at Jain Hills.)</td>
<td></td>
</tr>
<tr>
<td>Fruit crops</td>
<td>54,074</td>
</tr>
<tr>
<td>Ornamental</td>
<td>10,223</td>
</tr>
<tr>
<td>Agro-forestry</td>
<td>45,416</td>
</tr>
<tr>
<td>Medicinal</td>
<td>564</td>
</tr>
<tr>
<td>Flower plants</td>
<td>4,253</td>
</tr>
<tr>
<td>Natural forest species</td>
<td>1,691</td>
</tr>
<tr>
<td>Total</td>
<td>1,16,221</td>
</tr>
</tbody>
</table>
Kantai Watershed- A unique PPP Model

Innovation- Solar Energy
### Renewable Energy- Solar

**Developing Solar rooftop market**

- Favourable economics – Solar power is cheaper than commercial and industrial tariffs in many states.
- Green quotient – Many entities are leveraging solar installations to showcase CSR initiative.
- Regulatory push – Captive and Open Access consumers may need to adopt rooftops to meet their RPO targets.

**Canal top emerging as a large opportunity**

- India has 4,000kms of canal network.
- Huge potential to generate power through canal top projects.
- Canal top offers a substantial opportunity given scarcity of land.
- Government has a 100MW target of canal top projects in near future.

**Solar appliances**

- Solar Water Heater (SWH) - 60-80 degrees Celsius temperature attainable.
- Solar Lighting Solutions - Solar lanterns, Solar home systems. Solar street lights could be useful both in rural and urban areas – help reduce burden on conventional fuels.

**Solar projects**

- Utility scale projects (5.5MW installed in Jalgaon).
- Canal top projects.
- Lift Irrigation.

### Impact of Solar Pumps

<table>
<thead>
<tr>
<th>No. of Pumps Installed</th>
<th>State</th>
<th>GHG emissions reduced</th>
</tr>
</thead>
<tbody>
<tr>
<td>1948</td>
<td>Rajasthan</td>
<td>Generated 1,820,033 MWh green electricity till date which is equivalent to mitigation of more than 1,729,031 tones CO₂ emissions reduction.</td>
</tr>
<tr>
<td>2802</td>
<td>Maharashtra</td>
<td>Generated 366,548 MWh green electricity till date which is equivalent to mitigation of more than 348,220 tones CO₂ emissions reduction.</td>
</tr>
</tbody>
</table>
Renewable Energy- Biogas- Linkage to Contract Farming

➢ State-of-the-art and **first-of-its-kind** 1.67 MW fruit and agro waste based power generation, refrigeration and organic compost production.

➢ **Unique two stage bio-methanation process-** Hydrolysis and fermentation occur in separate tanks

➢ **Strategically placed heating based controlled temperature system that keeps temperature at optimum level (35-40 °C)**

➢ **Designed for multiple substrates (e.g. mango peel, banana peel, onion, tomato waste, agro waste etc.)**
The soil conditioners so produce is applied in the contract growers’ farm to maintain fertility, soil texture & soil biodiversity. Thus, apart from waste disposal, electricity generation and waste heat recovery the project plays a significant role in completing soil to soil sustainable cycles for more than 4000 onion growing farmers (with approximately 2600 hectare area under Jain’s contract farming and JAIN GAP system).
Research and Development

• Three Research and Development farms, Jalgaon (Central India), Coimbatore, (Southern India) and Alwar (Northern India) representing the major climatic and soil types of the Country.

• State of the art Modern Bio-tech and Analytical Laboratory which is a DST, GOICertified in-house R&D centre.

• The Laboratory is also accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL) in accordance with IS/ISO/IEC-17025:2005

• A high tech Agriculture training centre at Jalgaon.
Creating Awareness

Future Agriculture Leaders of India (FALI)

Creating Future Champions in Agriculture

- Jain Irrigation along with Godrej, Mahindra, Star Agri, ITC, UPL, Bayer and Action Platform have come together to create FALI.

- FALI takes initiatives to introduce agriculture to children in school at the primary level itself.

- Focus on agri technology, modern sustainable agriculture, and agri business through training, learning and contests
The prime purpose of Gorai Krishi Tantra Niketan is fostering formal education in the field of agriculture. The Centre conducts training programmes in the fields of agronomy, irrigation, pre and post-harvest technologies and crop rotation.

The world’s leading business magazine has released the first ever–Change the World
A listing of 51 companies that have addressed the world’s biggest social and environmental problems

Jain Irrigation, the only Company from India, is ranked No.7

“Jain has built its business by improving the livelihoods of 5 million small farmers in India. Based in the country’s western, Maharashtra state, Jain began selling micro-irrigation systems in 1986, when it recognized that the technology, commonly used in industrial agriculture, could be adapted for local growers, whose tiny land holdings were traditionally watered by rain or blunt flooding techniques. As Jain’s “More crop per drop” slogan promised, yields increased dramatically–50% to 300%, depending on the plant–as did farmers’ incomes. And Jain continues to boost in other ways as well: It has introduced more-viable crop varieties and trained farmers on more productive growing techniques, such as high-density planting for mangoes. The Company also branched into solar water pumps (electricity is often scarce on the farm), financing, and food processing—for the likes of Coca Cola and Unilever–so that there is a ready market for these farmers’ wares. The Company, the world’s second largest seller of drip irrigation systems, now does business in 116 countries.”

- Fortune.com, August 20, 2015

Global recognition – doing well by doing good
Only company from India in the Fortune “Change The World” List 2015

Doing well by doing good

In first ever Fortune ‘Change the World’ list of 2015, Jain Irrigation ranks 7th among 51 companies of the world
Proud to be the only company from India
Thank You